

## Chapter 19

# THE FINISH FLOORING

You have a wide selection of materials to choose from when it comes to the finish floor. There are hardwoods like oak, maple or birch, or softwoods like southern pine, Douglas fir or redwood. If you prefer, you can use linoleum, or linoleum or asphalt tile. Of course, all the floors in the house need not be finished with the same material by any means. You can use a hardwood or softwood flooring in the living room and bedrooms and a composition type

of flooring in the kitchen, bathroom and utility room.

For years, only hardwood flooring was considered suitable for first-class work, but we are getting away from that school of thought more and more, and today it is not at all unusual to find all the floors in a house covered with linoleum or asphalt tile. Composition flooring of good quality will give many years of service, plus a decorative and colorful effect.

## HARDWOOD FLOORING

Hardwood flooring must not be put down until all the other work inside the house has been completed. It should be the last item on the program. If the walls have been plastered, be sure not to lay the flooring, or even store it in the house until the plaster is absolutely dry. If hardwood flooring is left near wet plaster, it will absorb some of the moisture and expand. Later on, after it is in place, it will shrink and there will be cracks. Do not have the flooring delivered until the day it is to be laid down, and do not have delivery made on damp or wet days. To safeguard the flooring against moisture,

it is best to work with it either during very dry weather or after the heating plant is in operation so that the air in the house is dry.

Hardwood flooring is usually tongued and grooved on both sides as well as at the ends. It comes in different widths, and it is best to use the narrower boards as there is less chance that cracks will appear in the finished floor and also less chance of the boards' cupping. Some brands of hardwood flooring come with a factory-applied finish. These are more expensive than the unfinished flooring, but they are ready for use just as soon as they have



been nailed down. Unfinished flooring must be given some sort of a finish as soon as it is down and before it has been put into use.

### Laying a Hardwood Floor

The first step in laying a hardwood floor is to prepare the sub-floor. This should be done before the flooring is delivered. Sweep the sub-floor clean and then go over it carefully and drive down any nail heads that are sticking up. Check to be sure that the sub-floor is adequately nailed down, because if it is not, you may be troubled with squeaks after the finish flooring is in place. Any high spots on the sub-flooring should be taken down. Be sure that it is absolutely dry. As soon as you are satisfied with the condition of the sub-floor, cover it with a layer of 15-pound asphalt felt. Lay the paper from wall to wall and allow the strips to overlap about 4".

Flooring is usually laid along the longest dimension of the room. The first step, then, is to lay one board up against the wall with the tongue edge facing out. The groove edge should not quite come to the outside surface of the baseboard. See Fig. 1. If the sub-flooring was laid straight instead of diagonally, the finish flooring must be laid at right angles to it. The first strip is nailed with 10d floor nails driven right straight down through the board at the groove edge. The nails should be spaced about 10" apart and should be near enough to the edge so that they will be covered by the shoe

molding. The first strip of flooring can also be nailed through the tongue. You will see from Fig. 1 that the nail is driven in where the tongue leaves the shoulder, and at an angle of between 45° and 50°. Do not try to drive the nail all the way down with a hammer as you may easily strike the wood and damage it. Use a nail-set or another nail to finish off the driving in and to countersink the head.

The correct type and size of nail to use will depend on the wood and the thickness of the flooring. This information can be obtained from the lumber yard.

Each board should fit snugly against the next, but do not drive them up against each other with too much force for this may damage the wood and cause cracks later on. The best way to get one board tightly up to the next is to use a scrap piece of flooring. Slip the groove edge of the scrap piece over the tongue of the board that is being installed and then tap the edge of the scrap board with the hammer. This will push the floor board up tight.

It is the practice these days not to have thresholds on interior doors and, therefore, it is not necessary to break the flooring when you come to a door. It can be carried right on through into the next room. Use the long runs of boards where appearance counts the most and save the short lengths for halls, closets, etc.

You want to be sure that the two strips of flooring near the baseboards are parallel to the wall. The first strip



can be made parallel before it is nailed down. When you have come to within a few feet of the opposite wall, check and see if the flooring is parallel with it. If not, you can take off a little of the groove edges and so bring the last board parallel with the baseboard.

Baseboards can be installed either before or after the flooring is in place. Fig. 8 in Chapter 18 shows how the shoe molding is nailed in place. Note that the nail does not go through either the flooring or the baseboard but goes right past each into the sub-flooring. The reason for this is to make sure that there will be no cracks between the baseboard and shoe or the finish floor and shoe, even though there may be some shrinkage. As soon as the finish floor is down, apply a finish. This is

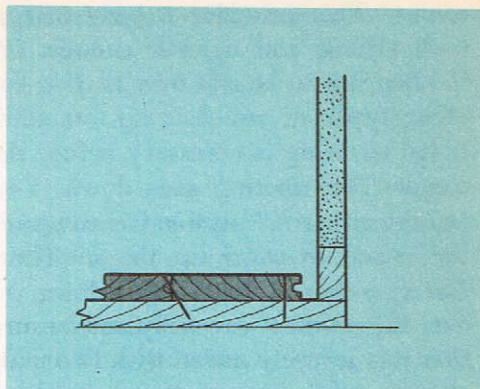


Fig. 1. How the first strip of flooring should be nailed down. Note that this strip does not come up against the wall but is kept a fraction of an inch away. This is to prevent the floor from buckling should the wood expand.

covered in the chapter on Painting and Finishing.

### SOFTWOOD FLOORS

This type of flooring is installed in exactly the same manner as hardwood flooring except for the size of nail, which will depend on the thickness of

the wood. If  $2\frac{5}{32}$ " softwood flooring is used, 8d wood flooring nails are used and they are spaced at least every 10 inches.

### COMPOSITION FLOORING

Rather than using wood floors throughout the house, you may prefer one of the many types of composition floor coverings, such as linoleum or asphalt, or linoleum, rubber or plastic tile. These can be used along with some floors of hardwood or softwood, or the entire house can be floored with them. All these materials come in numerous designs and colors and are suitable

for every room throughout the house. As a general rule, no type of composition floor covering should be laid over a single sub-floor. It is done, of course, but it is not wise because it reduces the wearing ability of the flooring and so there is nothing really saved. About the only exception is when the sub-floor is made out of  $\frac{5}{8}$ " plywood securely nailed to joists spaced 16" on



center. This provides a base that is both strong and smooth enough for the flooring to be laid over it. But for other types of sub-flooring, an additional covering is necessary before the composition flooring goes down. You can use either  $\frac{3}{8}$ " plywood or composition wood to cover up the sub-floor. Before either of them is put down, go over the sub-floor carefully and be sure that it is securely nailed with two nails at each point where a board crosses a joist. Drive in any nail heads that may be sticking up and be sure that there are no squeaks. If there are, you can usually take care of them by driving an extra nail into the joist at the point of the squeak. If you do not take the squeaks out now, you may find it impossible to remove them after the floor covering is in place. Any boards that are cupped should be planed or sanded down. Only after all these precautions have been taken can the plywood or composition wood be nailed down. Both should be nailed with rosin-coated nails spaced about 6" apart. Remove any grease or oily marks and, if necessary, coat the surface with a size to seal the wood pores so that the adhesive used for the final floor covering will make a strong bond.

#### Laying Linoleum

Linoleum should always be laid over a felt base. The felt is cemented to the flooring with a linoleum cement, and the linoleum is in turn cemented to the felt. The seams between the sections of felt should run at right angles to the

seams between sections of linoleum, so decide in advance where you want the seams in the linoleum to run and then lay the felt in the other direction. Be sure that the felt is on smoothly and that there are no bulges in it.

Linoleum becomes rather brittle in cold weather and, therefore, it is wise to let it lie loose in a heated room overnight or longer before you work with it, if the outside weather is cold.

When you are ready to start work, cut the felt and cement it in place. Seams between strips of felt should be butt joints but do not let any of the strips overlap. Once the felt has been cut and fitted, apply the cement to the floor. The best tool to use for this job is a linoleum-paste spreader. Now the felt goes into position. It should be rolled down—a kitchen roller will do nicely for this—so that it is absolutely flat. Next the linoleum itself can be put down.

Roll the linoleum out and start to fit and cut it. The best tool for cutting is a linoleum knife. The linoleum should not come up directly against the plaster or sole plate. Leave a small gap at these points to take care of expansion of the linoleum. The gap can be covered later on with wood trim. Fitting around doors and other places where accurate cutting is necessary can be easily done by making a pattern out of heavy paper. Cut this pattern so that it fits perfectly and put it into place. Coat it with glue and then roll the linoleum down over it as far as the linoleum will go. The paper will stick



to the linoleum so that, when the linoleum is rolled back up, the pattern will be in place and you can easily mark the linoleum for cutting.

Once the linoleum has been cut, it is ready to be cemented in place. It is a good idea to use waterproof cement around all seams as this is the point where water usually gets in to soften up ordinary cement. After the linoleum is down, go over it with a 150-pound roller so that it will be flat and tightly joined to the felt.

You can either rent or borrow this roller quite readily from your linoleum dealer.

#### **Linoleum and Asphalt Tile**

These tiles come in different sizes and can be purchased in either squares or rectangles. As for getting the floor ready and putting down the felt, the procedure is the same for either type of tile as for regular linoleum.

Few rooms are absolutely square, and it would be a mistake to start laying the tile at one side and work over to the other. The chances are that before you got very far you would see that the tiles were not coming out straight, but at that point it would be too late to do much of anything about it. The best way to lay the tile is to find the exact center of the room after the felt is down and lay the tile from this point out towards the edges of the room.

Measure the width of the room at each end and then find the midpoint

between each of these measurements. Run a chalk line between these two midpoints. Measure this chalk line and find its midpoint. Use a large square to run lines from this point to the two opposite walls. Now you have located the exact center of the room and, in addition, you have divided the room into four quarters.

Next, starting at the exact center, lay a few feet of the tile dry in whatever pattern you have selected. If you are satisfied with the pattern and also that the tiles are coming straight, take them up and apply the cement to the felt. Do not apply the cement over the entire floor or even to an entire quarter. Just cover as much as you can reach from one spot. Working from the center point, press each tile into the cement, getting the joints between them as snug as possible. Do not try to push too hard because you may move one of the tiles out of alignment. If you kneel on the tile it will help to hold it in place. Continue to lay the tile until one entire section has been finished.

Tile for the border will have to be fitted and then cut to size.

As soon as one quarter of the floor has been completed, go back over it carefully and, using a mallet, press down all the seams. Wipe off any excess cement that may be on the tile or around the seams.

You can now move on and do the other three quarters in the same manner, always starting from the exact center-point of the room.



### PARQUET HARDWOOD FLOORING

Instead of using a conventional type of hardwood floor, you may prefer a parquet floor. This is made out of squares of hardwood flooring that are themselves made out of strips of flooring glued together. The square is mounted on a felt base and each square is cemented in place with a mastic.

This type of flooring is installed in much the same fashion as asphalt or linoleum tile. Again the best place to

start work is the exact center of the room, for this will insure that the sections of flooring are straight regardless of the fact that the room may not be quite square.

After the center of the room has been determined, apply the mastic to a few square feet of the sub-floor in one quarter and set the sections of flooring into place. The sections are butted tightly against each other.

### FINISHING HARDWOOD FLOORS

Floors should be given a protective finish just as soon after they are put down as possible. If you delay doing this job for very long, the flooring is almost sure to become rough and worn and dirty and, when you finally get around to putting on a finish, you will find that you have made a great deal of extra work for yourself.

The first step in finishing the floor is to make it smooth. You can do this by hand with a scraper and sandpaper, but you will find that doing it this way will take forever. It is much more practical to rent an electric floor-sander from your lumber dealer or hardware store. Along with the large floor-sander, you will need an edger, which is a small sanding machine that enables you to sand to within about  $\frac{1}{2}$ " of the wall and in the corners where the large sander cannot reach. There will be a few spots that even the edger cannot touch; these you must do by hand.

The first sanding should be done with No. 2 grade sandpaper. Go across the grain first and then finish up by sanding with the grain. This first sanding with a coarse grade of paper will take out most of the high spots in the flooring. Now put a No.  $\frac{1}{2}$  grade sandpaper on the machine and work the floor over with this. Go down through successive grades of sandpaper until you end up with a No. 00 sandpaper.

Be sure to keep the sander moving at all times when the paper is touching the floor. If you do not, you may scar up the flooring a little. Another point to watch out for is the condition of the sander. If it is worn and not absolutely level, it will do more harm than good.

After you have finished with the power sander, go back and do by hand any areas that are left over. Use the same grades of sandpaper on these that were used with the sander.



Once the floor has been sanded down, do not walk on it until the finish is on. If you do, you will leave footprints that will have to be sanded out.

Now dust the floor and it is ready for the finish. You have a choice of several materials for this.

### **Varnish**

This finish can be used on any type of flooring. The usual method of applying it is to use three coats. Special floor varnishes should be used. Varnish intended for interior trim or furniture does not have the wearing quality of floor varnish. The drawback to varnish as a finish is that it must be waxed to prevent wear and, unless the wax is applied in thin coats, the floor will be slippery. Another drawback is that it takes a good while to complete the finish as each coat must be given ample time in which to dry hard before the next coat is applied.

If you wish, the floor can be stained before the varnish is applied. Stains are applied with either a cloth or brush. After the wood has had time to absorb some of the stain, the excess is wiped off with clean cheesecloth. After the stain has been applied, a filler of one sort or another is required. You can use a paste or liquid filler or shellac. When the filler is hard, it should be given a sanding with No. 00 sandpaper.

Now the varnish can be applied. Exercise the same precautions in applying floor varnish as are outlined for varnishing trim in the Chapter on Painting and Finishing. Be sure that

the floor is clean and that there are no pockets of dust in the corners.

### **Shellac**

Probably more floors are finished with shellac than with any other type of finish. It provides a very high luster and, because it dries so rapidly, an entire finish can be applied to a floor and the floor can be ready to be walked on in twenty-four hours or so. The disadvantage of shellac is that, like varnish, it must be protected by wax to prevent wear and scratching. Another disadvantage is that when shellac becomes wet it turns white.

If you are going to use shellac for a finish, be sure that it is pure shellac and not some sort of substitute. It should not be over six months old and should be in a glass container because, if it has been in contact with metal for very long, it may discolor certain woods. Shellac is sold as either a 5-pound cut or a 4-pound cut. For floor finishes, use the 4-pound cut and add 1 part denatured alcohol to 2 parts shellac as it comes from the can. Be sure that you use denatured alcohol and not anti-freeze.

Shellac can be applied over a stain or right over the natural wood. You will need 3 thin coats. Give the first coat at least three hours in which to dry. After this, give the finish a sanding with No. 00 sandpaper. Dust the floor clean and apply the second coat. This should be given a longer drying period than the first coat; twelve hours is about right. Sand this coat down with



No. 00 sandpaper after it is hard, and then apply the third coat.

For best results with shellac, it should be applied when the temperature is between 70° and 75°. The atmosphere should be dry because if it is damp, the shellac will dry with a cloudy appearance. The floor should be waxed after the final coat of shellac has had at least eight hours in which to dry. A paste wax should be used for this purpose. And you will save a good deal of time by using an electric waxer to do the job—it not only speeds up the work, but you will be able to get the wax on in thin coats that will not make the floor slippery.

#### **Floor Seals**

Floor seals are somewhat different from either varnish or shellac. While varnish and shellac remain on the sur-

face of the wood to form a protective coating, a floor seal goes into the wood's pores. These penetrating seals make an excellent finish. Although they do not have quite the same luster as either shellac or varnish, they are easily patched when worn spots appear and they take wax without becoming too slippery. Usually two applications of a seal are necessary, but in some work only one is required. Seals are applied to the floor with a wide brush or mop. The floor must first be sanded smooth.

There are a great many different brands of floor seals on the market. As the directions for application will vary according to the brand, it is not practical to give detailed instructions. The important thing to do is to read over the manufacturer's directions carefully and then apply the seal in the prescribed manner.

### **CONCRETE FLOORS**

Floors of this type can be covered with wood flooring, with a resilient type of flooring such as linoleum, with paint or merely with carpets. If radiant-floor-panel heating is used, wood flooring should not be put down because the space between the wood flooring and the concrete would act as insulation and prevent the heating system from working adequately. Even if the wood flooring is cemented directly to the concrete, the insulation value of the wood itself is enough to prevent the heating system from working properly. Other types of floor covering can

be used with success with radiant-floor-panel heating.

#### **Wood Floors on Concrete**

There are two ways that flooring of wood can be placed over a concrete sub-floor. One method is to put down wood sleepers and nail the floor boards to these. The other method is to use parquet flooring that is specially prepared at the factory and can be cemented directly to the concrete with a special mastic.

The sleepers for regulation hardwood flooring can be embedded in the



concrete when it is poured or anchored to it with metal clips. If the concrete is already in place and hard and no provision for anchoring the sleepers was made, they can be attached with masonry anchors. The sleepers should be spaced every 16" on center and should run at right angles to the finished flooring.

After the sleepers are in place, they should be covered with waterproof building paper. This is necessary to keep any moisture away from the flooring. After the paper is down, the floor boards are nailed to the sleepers in exactly the same fashion as if you were nailing them to a wood sub-floor.

### **Resilient Flooring**

Before you attempt to lay any of the resilient floor coverings such as linoleum, asphalt tile, rubber, etc., you should make sure that the concrete slab is absolutely dry. This can be done by placing a piece of tar paper over a section of the floor and allowing it to remain down for twenty-four hours or so. At the end of this period, pick it up and see if there is any moisture on the underside.

There are some types of floor covering that can be used over a damp base, but most require a base that is dry throughout the entire year.

After you have made the test with the tar paper, you can go to work and install the covering that you have selected. First of all, get a copy of the manufacturer's specifications for laying that type of covering on concrete

floors. The reason for this is that some types of covering require a felt lining, while others require that the floor first be coated with a special primer and the flooring cemented directly over this rather than to a felt.

As for the actual application of either linoleum or one of the types of tile, the same methods of cutting and fitting are used for concrete sub-floors as were described for use on wood sub-floors.

### **Ceramic and Clay-Tile Covering**

You can, if you wish, cover the concrete-slab floor with ceramic, clay or concrete tile or even with flagstone. Any of these coverings will, of course, give you a long-wearing floor that is easily cleaned and very hard to damage.

The first step is to apply a coat of cement grout over the concrete slab. Before this has a chance to harden, it is covered with a  $\frac{3}{4}$ " thick mortar bed. This is made with 1 part Portland cement, and from 3 to 4 parts clean fine sand. Add just enough water to get a plastic that has a workable consistency. Do not mix up more mortar than you can cover with flooring in 30 minutes.

The tiles are set into this mortar bed and tapped into place. Be sure that they are level and even. A small joint is left between each tile and this can be filled later with a thin mortar made with 1 part cement and 1 part sand. Force it into the joint and then wipe off any surplus on the tile before it has a chance to harden.



### Painting Concrete Floors

Concrete floors can be painted with ordinary oil paints intended for floors or with special concrete-floor paints that will not be damaged by dampness or the active lime that is present in fresh concrete. If an ordinary oil paint is used, it is important to know that the floor is perfectly dry. You can use the tar-paper method previously described to make sure that there is no dampness present. You will have to neutralize the lime in any event. Make a solution of 3 pounds of zinc sulphate to a gallon of water. Brush this on the

concrete and use plenty of it so that it will soak in. Allow several days for the concrete to dry and then brush off the crystals that have formed on the surface. After this, the floor is ready for paint.

Special synthetic oil paints do not require this treatment. They can be applied directly to the concrete.

Floors in unfinished basements are often given no finish at all. If the concrete tends to be dusty, it can be coated with a concrete hardener, which will keep it from sanding and can be painted over at some later date.