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PREP & APPLICATION MANUAL

PREFACE

This manual has been prepared for use by sales personnel as well as applicators.

The salesman has a responsibility to the company and the work crews to accurately estimate the labor time, amount of foam, and any special materials and tools needed to complete each job.

In order to meet this responsibility, the salesman must be as knowledgeable as the work crews about house construction techniques, siding materials, and the possible problems involved in each. Otherwise, a job cost-estimated as one or two day work may turn out to take a week. No company can afford too many shortfall estimates – nor to employ a salesman who makes them.

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PART A – WOOD FRAME CONSTRUCTION

PLATFORM FRAMING

- Construction form most common today.
- Each level constructed of 8 ft. long studs, usually 16” on center, set on plates and sub floors that are used as firestops so that wall cavities run only the height of each floor.

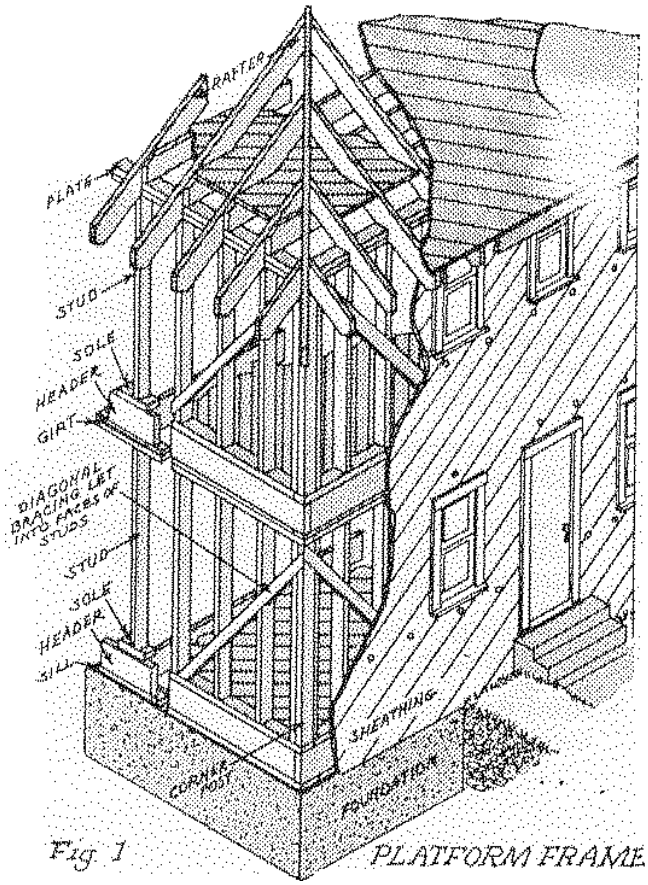


Fig. 1 PLATFORM FRAME

- If windows are 2-1/2' or higher above floor, open house immediately below windows for both first and second floors.

  Open as necessary for access to cavities above windows and doors.

- If windows are less than 2-1/2” above floor, open wall cavities half way up on each floor.

  Open as necessary for access to cavities above and below windows and above doors.

- See Part B – Siding Types for specific opening techniques.

- After opening probe all cavities to be sure that there are no obstructions.

II. BALLOON FRAMING

1. Two-story House

- Common to older houses; developed in Mid-West in middle 19th century. Predecessor to platform framing.
- 16 ft. long studs extending from sill to eaves.
- Wall cavities run full height of wall unless obstructed by fire or draft stops at floor joists. This possibility must be checked by probing.

- **Wall** cavities may be open into cellar. Possibility can be checked by probing or visually from cellar if sills are exposed.

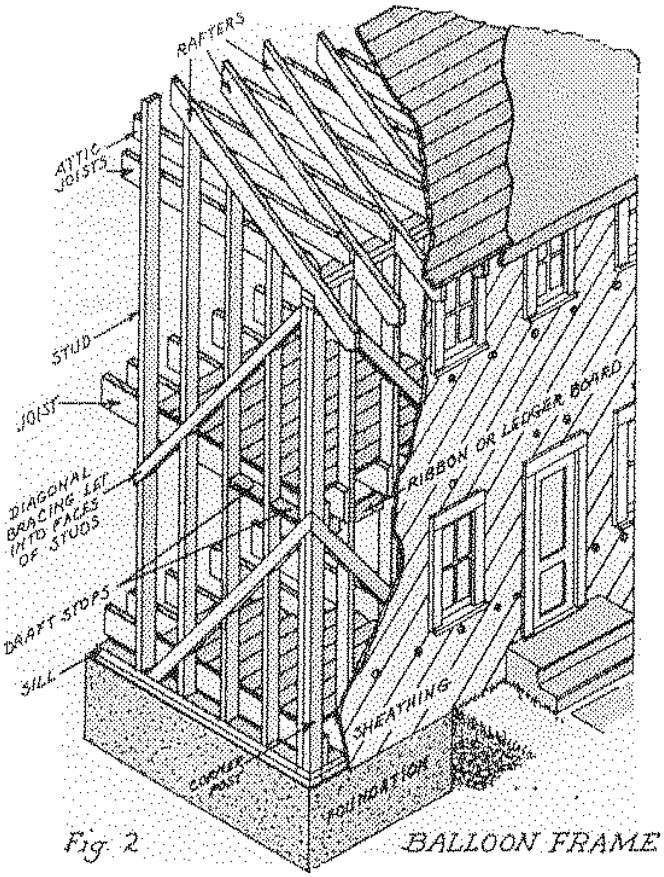


Fig. 2 BALLOON FRAME

- Access to wall cavities may be possible from attic particularly at gable end walls.

- If wall cavities are open from attic, foam second floor from there.

  Open as necessary for access to cavities below second floor windows.

- Foam first floor from outside. It windows are 2½' or more above floor, open immediately below windows. If windows are less than 2½' above floor, open half way up wall.

  Open as necessary for access to cavities above and/or below windows, etc.

- If second floor cavities not accessible from attic, foam from outside as in platform frame.

- See Part B — Siding Types for specific opening techniques.

- After opening, probe all cavities to be sure that there are no obstructions.

2. One-story House

- Modern Ranch. etc.

- Usually balloon frame In which case gable end wall cavities may open into space over ceiling.

- Open as for first floor, balloon frame above.

- See Part B — Siding Types for specific opening techniques.

- After opening, probe all cavities to be sure there are no obstructions.

III. BRACED FRAMING

- Oldest method of frame construction in this country; brought over by early settlers.
- Is a modification of post and beam construction.
- Evidence of heavy corner posts can usually be found on the interior by boxed in corners and by the main central support wall.
- Evidence of bracing can usually be found if first floor joists and sills are exposed in cellar.
- Bracing is 2 x 4's on diagonal with the broad side completely obstructing many or even all of the wall cavities.

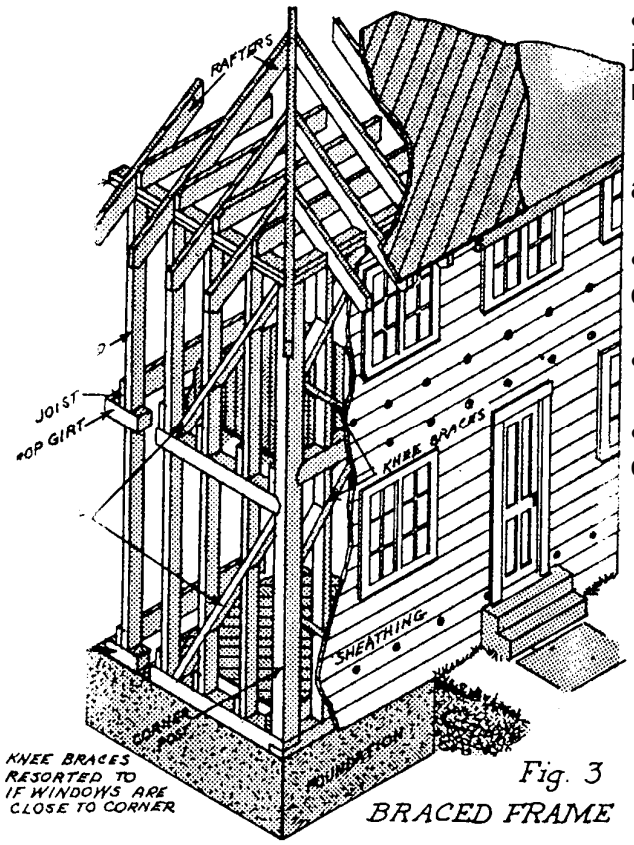


Fig. 3
BRACED FRAME

- Open each story just above floor level AND just enough below ceiling level to be sure of missing drop girt.

  Also open half way up wall between windows and corners where knee braces are likely.

- See Part B — Siding Types for specific opening techniques.
- Be ready to do a lot of probing.
- Salesman should give himself a price cushion on this job.

ALTERNATE METHOD

- Open house immediately below windows (windows will usually be well up from floor level.)

  Probe EVERY cavity opened to determine where obstructions occur and open each 'blind' cavity individually.

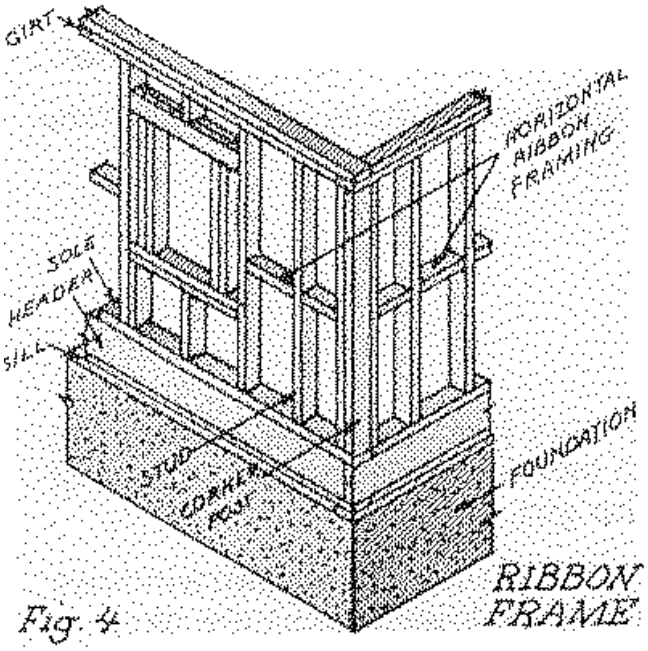
  Also open as necessary over windows and doors

IV. RIBBON FRAMING

- Horizontal nailers obstructing cavities.
- This style enjoyed popularity in the 1920's and is usually found on an otherwise balloon frame building.
- Still common in some areas of the country, particularly the South.

- Often found if house has vertical board siding.

- Interior wainscoting suggests the possibility of ribbon framing



- Open house over nailer. Locate nailer by use of stud finder, or correlation with top of wainscot, etc.

  Open as necessary above doors and above and/or below windows.

  After opening probe to be sure there aren't additional rows of nailers above or below the first.

- If siding is vertical open over every other stud.
- See Part B — Siding Types for specific opening techniques.

V. POST AND BEAM CONSTRUCTION

- May be found in very old houses.

- Conventional framing may be used between posts except that studs may be anywhere from 8" to 36" apart — in the same building. Verticals may have been determined by eye.

- Identification of heavy corner posts by boxed in interior corners as with braced framing above. Also main support wall.

- Also possibility of braced or X-framing.

- Salesman should give himself a price cushion on this also.

POST AND BEAM COMMERCIAL BUILDINGS

- Construction can be heavy wooden members as shown or can be steel posts and beams.

- Exterior surfacing often of corrugated metal siding and roofing and no interior surfacing.

- May have concrete slab floor rather than joist and board floor.

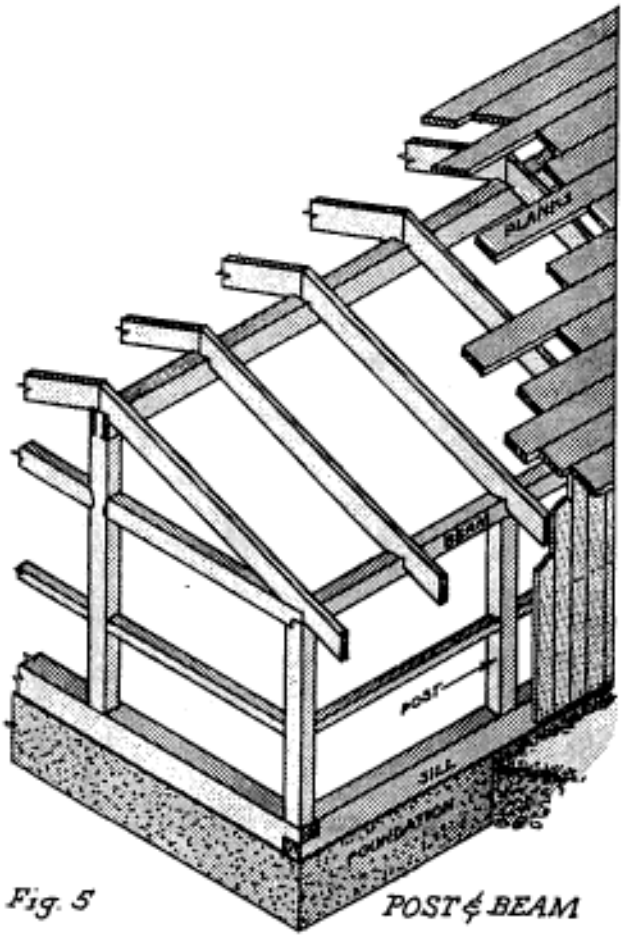


Fig. 5 POST & BEAM

RESIDENTIAL

- Determine form of framing used between posts and open accordingly.
- Locate each stud individually.
- After opening probe every cavity for possible obstructions.
- Make sure to open and foam all blind' cavities.
- See Part B – Siding Types for specific opening techniques.

WOOD OR STEEL COMMERCIAL

- Foam from inside.
- See Part G of this manual for specific technique.

NOTE:

1. When an old house has been added to over the years, each subsequent addition can be of a different construction method and require different prepping techniques.

2. Try to roughly determine the age of the house to help identify the construction method.

3. Try to determine whether or not it was professionally built. Non-professional construction may not conform to standard form in many respects. (See Post and Beam construction for examples.)

4. Become familiar with local fire laws and their history as a guide for when to expect the use of fire stops, but do not count on any conformity.

PART B – SIDING TYPES: OPENING AND CLOSING TECHNIQUES

I. CLAPBOARD SIDING

Method #1 – Removal

- Location of strips of siding to be removed depends on the framing method of the house. See Part A.

a) Corners:

1. If corner board has been used, or if corners are lapped or bevel fit, run utility knife down joints to cut paint seal and avoid paint chipping. (If homeowner intends to repaint entire house after, less care needed about paint chipping.)

2. Where metal corner caps have been used, use utility knife to cut paint seal if necessary, to remove corner cap, see Part B, Section VII – Vinyl Siding.

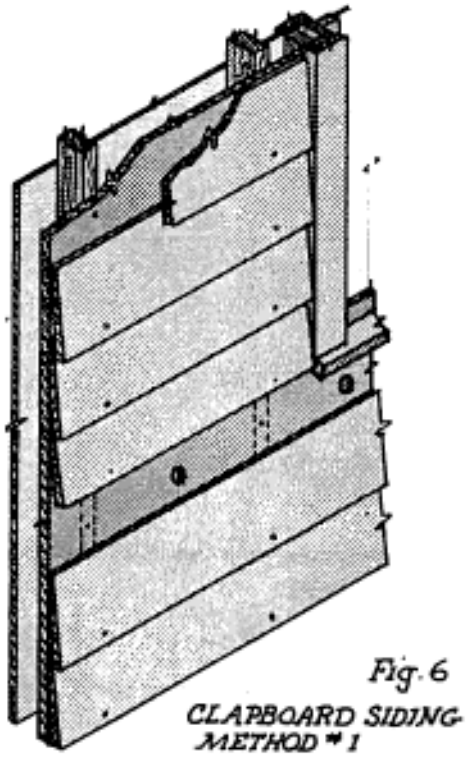


Fig. 6
CLAPBOARD SIDING
METHOD # 1

b) To remove clapboard:

1. Run utility knife to cut paint seal along top and bottom of clapboard to be removed.

2. Use nail pullers to pull nails in clapboard above one to be removed.

3. Use pry bar to loosen upper clapboard.

4. Use nail pullers to remove nails in clapboard to be removed.

5. Loosen corners of board with pry bar and remove.

NOTE: Place first floor clapboards, painted face in, against base of wall immediately under section where it was removed. Place second floor clapboards away from house, keeping pieces in order. This will avoid mixing up the pieces and make replacing quicker and easier.

c) 1. Drill 2-1/8" hole through sheathing over the center of each cavity.

2. For over or under window cavities inaccessible from the exposed strip of sheathing, drill two 1-1/8" per cavity directly through siding.

3. Foam all cavities.

d) To close:

1. Reverse steps of removal process to replace clapboards.

2. In renailing, set nails slightly above or to one side of original holes making sure nails go into studs. Use galvanized siding nails or plastic coated, anti-rust bedder nails in dented areas.

3. Run bead of caulk along knife cut when replacing clapboard.

4. Where holes have been drilled through clapboard, use proper size plugs to close. Drive plug in flush or countersink slightly. Using a 1½" putty knife and caulk or exterior spackle cover and smooth area over plug.

Method #2 – Non-removal

- Direct drilling of holes through siding and sheathing into cavities.
- For location of holes refer to appropriate framing method in Part A of manual.

1. Drill 2-1/8" holes over center of each cavity.
2. Foam all cavities.
3. Drive plug in flush or countersink slightly. When plug is nearly flush, tap around edge of plug so that hammer is also striking siding. This will prevent driving the plug in too deeply.
4. Using a 3½" spackling knife and American Hardware or Dap exterior spackle, cover and smooth the area. Don't work it; two or three swipes should be enough.
5. In touch up painting, tail the paint out in both directions. This procedure completely hides any sign of the plugs.

OTHER HORIZONTAL WOOD STRIP SIDINGS

- Use Method #2 as above under clapboard OR
- Remove siding for access to sheathing. See appropriate section of Part A for location of siding to be removed

a) Shiplap and Rabbetted bevel

1. Loosen bottom edge of strip above one to be removed.

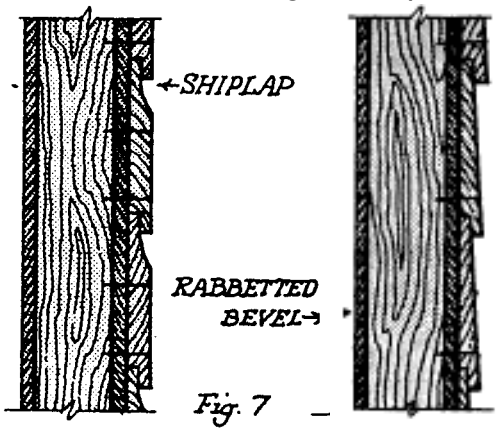
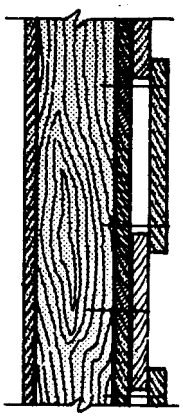


Fig. 7

2. Pull nails on strip to be removed.
3. Use pry bar at corners to loosen board; remove and store as noted under clapboard.
4. Drill 2 1/8" hole through exposed sheathing over center of cavity.
5. Foam all cavities.
6. Reverse procedure to replace siding.

b) Board and Batten



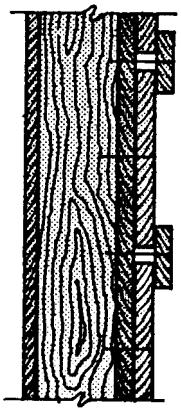
Wide Batten

To remove:

1. Pull nails and remove wide battens as necessary.
2. Drill 2-1/8" hole through sheathing over center of each cavity.
3. Foam all cavities.
4. Caulk along edges of battens when replacing.

Fig. 8
BOARD & BATTEN (WIDE)

Narrow Batten

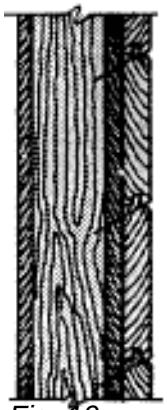


To remove:

1. Loosen narrow batten above board to be removed.
2. Pull nails and remove narrow batten below board to be removed.
3. Pull nails holding board; remove board.
4. Drill 2-1/8" hole through sheathing over center of each cavity.
5. Foam all cavities.
6. Caulk along edges of both battens when replacing.

Fig. 9
BOARD & BATTEN (NARROW)

C) Tongue and groove



- Almost impossible to remove without damaging boards.
- Drill through as explained above under clapboard: method #2 — nonremoval.
- This also applies to tongue and groove applied vertically.

Fig. 10
TONGUE & GROOVE

II. VERTICAL WOOD SIDING
BOARD AND BATTEN

- Can be true board, in which case when wall is open check for possibility of ribbon bracing nailing strips.

- More likely to be 4’ x 8’ plywood sheets.

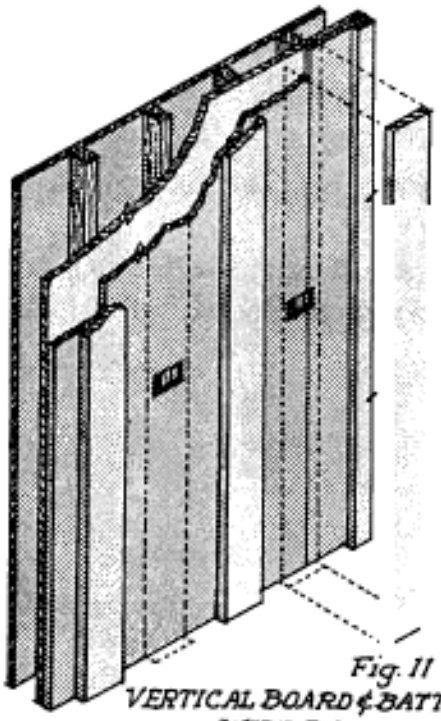


Fig. 11
VERTICAL BOARD & BATTEN
WIDE BATTEN

Wide Batten

1. Set nails through and remove batten over every other stud.

2. Make rectangular cut over stud to give access to cavities on either side of stud. Keep cut area inside width that is covered when batten is replaced.

3. Foam all cavities.

4. Replace batten.

5. Nail slightly to one side of original nail holes.

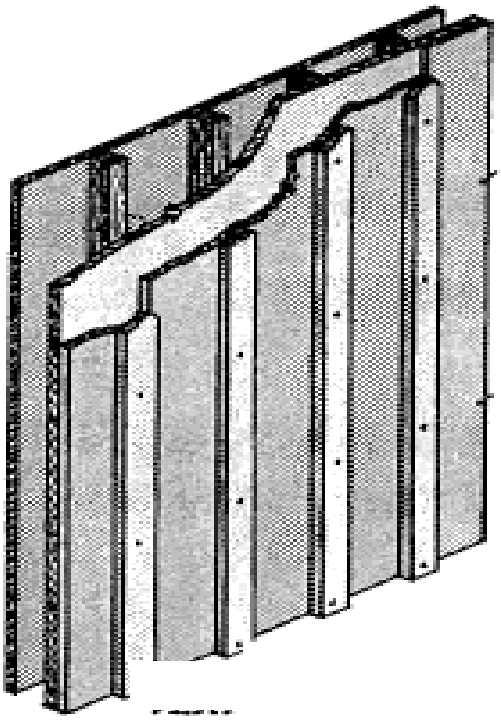


Fig. 12
VERTICAL BOARD & BATTEN

Narrow Battens

- Too narrow to cover access cuts.

- Use one of three possible methods to foam.

Method #1: Drill four 1 -1/8" holes per cavity. Foam. Plug and caulk to close.

Method #2: Drill as for Method #2 under clapboard. Foam and close the same.

Method #3: Foam from the interior.

- If siding is painted, drill and plug methods work well as evidence of plugs can be covered.

- If siding is stained, very difficult to stain plugs to match. Explain to homeowner and give him option of having the work done from the inside.

True board and batten

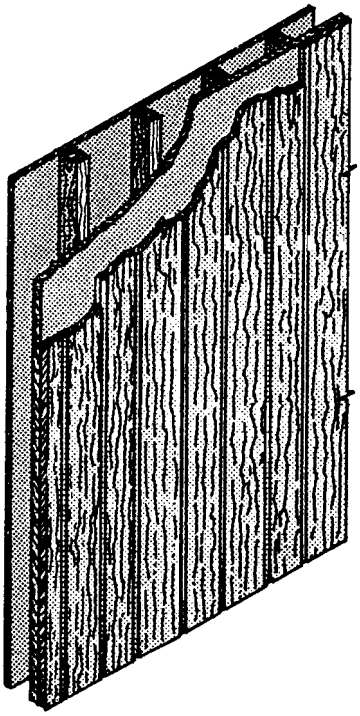
- Wide batten: proceed as for wide batten plywood, above.
- Narrow batten: Choose board for removal either over center of each cavity OR over every other stud to allow access to adjacent cavities.

To open:

1. Loosen narrow batten on one side of board.
2. Pull or set nails through batten on other side of board and remove batten.
3. Pull nails holding board and remove board.
4. If board removed is centered over stud, make rectangular cut over stud to allow foaming of two adjacent cavities.
5. If board removed is over center of cavity, check nailing pattern in sheathing as clue to whether or not framing uses ribbon nailers. Drill 2-1/8" holes as necessary to gain access to all cavities. Probe to double check.
6. Foam all cavities; replace boards and battens.

REDWOOD

- If a form of board and batten, use appropriate procedure above.
- Usually 4’ x 8’ sheets with rough-sawn surface.



Painted surface

1. Drill holes using method #1 or #2 as given above for narrow batten over plywood.
2. Caulk and texture over plugs to match siding.

Naturally-aged or stained surface

- Will be almost impossible to match plugs to siding well.
- Explain to homeowner and give him the option of having the work done from the interior.

Fig. 1.3
SHEET REDWOOD ROUGH SAWN

III. HARDBOARD LAP SIDING

- Looks similar to clapboard but is heavier.
- Can be finished to look like clapboard or shingles, etc.
- Usually about 10” exposed to weather and is ½” thick (10” exposed clapboard would be ¾” thick).
- Comes in 16 ft. long sheets and because of weight and brittleness, removal is a two-man job.
- Do not drill through hardboard if you can possibly avoid it. Very likely to chip. Best always to remove siding and drill through sheathing.
- Location of sheets of siding to be removed depends on the framing method of the house. See Part A.

Surface-nailed hardboard lap siding

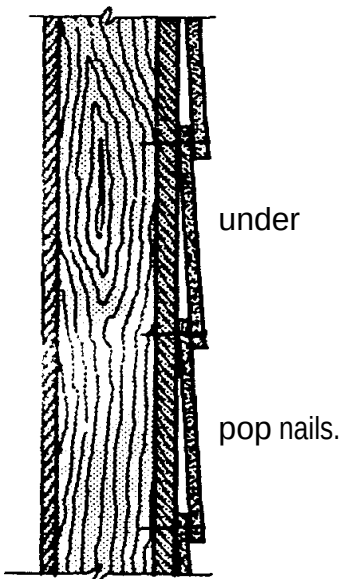


Fig *24*
HARDBOARD LAP SIDING SURFACE NAILED

- Nailheads exposed

a) To remove:

1. Run utility knife along top and bottom edges of piece of siding to be removed, paint chips off very easily on hardboard.
2. Do not use nail puller; instead slip pry bar or wonder bar well edge of upper piece of siding. Do not put pressure on edge of piece or the hardboard may chip.
3. Pry board loose to pop nails enough to be removed.
4. Pry bottom edge of lower piece of siding with same care to
5. Remove nails and lift off piece of siding.
6. For access over windows, etc., remove siding as necessary, do not drill through.

Alternate methods for removing hardboard siding:

If nail heads are small, punch the nails through the siding instead of pulling them.

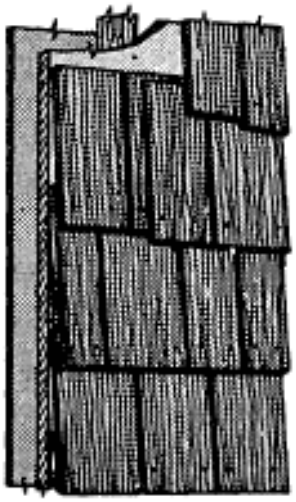
Or slide hack saw blade up under edge of siding and cut off the nails. In replacing siding drill new nail holes slightly to one side of old ones.

b) 1. Drill a 2-1/2” hole through sheathing over the center of each cavity.

2. Foam all cavities.

c) To close:

1. Reverse above procedure to replace siding.
2. Use large headed, heavy shanked spiral nails, not clapboard nails as they won’t hold the weight.



3. Make sure that nails bed into studding; the sheathing will not be enough to hold the weight.

5. Slide removed shingle under adjacent shingle for safekeeping.

b) 1. Drill 2-1/8" hole over the center of each cavity.

2. Be careful to place hole where it will not be exposed by gap between shingles when shingle is replaced.

3. Foam all cavities.

c) To close:

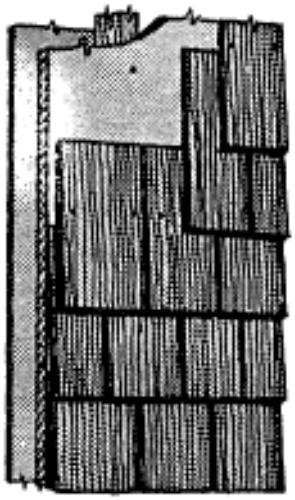
1. Slide uncut shingle back up into place.

2. Renail through same holes using small-headed siding nails set at slight angle to original nails.

3. If shingle had to be cut, run a thin bead of caulk along cut edge.

4. Replace and renail as above.

***Fig. 16 DOUBLE COURSE** SHINGLES*



Single course shingles

- Nailed underneath lap; no exposed nails.

a) To open:

1. If painted, run utility knife around edge of shingle to break paint seal.

2. Bevel cut exposed shingle off at lap.

3. Slide removed shingle under adjacent shingle for safe keeping.

b) 1. Drill 2-1/2” hole over center of cavity being careful to place hole where it will not be exposed by gap between shingles when shingle is replaced.

SINGLE COURSE SHINGLES

2. Foam all cavities.

c) To close:

1. Run thin bead of caulk along cut edge of shingle.

2. Replace shingle and nail in place using two finishing nails.

V. ASBESTOS CEMENT SHINGLES

- Never drill through asbestos cement shingles, always remove.
- Age of asbestos affects pliability so brittleness and cracking can be a problem.
- Procedure depends on age and condition of shingles.

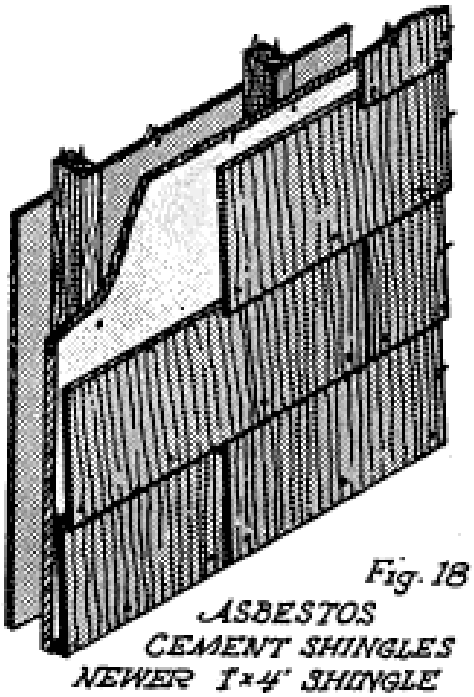
- Choose shingle to be removed to expose sheathing over middle of cavity.

- Hole placement depends on framing method used in construction --see Part A of manual.

Newer asbestos shingles in good condition

- **Shingles are 1' x 4' in size** with 4 holes/4 nails showing along bottom edge of course. Not usually nailed at top of course.

- Asbestos in good condition will have a 'spring' to it.



a) 1. Use pair of large, heavy duty end nippers with as flat a head as possible.

2. Push in with nippers and grab the head of the nail. Pull nail if possible. Otherwise snip off the head.

3. Remove or cut all 4 nails. Loosely replace one nail at one corner of the shingle. Using this nail as a pivot,
allow the shingle to swing down out of the way and to expose the sheathing.

b) 1. Drill 2-1/8" hole through sheathing over center of each cavity.

2. Foam all cavities.

c) To close:

1. Drive in the shanks of any cut nails.

2. Slide top edge of removed shingle back up under lower edge of upper shingle.

3. Renail at an angle slightly away from original nailing.

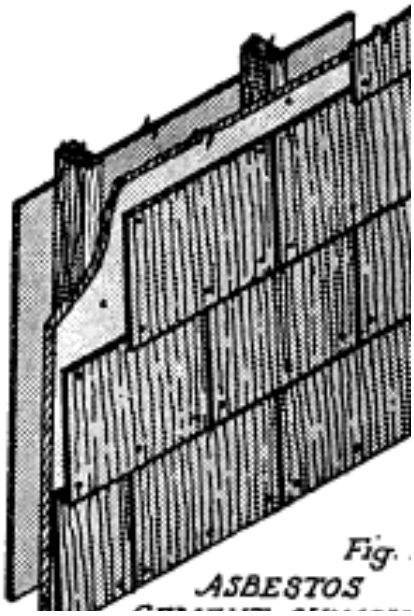
Older asbestos shingles or shingles in poor condition

- Older shingles are 1' x 2' in size with 3 holes/3 nails along bottom edge of course. They may also have 2 holes/2 roofing nails along top edge of course which will be hidden under edge of upper shingle.

- Shingles in poor condition will be brittle and have no 'spring' so that you will not be able to get a hold of the nail head with the end nippers.

- Damage to the shingles in removing is likely. Explain to homeowner and ask if he has any extra shingles which you can use if necessary, or see if you can buy any to match.

- And/or ask the homeowner if it would be possible to do the job through the interior wall.



If you must go in from the exterior:

a) To open:

1. Loosen the shingle above the one you need to remove.

2. Using pry bar, remove the roofing nails from the top of the shingle to be removed.

3. Using the end nippers, or if necessary the pry bar, remove the lower course of nails.

4. Loosely replace one nail at one corner of the shingle. Using this nail as a pivot, allow the shingle to swing down out of the way to expose the sheathing.

b) Drill and foam as newer asbestos shingle above.

c) To close:

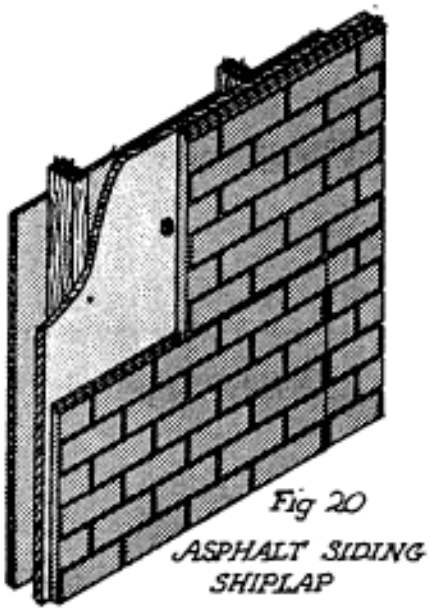
1. Replace undamaged shingles as given in previous section.

2. Replace damaged shingles with new ones and proceed as above.

VI. ASPHALT COMPOSITION SIDING

- Never drill through asphalt, always remove.
- See appropriate section of Part A for location of siding to be removed depending on construction of house.

Asphalt shiplap sheet siding



- Sheets are 2' x 4' x 1/2" thick with an asphalt face on an insulation board back.
  - The usual pattern is imitation brick with a black mortar line.
  - Usually nailed on with about a dozen nails driven through the fake mortar line.
  - Must be careful of possibility of face chipping. If piece of face chips, immediately re-glue with face cement to avoid losing chip.
  - Good idea to ask the homeowner if he has any extra sheets which can be used in case of damage.

a) To open:

1. If nails are small-headed, set them through with a pin punch.

2. If nails are large headed, use end nippers to pull them out or, if necessary, snip off heads.

3. Use pry bar at bottom of sheet to gently work loose.

4. Remove sheet cautiously: bugs tend to collect behind them and are likely to come out in a swarm in summer.

5. Set sheet face backwards against house immediately under space where it was removed.

b) 1. Drill 2'/8" holes through sheathing over center of cavity.

2. Foam all cavities.

c) To close:

1. Slide top edge of sheet back in place under lap of sheet above.

2. Renail using new holes.

3. Patch old nail holes with tab cement.

Asphalt Roll sheet siding

- Comes in 2 ft. wide long rolls.
- Imitation brick pattern.
- Nailed on with roofing nails.
- Do not drill through.
- Hole placement depends on framing method used in construction – see Part A of manual.

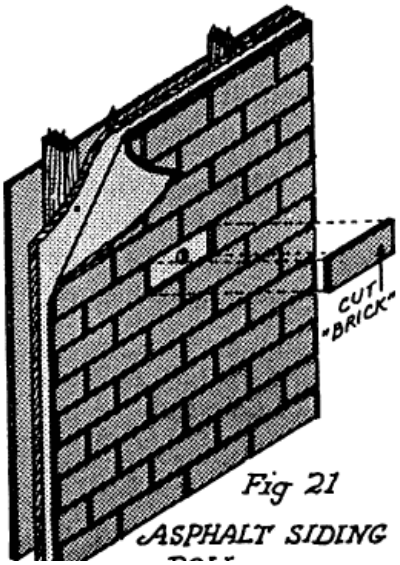


Fig 21
ASPHALT SIDING

a) To open:

Use utility knife to cut out a 'brick' located over center of cavity.

b) 1. Drill 2 9/16" hole through sheathing.

2. Foam all cavities.

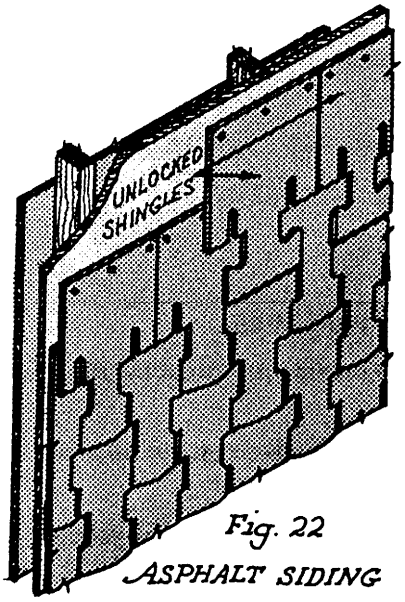
c) To close:

1. Run a bead of tab cement around inside edge of cut.

2. Replace 'brick'.

3. Nail 'brick' at all four corners.

Asphalt T-lock shingles



T-LOCK SHINGLE

- Should not be removed in cold weather as cold makes them brittle and likely to break.
- Held on with 2 or 3 nails at top of shingle.
- Do not drill through.
- Remove shingle located over center of cavity.

a) To open:

1.Unlock tabs on row above shingle to be removed.

2. Use pry bar to pop and pull nails at top of shingle to be removed.

3.Unlock tabs on bottom of shingle and remove.

b) 1. Drill 2-1/8" holes through sheathing.
2. Foam all cavities.

c) To close:

1. Replace and face nail shingle as close as possible to lap.

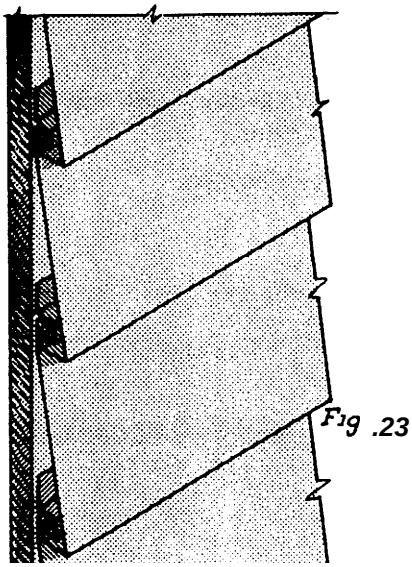
2. Relock tabs of replaced shingle.

3. Relock tabs of shingles in row above.

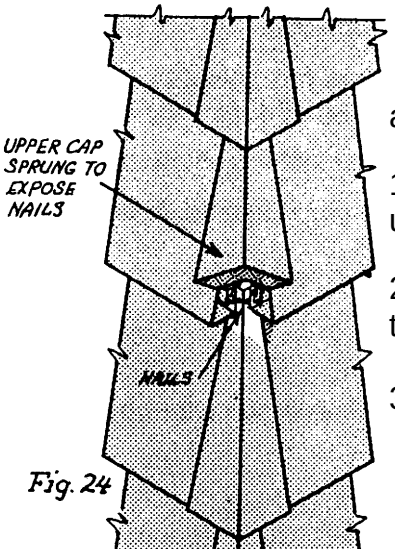
4.

VIII. VINYL SIDING

- Flexible except in very cold weather; best to work with it when temperature is 40° or higher.



VINYL SIDING



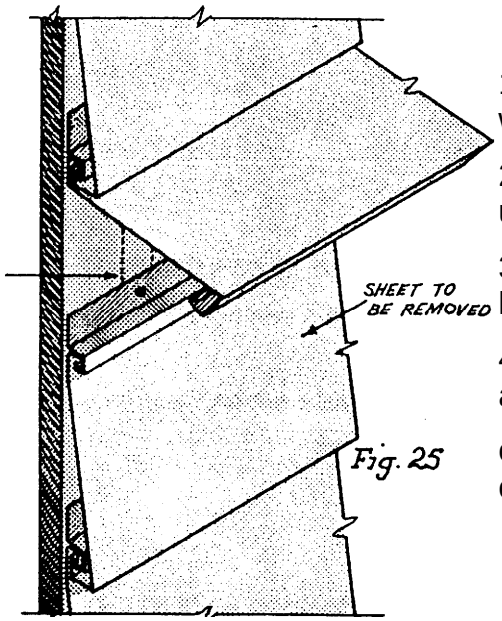
METAL CORNER CAP

a) To remove metal corner cap:

1. Use ¼" screwdriver to pry under upper course corner cap to unlock.

2. Spring corner cap out enough to pull nail holding lower corner cap.

3. Remove lower corner cap.



VINYL SIDING REMOVAL

b) To remove siding:

1. Using vinyl siding tool, unlock sheet above one to be removed working about a foot at a time.

2.Use tool to loosen ends of sheet to be removed. Sheet should unlock and drop.

3.Hold unlocked sheet up while using pry bar to pull nails holding sheet of siding in place.

4.Lift sheet off; place face to wall immediately under working area.

c) 1. Drill 2-1/8” holes through sheathing over center of each cavity.

2. Foam all cavities.

d) To close:

1.Replace and relock removed sheet.

2.Renail with large headed aluminum nails in original holes.

3.Bring upper sheet back down and out; slide back under lock strip of lower sheet.

4.Gently tap along bottom edge with short piece of 2x4 or furring strip to relock.

VIII. ALUMINUM AND OTHER METAL SIDINGS

- Aluminum siding comes in different gauges.
- All gauges must be handled carefully to avoid denting, crimping, etc.
- Possibility of damaging siding makes removal a two-man job.
- Do not work with siding on a windy day.
- If aluminum siding is over 2 or 3 years old, it will be almost impossible to replace if damaged, as the colors will have faded and manufacturing sizes have changed since.
- If any foam gets on aluminum, wipe off immediately with a clean, dye-free rag.
- There are three alternate methods for working with metal siding.

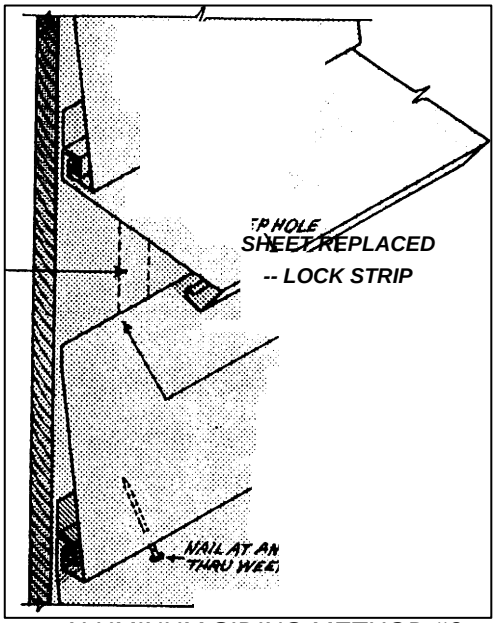
Method #1

- Same as vinyl siding above.

NOTE: This method often results in wrinkling of the lower sheet and denting of the edge of the upper sheet.

Method #2

- Proceed as with method #1 through part C.



ALUMINUM SIDING METHOD #2

d) To close:

1. Completely cut locking strip off the removed sheet; this also removes nailing strip.

2. Unless sheathing is 3/4” or more thick, find studs and mark both sheets of siding to align with stud using pencil mark weep holes in bottom edge of both sheets —one weep hole for every stud.

3. Replace and relock lower sheet.

4. Using aluminum nails and being careful not to mash edge of siding, nail at an angle through every weep hole of lower sheet into studding.

5. Bring upper sheet down against cut edge of lower sheet and nail at angle through every weep hole. Cut edge of lower sheet will be held by pressure of the upper sheet.

6. Carefully slant heads of nails flush with bottom of siding.

Method #3

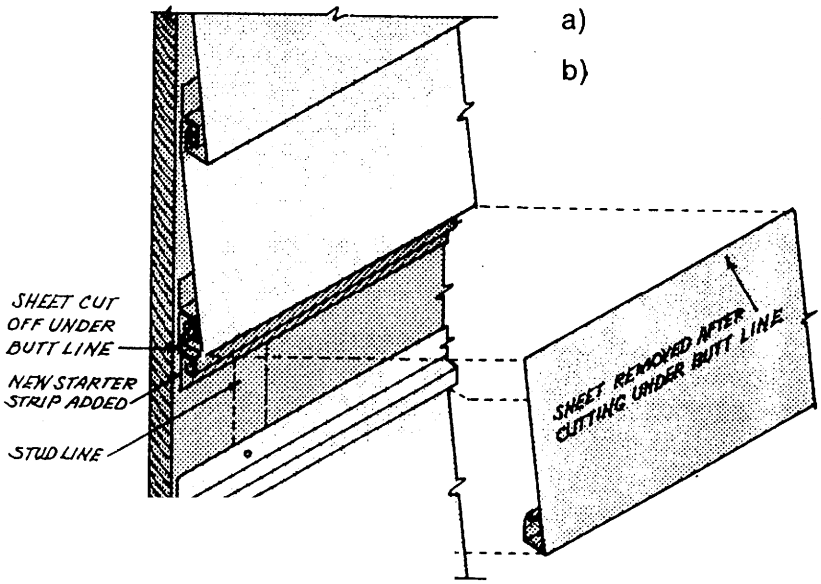


Fig. 27
ALUMINUM SIDING METHOD #3

a) Remove corner cap as under vinyl siding.

b) To open: Do **not** unlock sheet above one to be removed.

1. Using circular saw set to necessary depth, cut length of sheet of siding to be removed just below butt of upper sheet.

2. Unlock sheet of cut siding and remove.

c) Drill and foam as above.

d) To close: Buy new starter strip to match existing siding.

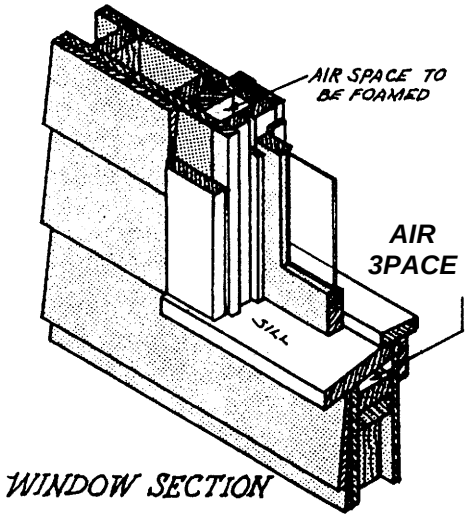
1. Nail on just below butt of upper sheet of siding.

2. Slide cut top of removed sheet of siding up inside lip of starter strip.

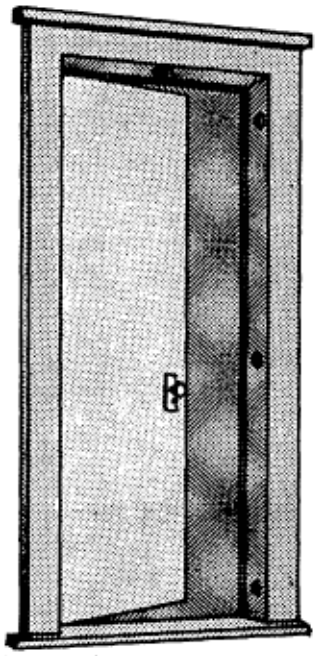
PART C – WOOD WINDOW AND DOOR FRAMES

I. WINDOWS

- Usually small cavities within window frame construction.
- Source of infiltration unless foam insulated.
- Drill in through frame using 11/8” bit.



FRAME HEIGHT	NO. OF HOLES NEEDED AND PLACEMENT
2’ or less	1/side at center height
2’ to 6’	2/side, 6” from top and bottom
6’ or more	3/side at center, top and bottom
FRAME WIDTH	**NO. OF HOLES NEEDED AND PLACEMENT**
2’ or less	1 at center
2’ to 6’	2, 6” from each side
6’ or more	3, at center, and 6” from each side



- If necessary to foam bottom frame of window:
  1) Drill down through sill.
  2) If access to sill is blocked by storm window, either remove or try drilling up from below while clapboard immediately under window is removed.

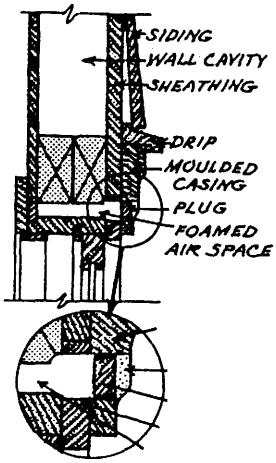
Fig. 29
WINDOW-HOLE PLACEMENT

Sash-weighted windows

1. Drill upper side holes 12” down from frame top to avoid drilling into mechanism.

2. Immediately after foaming, work window up and down to free weights and form channels.

3. Have homeowner work the window again next day.



Plug to close:

Flat window frame

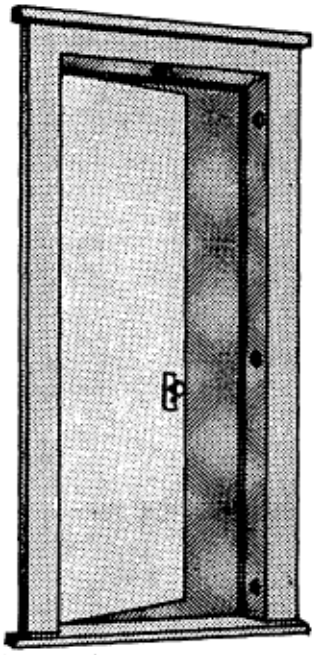
1. Drive plug in flush or countersink slightly.
2. If plug projects, chisel off surface with sharp chisel.
3. Caulk to cover, and smooth.

NOTE: Cannot use caulk on a rainy day. Either call back when not raining, or leave sufficient caulk to finish with homeowner and knock appropriate amount off price of job.

Molded window frame

1. Countersink plug slightly below lowest level in molding.
2. Re-sculpture area over plug using acrylic vinyl caulk and 1½" putty knife.

II. DOOR FRAMES



- Usually small cavities within door frame construction as with windows.
- Source of infiltration unless foamed.

a) 1. Drill through jamb on inside of door casing.

2. Drill one 1-1/8" hole into top of frame.

3. Drill three 11/a" holes on each side of door frame.

b) After foaming, seal holes with wood plugs.

NOTE: Hollow core exterior doors can also be foamed filled. Door may be honeycombed for internal support. Drill holes as needed after locating inside bracing. Close with wood plugs.

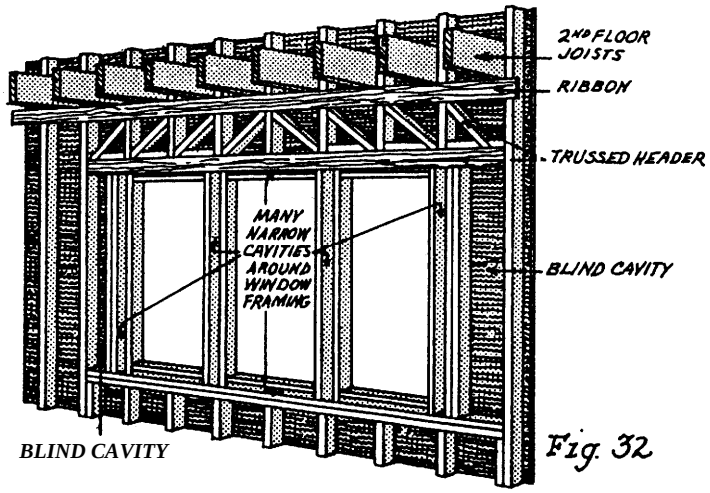
Fig. 31
DOOR – HOLE REPLACEMENT

III. POTENTIAL PROBLEMS AROUND WINDOW AND DOOR OPENINGS IN OLDER HOUSES

a) **A common practice in older** construction was that of first running the top and bottom window headers to the next regular studding and then framing in the sides of the windows within that span. See illustration below.

Careful location of studding around windows and precautionary probing will prevent the possibility of overlooking these blind cavities.

b) Trussing over window or door openings of 3' 6" or more in width was a recommended practice in balloon framing.



WINDOW CONSTRUCTION
TRUSSING OTHER PROBLEMS

Suspect the presence of trussing when:

1. Cavities over windows seem to fill more quickly than they should.

2. In drilling a hole in the middle of a cavity above a window you unexpectedly hit a framing member.

3. In foaming over wide windows in an older house, take the precaution of probing.

PART D – MASONRY CONSTRUCTION

I. CONCRETE BLOCK CONSTRUCTION

Core filling of existing building

- Salesman must find out depth of wall below ground level to add to estimate of foam needed for job.

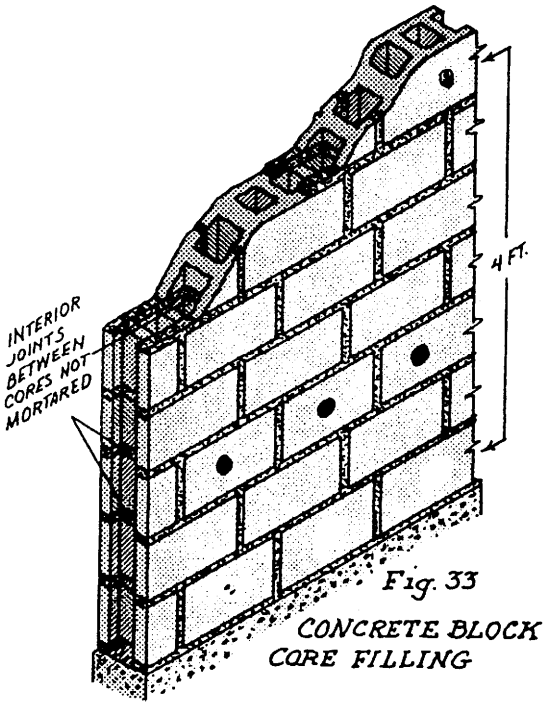


Fig. 33
CONCRETE BLOCK CORE FILLING

- Use hammer action drill with carbide bit for drilling masonry.

a) To open:

1. Drill one 11/8" hole in every block at ground level.

2. Make each succeeding row of holes 4' above the previous row.

3. Drill all holes before foaming to avoid having bits of masonry falling down into fresh foam.

b) To foam:

1. Foam by horizontal rows beginning at ground level, and work up, row by row, to top of wall.

2. Stick applicating hose into hole and pull up slightly to bind hose in hole.

3. Foam will flow over interior block division and fill adjacent cores.

4. Foam until foam shows at hole above. (This takes about six seconds per hole in an 8" block.)

c) To close:

1. Ream each hole with wire brush to remove all remnants of foam from block.

2. Using Sakrete and V-shaped mortar board, push Sakrete into hole with pointed trowel. Trowel over.

Core filling of new construction

- Attach thin wall PVC pipe to application hose:

If foaming 8" or 10" blocks use PVC pipe with a ¾" outside diameter and push PVC pipe a couple of inches up inside the application hose.
If foaming 12" blocks use PVC pipe with a 1" inside diameter and push end of applicating hose a couple of inches down inside the PVC pipe.

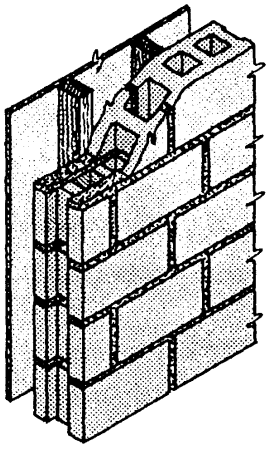
- The length of the application hose should be as long as or longer than the length of the PVC pipe. However, keep the length of the PVC pipe/application hose combination as short as possible for ease of handling.

- Make test foam to determine gram weight AFTER attaching the PVC pipe.
- Adjust air pressure accordingly to propel the foam out of the pipe.

.

1. Foam from above down EVERY core.
2. Drop PVC/applicating hose combination as far down the core cavity as possible. As the foam reaches the level of the end of the PVC, it will force the PVC pipe back up and out.
3. Foam cores under windows before sills are in place.

Block cavity wall



- Foaming should be done through the interior wall, if possible (see Part E – Foaming from the Interior).
- If necessary to foam from the exterior, use overlength drill to go entirely through the concrete block and into the stud cavity.

Fig. 34
Block w/Cavity Wall

II. BRICK CONSTRUCTION

Brick-on-brick cavity wall

- Usually a 1 ½" to 2" cavity between inner and outer brick walls.
- Inside brick wall is usually plastered over for interior finish so must foam cavity through exterior wall
- Use hammer action drill with carbide bit.

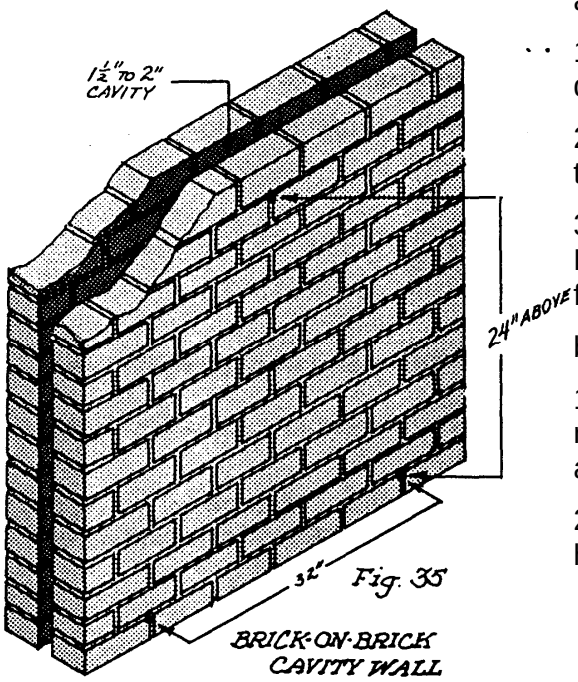


Fig. 35

a) To open:

1. First row of holes should be about 1, above downstairs floor level.

2. Drill a ¾" hole every 2½' horizontally. Drill through the mortar at the conjunction of three bricks.

3. Repeat rows of holes at 2' intervals up the wall. Holes of each succeeding row should be staggered from the preceding one to form a triangular pattern.

b) To foam:

1. Using an 8" length of tubing and a hose clamp, jury rig a reducer to fit inside the end of a standard application hose.

2. To check on filling: place pencils in all unfilled holes adjacent to the one being foamed.

3. When foam reaches pencils, they'll move.
4. Immediately stop and go on to the next hole.
5. Fill all holes in the bottom row first. Then keep working up by rows.

c) To close

1. Ream each hole with wire brush to remove all remnants of foam from mortar.
2. Use Sakrete and V-shaped mortar board; push Sakrete into hole with pointed trowel. Trowel over.

Alternate method for foaming Brick-on-brick cavity wall

1. Remove a whole brick about halfway up the wall.
2. Probe the cavity to eliminate the possibility of studding.
3. If studding exists, remove one brick over center of each cavity.
4. If entire cavity between inner and outer brick walls is unobstructed except for metal ties, then remove one brick about every four feet horizontally.
5. For technique in removing and replacing bricks, see below under Method #1, Brick veneer on wood cavity wall.

Brick veneer on wood cavity wall

- Metal ties used every fourth course, 16" o.c.
- Usually has 1" air space between brick and sheathing besides main cavity. Just do cavity.
- If possible foam from interior.
- If foam from outside, there are three alternate methods.

Method #1

1. Locate studs from inside of wall and correlate to the outside.

2. Choose bricks over studs to gain access to two adjacent cavities for each brick removed.

3. Try to go in high up wall, even 7' or 8' up, as it is easier to maneuver hose in rectangular opening if worked from top.

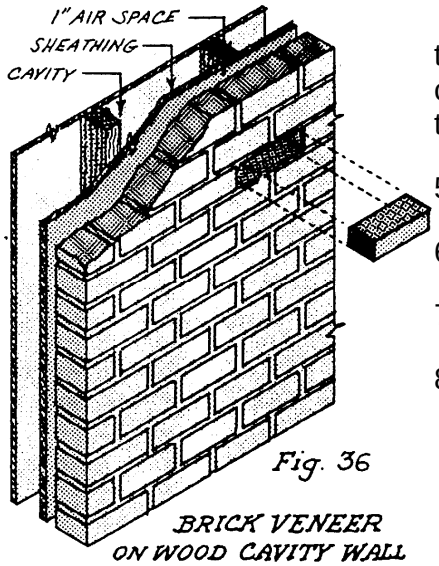


Fig. 36
BRICK VENEER ON WOOD CAVITY WALL

4. Using 3/8" masonry bit, drill through mortar at corners of brick to be removed. Then use a hand saber saw with a mortar blade to cut around brick. This method is preferable to using a power chisel to remove brick, particularly when working up on a ladder.

5. Remove brick.

6. Drill into sheathing in both sides of stud.

7. Probe to make sure cavity is not obstructed. Foam all cavities.

8. Mortar brick back in place.

Method #2

1. Using hammer action drill and ¾" carbide bit, drill 4 holes per 8' tall cavity. Place holes at the conjunction of three bricks.

2. Then extend holes through sheathing into the cavity.

3. Pressure fill all cavities with foam.

4. Fill all holes with mortar as in closing for brick-on-brick cavity wall above.

Method #3

1. If there is a wood facer board at the top of the wall, it may be possible to drill 21/a" holes through the facer board to gain access to as many cavities as possible.

2. Foam under windows by drilling down through sills.

3. To reach cavities inaccessible by these means, use one of above two methods.

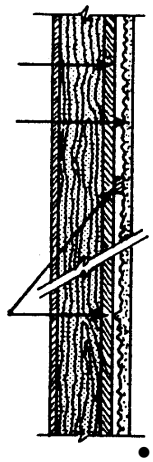
NOTE:

Brick walls other than the stretcher or running bond type shown above cannot be foamed. They will be solid or in a variety of complicated, obstructed cavity forms. Also, even with stretcher/running bond, be sure that it is not used as a veneer mortared directly to a concrete of tile wall; there will be no cavity in that case.

III. STUCCO AND STONE VENEER

- Both can be found used as facing on concrete, concrete block, brick, or tile walls as well as on wood cavity wall construction.

- Only the cavity wall construction can be foamed, and this should be done from the interior.



SHEATHING 1" STUCCO

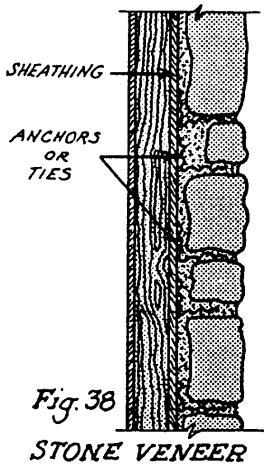


Fig. 38
STONE VENEER

Stucco

Chips very easily and patching is rarely very successful.

Commonly found on a variety of architectural styles including imitation half-timber Tudor, 'Spanish mission', etc.

Stone

Can be solid wall instead of veneer.

Removing stones from a wall is likely to result in damage either to the wall, the individual stone, or both.

ON WOOD CAVITY WALL

PART E – FOAMING FROM THE INTERIOR

I. EXISTING BUILDINGS

- Requires a certain amount of ingenuity to leave as few traces of access holes as possible.
- Potential approaches:

A) Access through mopboards — generous 6” to 8” high baseboards in older houses.

1. Balloon frame: fill both first and second story walls from second floor mopboard providing no obstructing fire or draft stops.
2. Platform frame, obstructed balloon frame, or braced frame: fill second story walls from upstairs mopboard, first story walls from downstairs mopboards.
3. Areas inaccessible from mopboards, like around windows, etc., drill down through sills or use over length drill to go up through headers.

B) Access from cellars and attics.

1. Possibility of attics in balloon frame giving access to wall cavities.
2. If roof is steep enough to give sufficient maneuvering room, may be able to take a right angle drill with an extension and drill down through the top plate into exterior wall cavities. Use two 1 1/8” holes per cavity.
3. Balloon frame: wall cavities may be accessible from cellar. If draft stop used at floor level, drill up through.
4. Platform frame: may be able to drill up through sole plate from cellar. Use two 1 -1/8" holes cavity. Watch out for nails.

C) Solutions requiring special cooperation of homeowner.

1. Kitchens: go in through walls in backs of cupboards.
2. Bathrooms: remove sections of tiles; Marlite walls, go in through base of wall and cover holes by adding a new rubber baseboard.
3. Other rooms: go in through the top of interior wall if homeowner is willing to invest in a new molding to cover the work. Of if homeowner is willing to add a chair rail to his walls, go in at that height.

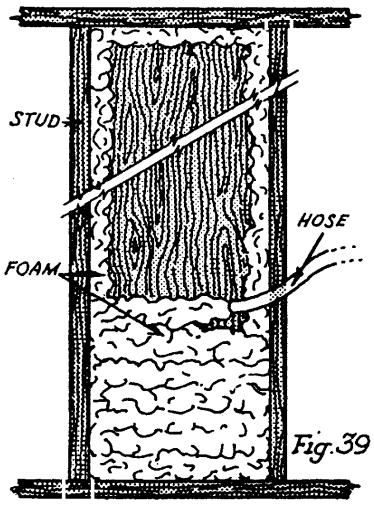
NOTE: Use carbide hole saw for plaster.

II. NEW CONSTRUCTION

- Should always use 4 mil poly film vapor barrier in new construction.
- Vapor barrier should always be applied on the side of the insulation toward the heated space.
- There are basically six methods for foaming wall cavities in new construction. The first three are open cavity methods; the second three are closed cavity methods.

a) Open Cavity

1. Lay it in as is shown in figure 39. First run foam entirely around the back margin of the cavity where the studs meet the sheathing. This helps prevent leaving voids in this area. Then starting at the bottom of the cavity, just lay in the foam.



OPEN CAVITY— LAYING FOAM IN

- A disadvantage of this non-pressure fill method is that it has the highest rate of shrinkage.

. Using the trowel attachment, begin at the bottom of the cavity and trowel the foam in. This technique requires working rapidly and accurately because once the foam sets, you cannot rework an area.

- Another disadvantage of this method is that it has the second highest rate of shrinkage.

3. Impact the foam into the cavity. To increase the pressure under which the foam leaves the hose, increase the air needle setting by a 360o turn. We do not recommend pinching the end of the application hose as a means of increasing pressure as that can cause back up into the bead chamber.

- Because the foam is applied under pressure, the rate of shrinkage is lessened.

- A major disadvantage with this method is that the yield on the foam will be **200/o** less than with other methods.

NOTE: In open cavity foaming, if extra foam projects beyond the face of the stud line, let it set for about 30 minutes. Then run a piece of piano wire – stretched taut and flush across the face of the studs – down the front of the cavity to trim off the excess. Otherwise, applying the poly and the dry wall will result in some crushing of the foam which decreases its insulating value.

b) Closed Cavity

1. After the poly is up, make 1½” to 2” slit over the center of the cavity. Insert the application hose and pressure fill each cavity. Tape slit closed to restore the effectiveness of the vapor barrier.

ON WOOD CAVITY WALL

- If voids were left during foaming, let foam set about 20 minutes; then slit over void and give it a shot of foam. Tape all slits shut.

- Bulging of poly occurs with this technique. In applying poly try to make it taut enough to keep bulging to no more than ¼" to minimize crushing when dry wall is applied.

2. If dry wall is already in place, but the exterior siding is not yet on, work from outside. Drill 2-1/8" holes through exterior over the center of each cavity; pressure fill.

3. If exterior siding is in place and dry wall is up but not finished off, use hole saw to drill 2" holes through dry wall over center of each cavity. Tape over holes after foaming. The contractor will attend to the rest of the finishing.

NOTE: Closed cavity methods are pressure filling and result in minimal shrinkage.

c) Infiltration spaces around windows and doors

- Since these spaces are usually narrower than the diameter of the application hose, the process of filling them can be messy and wasteful. To avoid this:

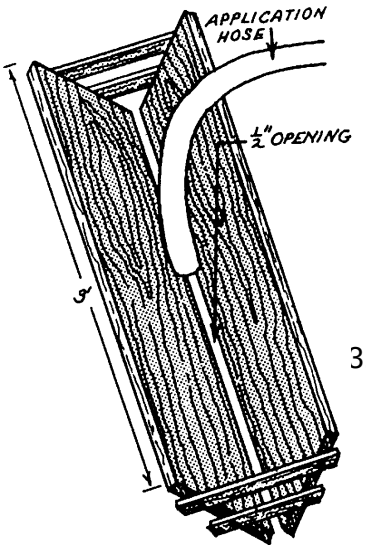


Fig. 40

1. Using scrap plywood at the job site, make a V-shaped container about 3' long with a ½" opening at the narrow end of the V. Tie the ends of the V together with scrap wood. (See figure 40.)

2. Place the narrow opening of the V against the infiltration space and run the application hose down the opening to funnel the foam into the space.

3. Move the container along the length necessary to foam fill the entire space.

III. FLOORS OVER CRAWL SPACES

- This applies to both new and existing construction.

- The following method also applies to floors over unheated cellars and unheated garages under heated living spaces.

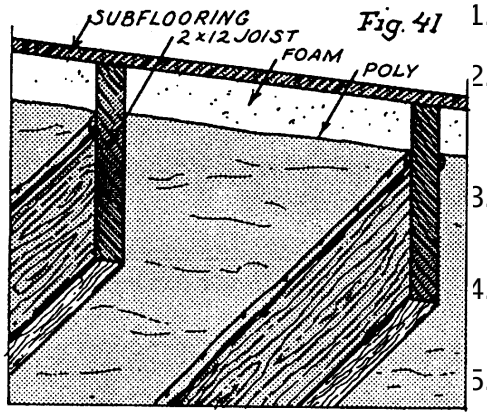


Fig. 41

INSULATING OVER CRAWL SPACE

1. Gain access to the crawl space.
2. Based on the thickness of foam needed to attain the desired R value, staple poly to the sides of the joists the necessary distance below the floor boards (Fig. 41).
3. Make a 1½" to 2" slit in the poly at about the center of the cavity, Insert the application hose and foam.
4. Go back and spot fill any voids left during the foaming process.
5. After the cavity is foamed, make additional haphazard slits in the poly to permit "breathing".

NOTE:

- Ideally, 6 mil poly film should be put down on the ground of crawl spaces and fastened to the foundation walls to act as a moisture barrier.

- Crawl spaces should be vented.

1. With vapor barrier: 1 sq. ft. net free vent area per 1500 sq. ft. of crawl space area with at least 2 vents, one in each foundation wall.
2. Without vapor barrier: 1 sq. ft. net free vent area per 150 sq. ft. of crawl space area with a minimum of 4 vents, one near each corner of the crawl space.

ON WOOD CAVITY WALL

PART F – ATTICS AND CEILINGS

I. ROOF TYPES

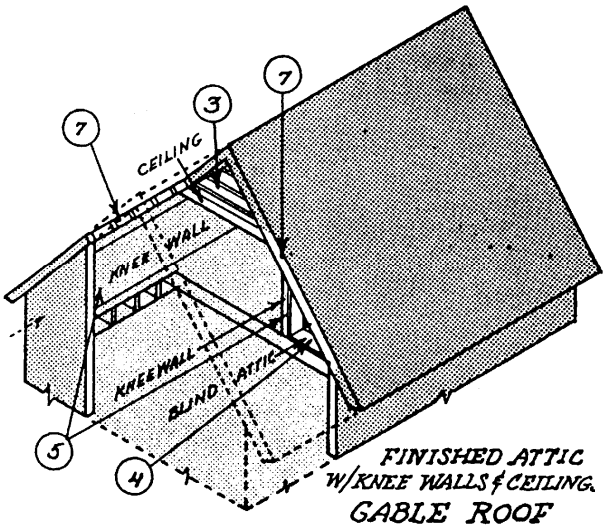
- The following figures illustrate the basic types of roofs and where they should be insulated. The numbers within circles indicate the various types of wall, floor, and ceiling constructions encountered. For instructions on how to foam each particular type, refer to the appropriate number in section III. b) which begins on page 39.

- The term attic is used to refer to any space between the ceiling joists and the roof rafters. This space may be almost big enough for a basketball court, or it may be just high enough for a man to squirm through on his belly.

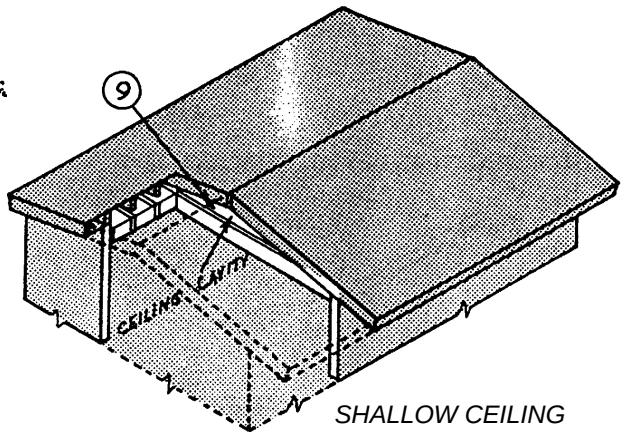
- The case of an unfinished attic of reasonable size and with windows, it's a good idea for the salesman to ask the homeowners if they intend to finish the attic as *living* space at some later. It can make a difference as to where the insulation should go.

a) Gable roof

- The degree of slope can vary considerably so that there may be a full-sized attic with adequate headroom and may or may not be finished as living space (fig. 42), or the over ceiling area may be so low that there is only a few inches clearance between the ceiling joists and the base of the ridge rafter (fig. 43).



FINISHED ATTIC
W/KNEE WALLS & CEILING.
GABLE ROOF



SHALLOW CEILING
CAVITY GABLE ROOF

- Dormers may be used in addition to the basic gable roof form (fig. 44). The shed roof dormer illustrated in figure 44 is commonly found in one-and-a-half story houses. Two other common dormer forms appear in figures 48 and 49.

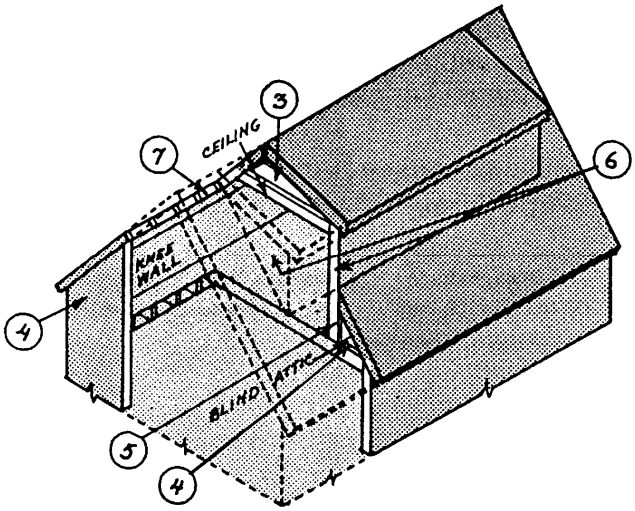


Fig. 44

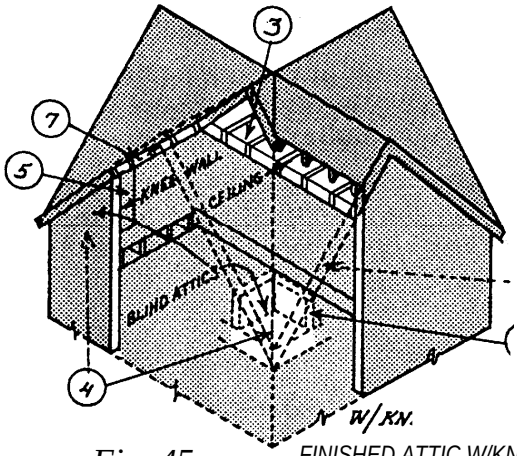


Fig. 45

FINISHED ATTIC W/KNEE WALLS & CEILING DOUBLE GABLE ROOF

4

- There are also multiple gable constructions. Figure 45 illustrates one of these, the full double gable. In this and in other multiple gable roofs, the common use of knee walls creates small blind attics at corners where two slopes come together. Do not overlook the need for insulation between the joists in the floors of these tiny attics.

b) **Cathedral ceilings**

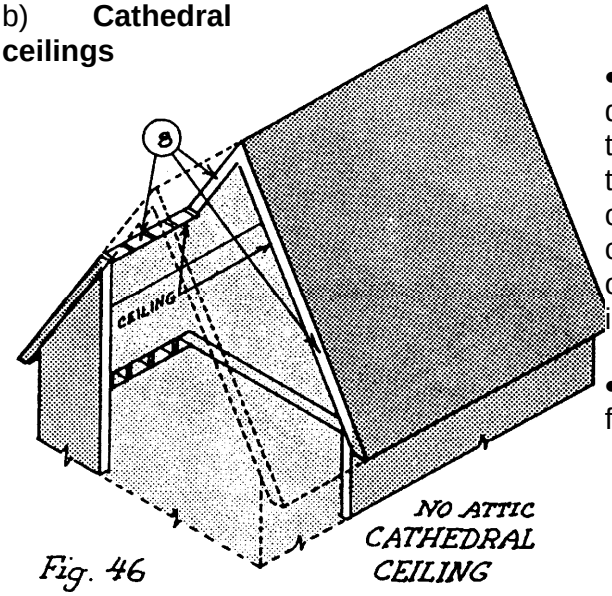


Fig. 46

NO ATTIC CATHEDRAL CEILING

- This is actually a form of a gable roof. The distinction which makes it a cathedral ceiling is the steepness of the roof slope and the fact that the entire area under the roof is part of the conditioned living space. This means that the ceiling is carried as the interior finish on the base of the rafters so that the only place for the insulation is between the rafters.

- A common use of cathedral ceilings is in A-frame construction.

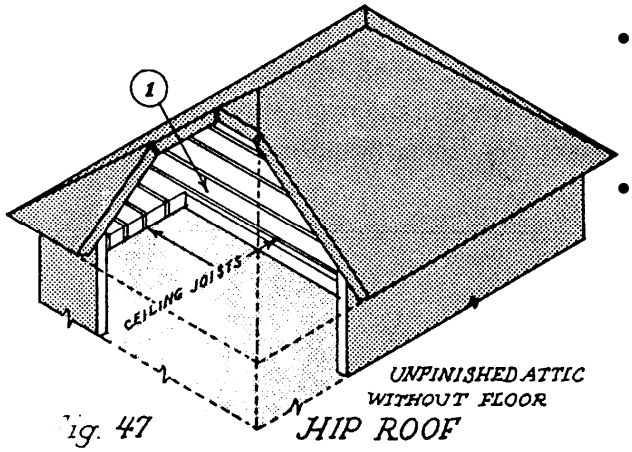
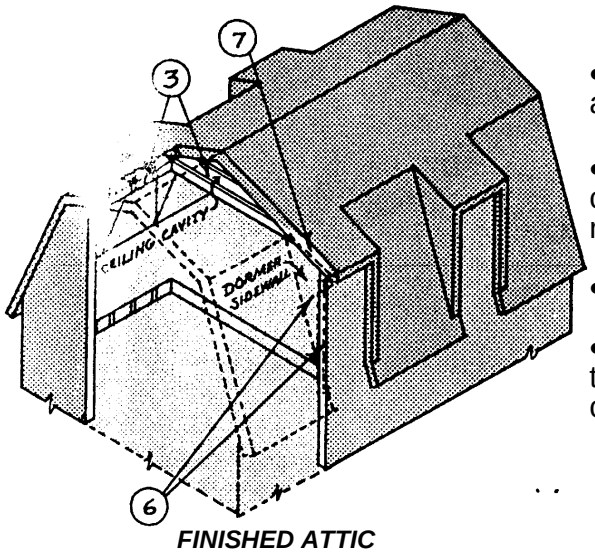


Fig. 47 HIP ROOF

- The degree of slope can vary so that there can be anything from a full-sized attic with adequate headroom to only a few inches of clearance.
- With the addition of dormers, hip roofed attics can be finished as living space, in which case watch out for blind attics in corners.



FINISHED ATTIC
GAMBREL ROOF Fig. 47 WITH DORMERS

- The under-roof area finished as living space is almost always finished as living space.
- The exterior of dormer side walls are usually covered with the same material as the rest of the roof, often shingles.
- Sometimes knee walls will also be present.
- The finished ceiling may be carried all the way to the ridge rafter instead of allowing the small ceiling cavity shown in figure 48.

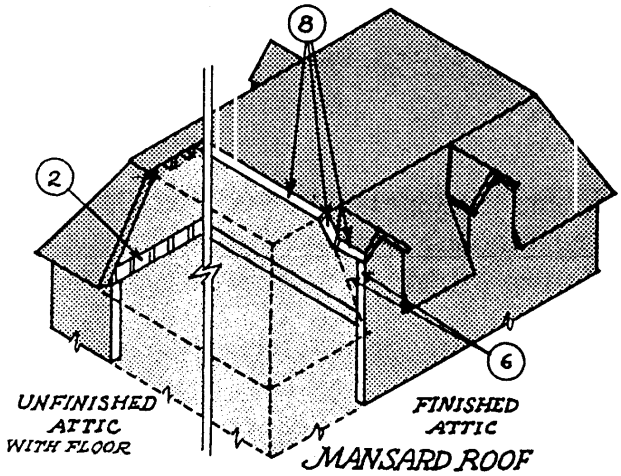


Fig. 49 MANSARD ROOF WITH DORMERS

- The ceiling is often carried on the base of the rafters as in the finished attic shown in figure 49. However, ceiling joists may have been used to create a shallow attic above.
- Sometimes instead of the upper roof being flat as shown in the illustration, it will have a shallow hip construction.
- A notable example of the mansard roof can be found in the classic Victorian house.

f) Shed roof and Flat roof

- These two roof types differ from the others in that they do not have a ridge.

- In both types the ceiling can either be carried on the base of the roof rafters as shown in the illustrations, figures 50 and 51, or ceiling joists may have been used to create a cavity between the ceiling level and the roof.

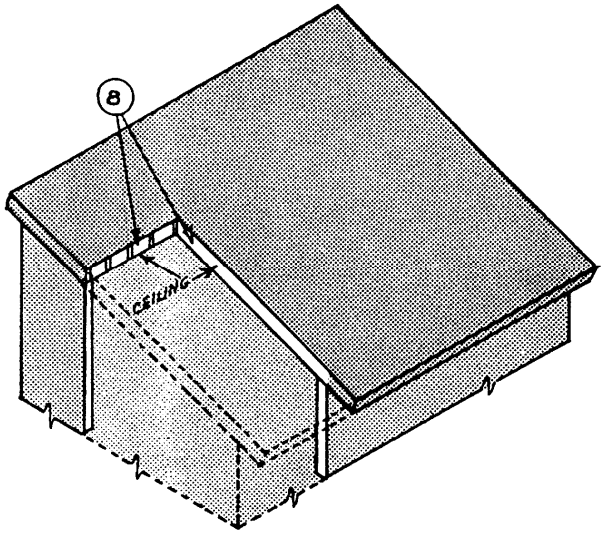


Fig. 50 **NO ATTIC SHED** *ROOF*

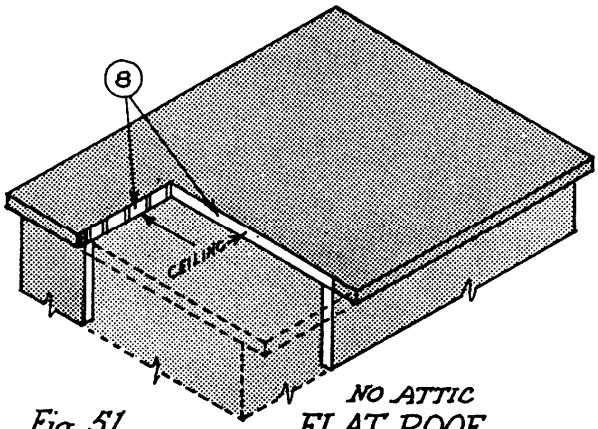


Fig. 51 **NO ATTIC** *FLAT ROOF*

II. VENTILATION

All attics and ceilings should be ventilated above the insulation to prevent moisture build-up and condensation problems during the heating, season and to prevent heat build-up in the living space in the summer.

- Use the largest possible vent that will satisfy both practical and esthetic considerations.
- Install vents before foam application.
- Vent openings must be protected against the entrance of rain and snow.
- Ventilation pathways must not be blocked by insulation.

a) Determine the minimum total net free ventilating area required for the attic/ceiling space.

1. Net free area is the opening through which air can pass unobstructed. All protective coverings effectively reduce the venting surface so that vent size must be increased to offset the obstruction.

2. Ceilings WITHOUT vapor barriers require 1 sq. ft. of net free vent area for each 150 sq. ft. of ceiling area.

Ceilings WITH vapor barriers require 1 sq. ft. of net free vent area for each 300 sq. ft. of ceiling area.

b) Whenever possible use a combination of ridge/gable vents and eave vents to achieve maximum cross ventilation. Van-pitch vents and continuous soffit vents can be adapted to most venting situations.

1. Gable roof

- ¼ total vent area at each gable end (gable vent) ¼ at each eave (continuous soffit or cornice vents).

- OR ½ total at each gable end.

- Blind attics, particularly ones isolated in corners, should also be vented independently of the gables. Do not forget venting on dormers.

2. Cathedral ceiling

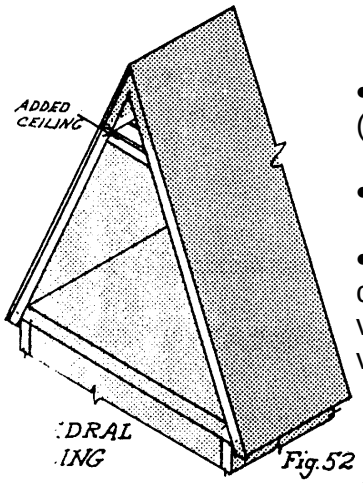


Fig. 52

- ½ total vent area at ridge (ridge-line louver), ¼ at each eave (continuous soffit or cornice vent).

- OR ½ vent area at each eave (continuous soffit or cornice vent).

- OR if slope of roof is too steep to accept a ridge-line louver, construct a ceiling as shown in figure 52 to form a ventilating attic. Open rafter cavities to vent into area. Put ¼ total vent area at each gable end (gable vents) and ¼ at each eave.

3. Hip roof

- ½ total vent area at ridge (ridge-line louver) 1/4 at each eave (cornice or continuous soffit vents.)
- OR total vent area just below ridge at either end (roof line louvers).

4. Mansard roof

- If ceiling is at roof there is no really good solution to the venting situation, unless you install a roof line louver in each cavity, and cost would be prohibitive.

- If there is a ceiling cavity, use a roof ventilator and cornice or continuous soffit vents on all eaves.

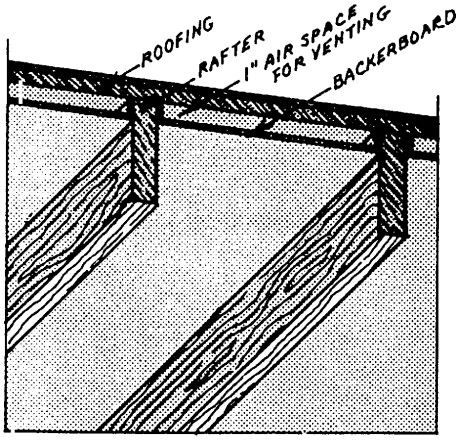
5. Gambrel roof

- 1/2 total vent area at each gable if ceiling cavity exists, or ridge vent if no ceiling cavity, 1/2 at each eave (continuous soffit or cornice vents). Don't forget venting on dormers.

6. Shed or Flat roof

- Use ½ vent area at each eave) continuous soffit or cornice vent).

c) On a sloped or flat ceiling where you have only the depth of the rafters to foam in, ideally you should create ventilation pathways between the eaves and the ridge or ceiling cavities in order to provide ventilation for summer heat build-up



INSTALLING BACKERBOARD FOR VENTILATION PATHWAYS

1.To create the ventilation pathway, staple backerboard panels 1” in from the exterior or roof side of the rafters (figure 53). Foam between that and the interior ceiling surface.

2.Where it is impossible to get in to construct this ventilation pathway, you should not foam insulate this unless the homeowner understands that there may be an odor problem and wants it foamed anyway. It is a good idea to have this understanding and agreement in writing, and signed, if at all possible.

3.In situations where 2x4 lumber has been used for rafters and it is impossible to make ventilation pathways, there is little point in installing vents on cathedral, shed, or flat ceilings/roofs. If the lumber used is 2x6 or larger, install vents as required; shrinkage on upper surface of foam will help offset the lack of constructed ventilation pathways.

III. METHODS FOR FOAMING

a) General precautions

1. In working in attics, particularly unfinished ones, it’s a good idea to wear a face mask. Also essential in most attic applications is a good trouble light.

2. Where there is no normal access to the attic, you can go in up through the ceiling over a closet, or if adding gable vents, use the rough cut of the vent opening for access. In finished attics with knee walls, use adjacent closet walls, if available, for access to blind attics.

3.The depth of foam used will depend on several factors: 1) the recommended R value for the winter design condition for the particular locality; 2) the space available for foaming, (obviously when foaming between roof rafters, the depth of the rafters is the limiting factor); and 3) whether or not there is already some insulation in place.

4. It is a good idea to put down a 4 mil poly film moisture barrier before foaming any open floor/ceiling. If the ceiling is in poor condition, or if the ceiling tile is stapled directly to the joists, the addition of the poly film is an absolute must.

5. If the ceiling already has foil-backed Fiberglas insulation, you can foam directly over it, but do NOT put down poly because the foil is a moisture barrier. If any other insulation, including Fiberglas without the foil back, is already there, you should remove it, and then put down the 4 mil poly, and foam.

6. Do not foam directly on top of a dropped ceiling to avoid weight problems. If there is an older ceiling above the dropped one, foam that and make sure you apply the exterior wall insulation up to that height. If there is no older ceiling (you may find this in commercial buildings particularly), you cannot insulate unless the owner agrees to constructing a ceiling above the dropped ceiling.

7. Where foaming an unfloored attic of adequate headroom, make sure that the homeowner understands that it cannot be used for storage unless the foam is protected against compression and other mechanical damage.

b) The following numbers refer to the numbered circles used on the illustrations under section I. Roof Types on pages 33 through 36.

Type 1:
Unfinished attic, no floor, reasonable amount of headroom.
After following the appropriate guidelines and precautions above, apply foam between joists.

Type 2:
Unfinished attic with floor.
Access is probably provided for and the space used for storage. Remove strips of floor boards at 8' intervals across attic for access to all between-joist spaces. After checking the ceiling construction below, and taking the proper precautions, apply foam between joists.

Type 3:
Unfinished attic/ceiling cavity, no floor, minimal headroom.
Proceed as Type 1. The problem will be the lack of headroom. If clearance is so low that it's impossible for a man to get in, refer to Type 9 below.

Type 4:
Floor/ceiling in blind attics behind knee walls.
These may be either isolated corners as in figure 45, or run the full length of the eave area as in figures 42, 44, and 45. Here again the problem is the lack of space in which to maneuver. Otherwise the procedure is the same as for Type 1.

Type 5:
Knee walls.
These should be done from the back while you're in the space behind them doing the floor/ ceiling cavities under Type 4. The backs of the knee walls will probably be open; staple on backerboard to close them after foaming. Do NOT use poly film or you create a vapor barrier where one should not be.

Type 6:
Dormer side and face walls.
Usually these are done from the exterior at the same time as the walls of the house. If necessary, do them through the interior wall inside the attic.

In figure 44 the dormer face wall is an extension of the knee wall below. Provided that the cavities are not obstructed where the lower roof meets the dormer wall, you may be able to foam the upper and lower sections of the wall at the same time. If the cavities are open, make sure that you won't be filling the entire blind attic with foam.

Type 7:
Between rafters accessible from small attic/ceiling cavities.
Ideally these should be given a ventilation pathway using backerboard as discussed under section II. Ventilation. If these rafter areas have a relatively short run between the ceiling cavity and a knee wall blind attic, and if the size lumber used for the rafters is 2x6 or more in depth, you may be able to install the backerboard by working from both ends of the cavity providing the ends are not blocked off. Install the backerboard before doing ANY foaming in the attic.

Foam these cavities before foaming the ceiling cavity, and check beforehand to be sure that you won't be pumping the foam out the bottom of the cavity and filling up the blind attic below.

Type 8:
Cathedral ceiling between rafters.

Foam from the exterior:

1. Choose shingle located over the center of each rafter cavity.

2. Remove shingle, drill 2-1/8" hole through roofing boards over the center of each cavity, and foam.

3. Use wood plug to close.

4. Tar over plug to seal against leaks.

5. Replace shingle.

If roof is surfaced with aluminum or slate, foam from the inside through the interior surface. Go in high on the slope of the ceiling and patch or plug access holes.

Type 9:
Ceiling cavity with only a few inches clearance between ceiling joists and ridge rafter.

If

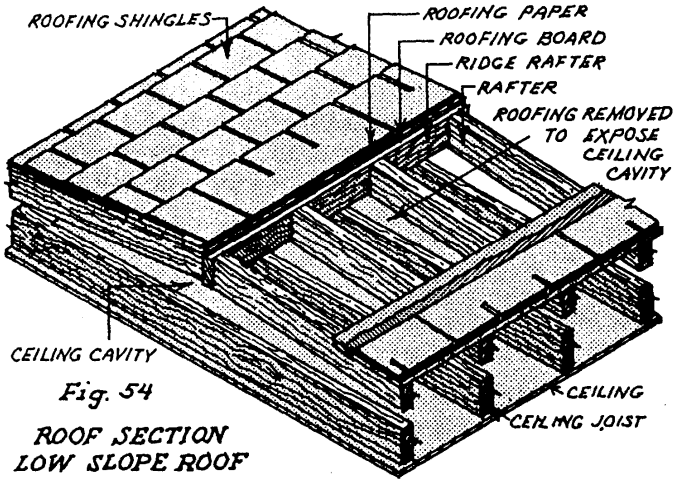


Fig. 54
ROOF SECTION
LOW SLOPE ROOF

In this case the cavity is too small for a man to get into, yet the cavity is big enough that *it* would be expensive and impractical to completely fill with foam.

The only solution to foaming this is very expensive.

To gain access to the cavity it's necessary to open up a 2' or so wide section to one side of the ridge and running the entire length of the roof. Remove all roofing material in this strip to expose the cavity for foaming. See figure and make water tight against leaks.

IV. NEW CONSTRUCTION

• Always install a 4 mil poly film vapor barrier between the foam and the interior surfacing material.

• Must work in cooperation with the construction crew so that they will understand how and when the foam must be installed and will leave cavities open and accessible until after they are foamed.

1. Foam floors of blind attics while knee walls are still completely open.

2. Close backs of knee wall cavities with backerboard, foam fill, then apply the poly film.

3. Do sloped ceilings, such as cathedral, where foaming between rafters before interior surface is put up. First install backerboard for ventilation pathways as discussed in section C of 11. Ventilation. Then staple the poly film in place; make sure it's stretched tight. Add temporary furring strips as shown in figure 55 (below) to support poly at center of cavity. Foam in from the top before stapling the poly in place at the top of the cavity. When the foam has set, remove the furring strips.

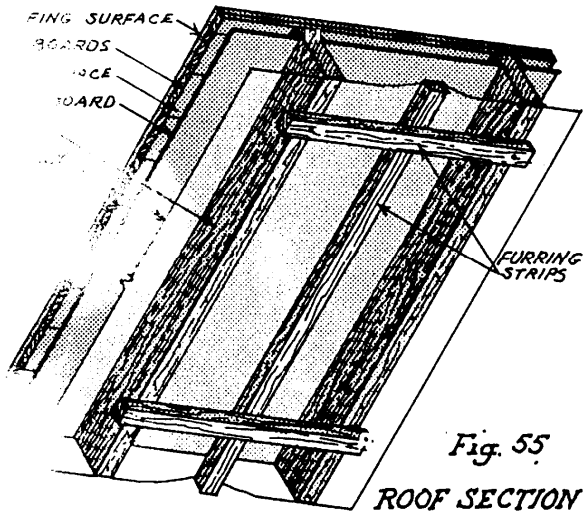


Fig. 55
ROOF SECTION

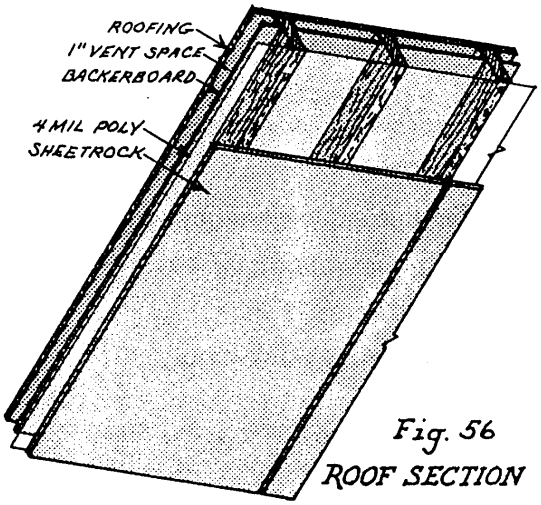


Fig. 56
ROOF SECTION

An alternate method is, after putting in the backerboard and the poly film, instead of adding the furring strips, have the sheetrockers put up all but the top panel of sheetrock. Then foam the cavity from the top. See figure 56, above.

4. For a flat roof, or a low clearance situation as shown in figures 43 and 54, use the method given in #3 above or foam the ceiling joists from the top before the roof is closed in.

PART G--POST AND BEAM COMMERCIAL BUILDINGS

These can be either wood or steel framed and include Quonset and pole buildings.

- Buildings can have either wood or corrugated metal exterior walls and usually no cavity construction or interior wall.
- Use Stick-clip method to create cavity for foaming.
- Stick-clip method works on both ceilings and walls providing that surfaces are dry and warm at the time of installation, and that, if metal wall, the corrugations are not too narrow to take Stick-clips.
- If use of building requires that the wall be protected against damage, then regular cavity wall should be constructed to the necessary height and Stick-clip method used above that.
- Thickness of foam required depends on temperature the owner wants to maintain inside.
- Job usually requires a three man crew.

a) Materials needed

1. Polyethylene sheeting: 4 mil thickness, comes in widths of 8', 12', 16', and greater in roll form. Width needed depends on distance between poles.

2. Stick-clips and washers: size needed depends on thickness of foam to be installed – 2½" Stick-clips for 3" of foam; 3½" for 4" foam; 4-1/2" for 5" foam.

3. Mastic.

4. Good quality panel adhesive.

5. Staple gun and staples.

b) Application of Stick-clips

Ceilings:
If rafters are 16" o.c., no Stick-clips are needed. If rafters are more than 16" o.c., number of rows of Stick-clips needed is based on a maximum spacing distance of 16" apart. For example, beam rafters 4' o.c. would need 2 rows of Stick-clips.

Apply as given for walls in the next section.

Walls:

1. Spread bottom of base of Stick-clip with mastic. Set first row of Stick-clips vertically 12" from pole and spaced a maximum distance of 16" apart. (Refer to illustration below.)

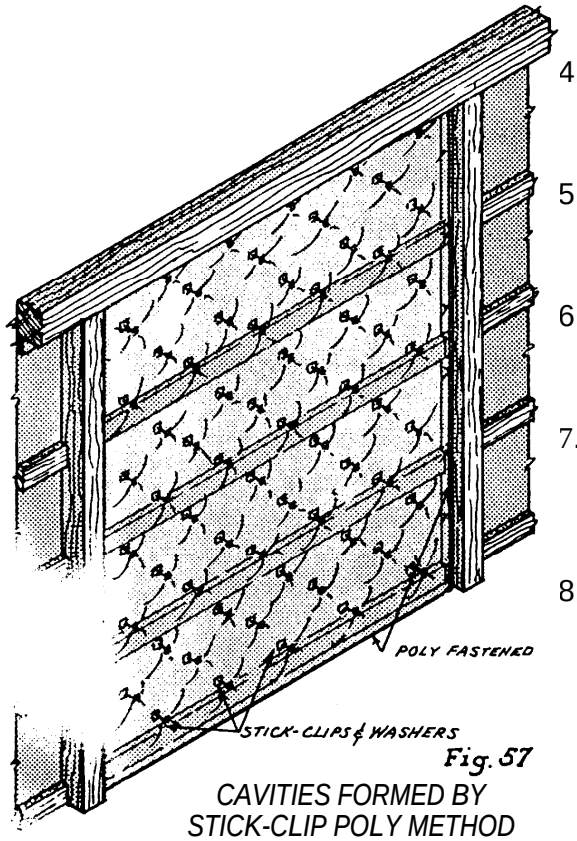
2. Make next row 12" to 16" over and offset from first row to form a triangular pattern.

3. Allow mastic to dry at least 24 hours before foaming.

c) Application of Poly Film

1. Use width of poly that completely spans distance between two poles.

2. Use panel adhesive to seal poly to sides of each pole; the distance out from wall depends on thickness of foam to be applied.



CAVITIES FORMED BY STICK-CLIP POLY METHOD

3. Press poly onto adhesive.

4. With wood pole construction, fold any extra edge of poly over and staple to pole placing staples no more than 6” apart.

5. On steel pole construction, adhesive is only fastening and must be thoroughly dry before foaming.

6. Fasten poly to floor either with adhesive (surface must be clean and dry for adhesive to hold) or with a nailing strip.

7. Fasten poly to beam at top of wall or, if ceiling is also to be insulated, use a continuous run of sheeting for ceiling and wall to insulate and seal roof line.

8. Make poly as taut as possible.

9. Press poly onto the nails of the Stick-clips and put washers on to secure poly.

d) Foaming

1. Make vertical slit, 1 ½” to 2” long, in poly about 1½’ over from pole and spaced 4’ to 6’ up. Make as few slits as necessary to foam each wall section.

2. Insert application hose in slit and pump full, letting plastic belly out. Do not try to work it with your hands.

3. Air pockets will develop and are hard to see from close up.

4. Go back and fill these air pockets by puncturing poly at those places and pump in enough foam to fill the voids.

CEMENTITIOUS FOAM INSULATION

Non-toxic
Water resistant
Non-combustable
Easily installed
Inorganic

PART H - CHECKLIST FOR EQUIPMENT AND TOOLS

I. TOOLS FOR PREPPING AND FOAMING HOUSE

	ABSOLUTELY NECESSARY		SUGGESTED AS GOOD IDEA
1	Large toolbox	1	Asbestos siding cutter
2	One hammer per man	2	Two vinyl siding removers
3	Four nails sets 2 fine-tipped & 2 coarse tipped	3	Two pair nail pullers
4	Two pin punch sets	4	One hand saw
5	Two Wonder bars and/or flat bars	5	One extra heavy duty industrial drill
6	Two pair end nippers (horseshoe nippers)		
7	Two utility knives and extra blades		OPTIONAL
8	Two caulking guns	1	One circular saw
9	Two pair rubber gloves	2	Two ¾” carbide bits (for brick)
10	Three 50’ extension cords	3	Two 1-1/8” carbide bits (for block)
11	Two putty knives One 1-1/2” wide & one 2-1/2” wide	4	One hammer action rotary drill (for block and brick)
12	Trouble light and/or good flashlight	5	Two carbide hole saws (for plaster)
13	Two tape measures – 12’ or longer		
14	One plumber’s snake and/or band iron		
15	One reciprocating saw & extra blades		
16	Three SHARP 2-1/8” bits, two SHARP 1-1/8” bits & one 2-9/16” bit		
17	Dusk mask (for attic)		
18	One 6’ stepladder		
19	Two 18’ (full) extension ladders		
20	Two 30’ (full) extension ladders		
21	One 1-1/4” wide SHARP wood chisel		
22	Window scraper		
23	Nail and/or utility aprons		
24	Clean rags		

II. TOOLS & EQUIPMENT FOR CLEANUP

	ABSOLUTELY NECESSARY		OPTIONAL
1	Garbage bags	1	Lawn or shop vacuum
2	Leaf rake		
3	Broom		
4	Two 30 gallon Rubbermaid garbage cans		
5	150’ High quality garden hose w/ trigger shut-off.		