

upholstering methods

Fred W. Zimmerman



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by
FRED W. ZIMMERMAN

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INTRODUCTION

UPHOLSTERING METHODS is designed to provide a broad experience for the beginner who wants to master the basics of reupholstery. It will provide a solid foundation in all upholstery processes, through the use of tools, materials and techniques that are basic to this important area. Special attention has been given to the selection of the upholstery covering.

After the various processes have been mastered through the easy-to-follow step-by-step detailed instruction of the text, which are supplemented by numerous photographs and diagrams, the user will have the opportunity to try out newly acquired skills on a small scale. A section of UPHOLSTERING METHODS is devoted to the building and upholstering of a small furniture piece. Thus, if a larger project might seem overwhelming, the smaller one will provide a meaningful experience and assure success.

Fred W. Zimmerman

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Section 1

UPHOLSTERY MATERIALS AND EQUIPMENT

As is true of any other occupation, upholstery or reupholstery requires certain tools which are especially designed for the job. Likewise, it depends on materials which have special qualities and characteristics. This section introduces you to the furniture frame and its

parts; to adhesives and fasteners; to padding, springs and twine; to stains, sealers and varnishes. It also describes all the tools you will use from bolt cutters to upholstery pins. Finally, it explains about upholstery fabrics and their care.





Examples of some of the upholstered furniture offered by an American manufacturer today. Skilled upholsterers are needed when such furniture is built. Their skills are also in demand to restore used furniture to its original beauty and usefulness. (Bassett Upholstery Division)

Chapter 1

UPHOLSTERING MATERIALS

Upholstery materials come from all over the world. Wood for building or repairing furniture frames, cotton and moss for padding of seats and backs come from the United States. But many other materials are imported. For example:

1. Most jute and hemp fibers come from India.
2. Curled hair is brought from South America.
3. Kapok is produced in Java.
4. Needles are made in England.

In this chapter we will discuss the nature, uses and purposes of upholstery materials. Each will be described in the general order in which it is used during upholstering.

FRAME COMPONENTS

Frame components include materials of metal and wood which become a part of the structure of the frame itself. It also includes those parts whose function is to attach or reinforce the structural parts.

DOWELS, PEGS AND BLOCKS

Dowels are round wood pieces usually made of birch. They are made in diameters of 1/8 to 1 in. (3 mm to 2.5 cm) and in 3 ft. (91 cm) length. Dowels are frequently

used to reinforce wood parts fastened together with glue. Dowel pegs with spiral grooves usually 1 1/2 in. or 2 in. long, are specially made for wood joints. The grooves allow air and excess glue to escape during assembly and the clamping process. See Fig. 1-1.

Glue blocks are small pieces of wood attached to the frame with glue or metal fasteners to strengthen or brace joints. See Fig. 1-2. Glue blocks also serve as supports for attaching feet or legs under upholstery frame seats. Sometimes they anchor a slip seat to an upholstery frame.

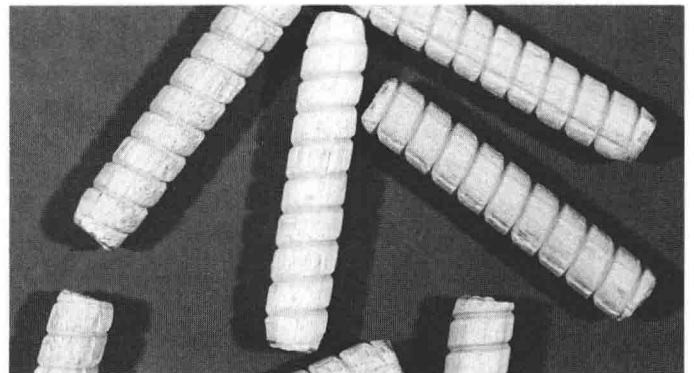


Fig. 1-1. Hardwood dowels and glue make strong butt joints.

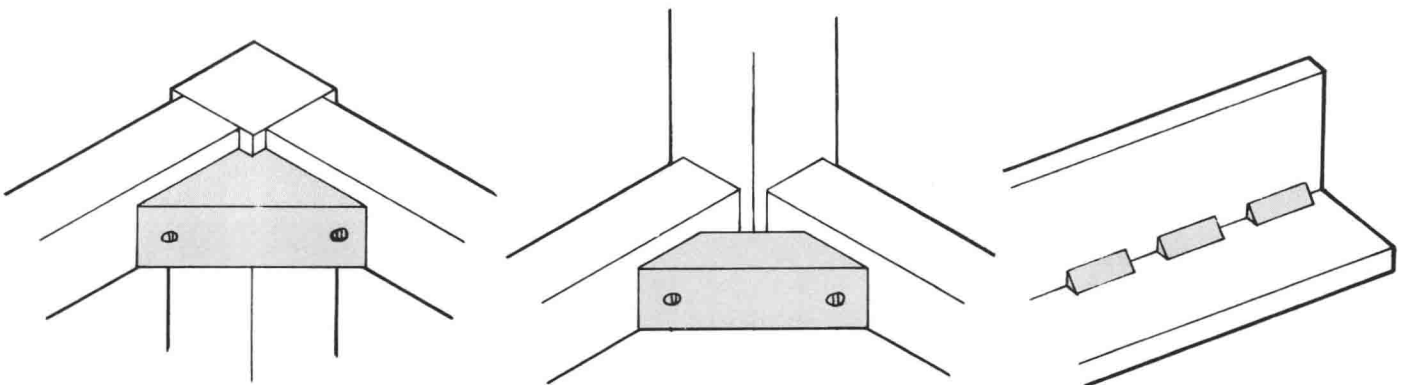


Fig. 1.2 Glue blocks are another device used to reinforce corner joints. On slip-seated chair, they reinforce the joint, hold the legs against rails and provide a base to which the slip seat is fastened.

Upholstering Methods

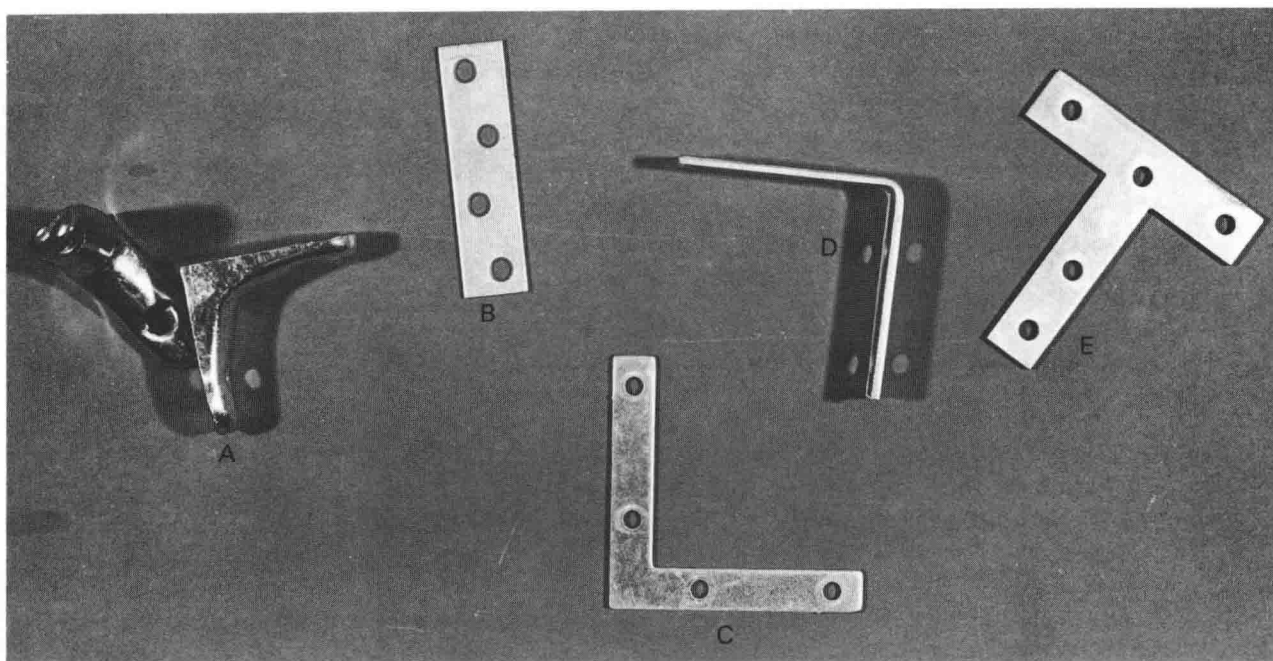


Fig. 1-3. Metal braces and plates provide satisfactory reinforcement where they can be hidden from sight.
A—Chair brace. B—Flat plate. C—Flat corner. D—Bent corner. E—T plate.

METAL STRAPPING AND BRACES

Chair braces, being strong and rigid, are used to strengthen chair joints, particularly near the seat. Chair braces are also useful for attaching furniture frames to tops. Repair strap metal plates are available in a variety of shapes, Fig. 1-3. They can be used on chairs, couches, tables and other furniture.

ATTACHING PLATE AND HANGER BOLTS

Legs are more easily installed with attaching plates and hanger bolts, Fig. 1-4. The hanger bolt has a wood screw thread on one end and a machine screw thread on the other end. The wood screw thread is turned into a hole drilled in the leg and the machine screw thread is fitted into a nut joined to the attaching plate.

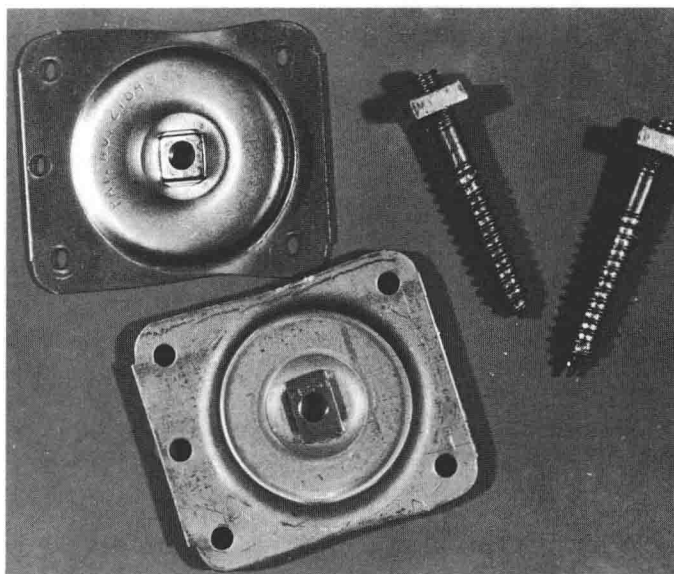


Fig. 1-4. Legs can be easily detached when attaching bolts and hangers are used. Hangers have threaded holes to receive bolts.

GLIDES

Either tilt-base or stationary glides, Fig. 1-5, can be used beneath furniture legs and feet. Glides protect the legs, stabilize furniture, and help in moving it about. Glides also protect the floor.

Fig. 1-5. Glides protect bottoms of chair legs. Left. Tilt-base glide. Right. Stationary glide.

ADHESIVES AND FASTENERS

Adhesives stick to the surfaces of the materials they are holding together. Fasteners grip the materials mechanically, usually by friction, after the fastener is embedded in the material. Each has its special uses in furniture construction, as we will see.





Fig. 1-6. Typical cements. Some can be used directly from the container; others must be mixed before use. Contact cement offers instant bonding.



Fig. 1-7. All of these glues are satisfactory for bonding of woods and other furniture materials.

Many adhesives have been developed with special purposes and properties. A variety is shown in Fig. 1-6 and Fig. 1-7.

Method of application differs with type of product. Always read the manufacturer's directions carefully before using any cement or glue.

RUBBER CEMENT

Rubber cement bonds paper, cardboard, felt, and other light, porous materials. Especially useful in preparing patterns, it is available in ready-mixed, liquid form. Rubber cement is brushed on to the surfaces of both pieces to be attached. When the cement has dried to a dull appearance, the two pieces can be carefully pressed together.

FOAM CEMENT

Foam cement is specially made to adhere foam cushion material to other seat material. It is available in brush or spray form.

CONTACT CEMENT

Contact cement is frequently used to fasten veneer or laminated plastic to other surfaces. It is sold in liquid form and may be applied with a brush, roller, or spray gun. One or more thin coats are applied to the bonding surfaces of both pieces. When dried (usually after 30 minutes) to a dull appearance, the surfaces are carefully brought together.

As the name implies, this cement bonds instantly on

contact of two coated surfaces. Keep the pieces separated with wrapping paper or dowel rods until properly positioned. Once in contact, parts cannot be shifted. Then, working from one end, begin removing the dowels or paper and press the two parts together. Move toward the other end, pressing from the center outward, and removing the separating materials a piece at a time. Roll the surface with a large dowel or rubber roller to remove air pockets. Tapping the surface with a block of wood and a mallet will also help bond the surfaces together.

PLASTICS CEMENTS

Plastics cements are useful for repair jobs on a variety of materials. These cements usually come in tubes.

Airplane cement, a common plastics adhesive, sets quickly and hardens overnight to form a waterproof bond. It can be used to fasten porous or impervious materials.

One of our strongest adhesives is epoxy cement. It is usually packed in two separate parts, a resin and a catalyst. These are mixed in small amounts as the cement is used. Epoxy cement usually requires six to eight hours curing time, but some types set in five minutes and cure in one hour.

ALIPHATIC RESIN GLUE

Aliphatic resin glue is a cream-colored, nonstaining liquid adhesive which comes in ready-to-use form. A very strong glue, it produces a joint, if properly made, that is stronger than the wood itself. It is highly resistant to heat and chemicals. When dry, aliphatic resin glue sands easily without clogging sandpaper.

This glue sets quickly, requiring only about 45 minutes curing time at temperatures above 70 °F (21 °C). It can be used at temperatures as low as 40 °F (4 °C). Aliphatic resin glue is excellent for use on upholstery frames and furniture. Its chief disadvantage is its inability to resist moisture. However, it is a good choice for interior work.

WHITE LIQUID RESIN GLUE

White liquid resin glue (polyvinyl acetate) comes in convenient squeeze bottles. It spreads easily at temperatures above 60 °F (16 °C). White glue is strong and has good gap-filling qualities. It sets and dries quickly, usually requiring only about 30 minutes of clamping time. Only enough pressure is required to pull the joints tightly together. Twenty five psi or 172 kPa of clamping pressure should be sufficient.

Polyvinyl glue dries by moisture absorption and evaporation. When dry it is flexible and colorless making it ideal for furniture and cabinetwork. A disadvantage is its lack of resistance to heat and moisture.

Remove excess glue before sanding to prevent clogging the sandpaper.

ANIMAL GLUE

Animal (hide) glue, made from hides and hooves, is one of the oldest wood glues. A liquid form is packaged in plastic squeeze bottles for easy application and storage. Being difficult to prepare, the dry form is seldom used, except by expert gluers on production jobs. It must be dissolved in water, heated to about 140 °F (60 °C) and applied hot.

Hide glue is excellent for furniture and cabinetwork. Since it is not waterproof, it should be used only for interior work. Hide glues should be clamped 3 to 4 hours at temperatures above 70 °F (21 °C).

PLASTIC RESIN GLUE

Plastic resin glue (urea-formaldehyde) is highly moisture resistant and very strong when used properly. It is most suitable where it will be subjected to large amounts of moisture for a short time. However, plastic resin glue should be used only with non-oily woods.

A powder, it is mixed with water to a creamy consistency. It is easy to use, becoming hard and brittle when dry. Drying, a chemical process, takes place slowly. Thus, there is plenty of time for clamping.

Plastic resin glue should be used only on stock with well-fitted joints. The joint should be clamped securely for six to eight hours or longer at temperatures above 70 °F (21 °C). Additional heat is desirable since it helps set the glue. Certain compounds of this glue are used with electronic gluing equipment.

RESORCINOL RESIN GLUE

Packaged in powdered form, this glue is mixed to a creamy consistency with a liquid catalyst and water immediately before use. Being a very strong, waterproof glue, it can be used with materials subjected to large amounts of moisture. Resorcinol glue, however, creates an unwanted dark glue line and requires 12 to 16 hours of clamping time at temperatures above 70 °F (21 °C).

CASEIN GLUE

Casein glue is made in powder form primarily from milk curd. Before use, it is mixed with cold water and allowed to stand a few minutes. Then it is further mixed to a creamy consistency. It is a strong glue requiring moderate clamping time. Casein glue can be used at temperatures just above freezing, but it works better at warmer temperatures. It is water resistant and especially useful with oily wood, such as cypress. Casein glue has a tendency to stain some woods, like maple and oak.

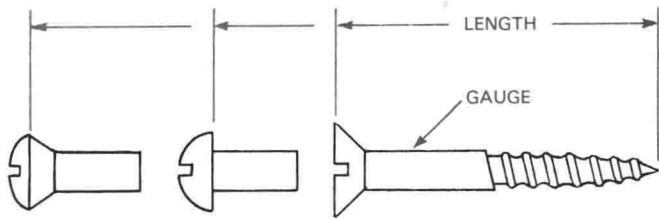


Fig. 1-8. Screw length is measured from its tip to point on head which is at surface of material it is holding. Left. Oval head screw. Center. Round head screw. Right. Flat head screw.

SCREWS

Screws fasten hardware and pieces of wood which may need to be disassembled later.

Many kinds and sizes of screws are made from mild steel, brass, aluminum and other metals. Finishes include bright, blued, zinc chromate, brass, copper, nickel, and chromium. Diameters are given by gage numbers from 0, the smallest, to 24. Lengths are marked in inches from 1/4 to 6 in.

Flat head screws are designed so the heads rest flush with the surface of the wood or slightly below it. The entire screw, head to point, is measured to determine its length. Since heads of round head screws fit on top of the wood surface, the length is measured from under the head to the tip. Heads of oval head screws are partially recessed into the wood surface. The length is determined by measuring from the point of recess to the tip of the screw point. See Fig. 1-8. Heads of screws may be slotted to take a regular screwdriver or recessed to take a Phillips screwdriver.

UPHOLSTERY MATERIAL

Attached to the furniture frame are the materials which provide the comfort built into upholstered furniture. Included are not only the padding and the covers but the materials which provide support, such as tacks, springs and webbing.



Fig. 1-9. Jute webbing is sold in rolls.

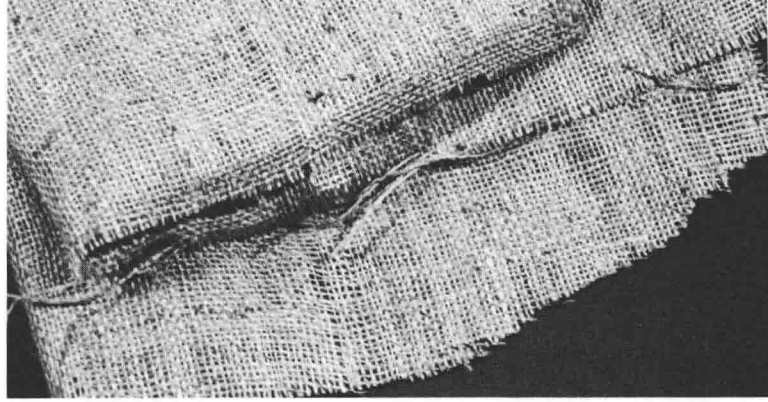


Fig. 1-10. Burlap is a coarse-woven jute or hemp fabric. Heavier weights—12 oz. and above—are recommended for upholstery use.

WEBBING

Webbing provides support for padding materials or springs. Jute webbing, a closely woven strap or tape, is made from jute fibers. It is very strong and comes in widths of 3, 3 1/2 or 4 in. (7.5, 9 or 10 cm) by 72 yd. (66 m) or more long. Jute webbing, generally khaki colored, is available in three quality grades. Grades are indicated by colored stripes running the length of the webbing. Red stripes indicate the highest grade and black the lowest. See Fig. 1-9. Webbing is also made of rubber, plastic, wood and steel.

BURLAP

Burlap is a coarse, strong fabric loosely woven from jute or hemp. Widths range from 36 to 100 in. (91 to 254 cm) but a 40 in. (102 cm) width is most common in upholstery. Weights usually range from 8 to 16 oz. (0.23 to 0.45 kg). Burlap is generally used to cover springs before installing padding materials. It is also used for edge rolls and as a foundation base over webbing, Fig. 1-10.

MUSLIN

A lightweight, cotton cloth, muslin is sold unbleached or bleached. It is an open-textured fabric often used as the first covering over padding materials. This covering helps produce the right density of padding, eases installation of the final covering and gives it a smoother appearance. See Fig. 1-11.

Fig. 1-11. Muslin is often used to encase padding materials—especially if they are loose—before final covers are installed.



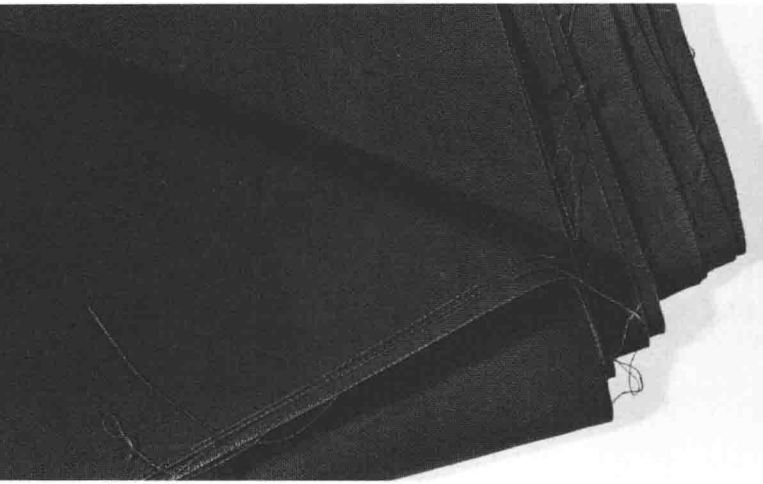


Fig. 1-12. Denim is a strong, usually inexpensive fabric used as covering material where it will not show.

DENIM

Denim is a strong, twilled cotton fabric, Fig. 1-12. It comes in plain colors or has a small pattern woven into it. Plain denim is sometimes used for upholstering under loose cushions. Figured denim is used for upholstering furniture and for mattress covers.

CAMBRIC

Cambric is a lightweight fabric, generally made of cotton. It is sized and glazed during manufacture to render it dust resistant. White cambric is often used for cushion and pillow casings. Black cambric, Fig. 1-13, being less conspicuous, is used on the bases of upholstered furniture to catch loosened stuffing materials and to keep out dust.

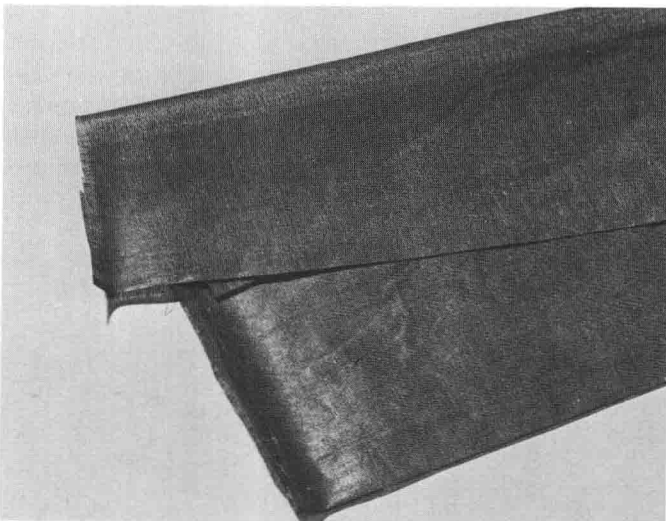


Fig. 1-13. Light and inexpensive, cambric is chiefly used as a covering for undersides of furniture. White cambric is sometimes used to encase stuffing for pillows.

UPHOLSTERY FASTENERS

Upholstery tacks have flat heads and are made of steel with blued finish. Tacks fasten upholstery fabrics to frames in unexposed areas or in areas where they can be hidden with more decorative materials. Sizes range from No. 1 to No. 24. Numbers 3 to 14 are generally used in upholstery. The best size is determined by strength needed, thickness of materials being fastened, and quality of frame. Tacks are packaged in 1/4 lb. containers and larger. See Fig. 1-14.

Gimp tacks are designed to fasten cloth gimp (narrow decorative edging) and other outside covering materials to exposed portions of furniture frames. The small round heads are easily concealed in the nap of the fabric.

Gimp tacks, though considered obsolete for modern upholstery methods, are still useful to have. They are made of steel which is coated for rust protection. See Fig. 1-15.



Fig. 1-14. No. 12 upholstery tacks are quite large. The larger the number the larger the tack.



Fig. 1-15. Gimp tacks are packaged in 1/4 lb. and larger containers. Sizes range from No. 2 (5/16 in.) to No. 8 (10/16 in.).

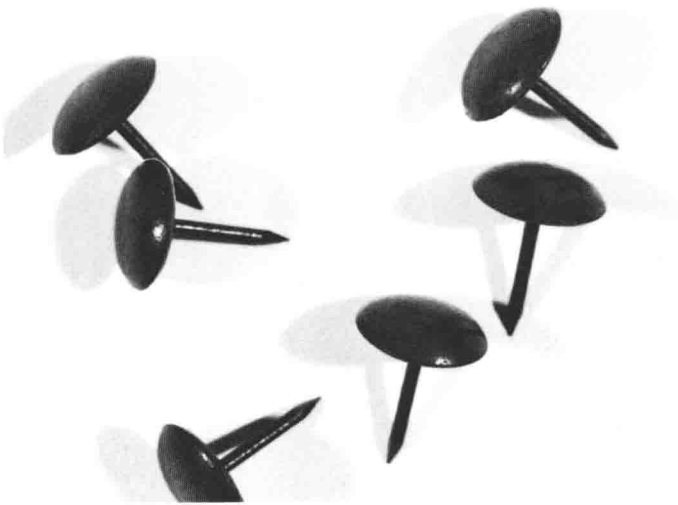


Fig. 1-16. Metalene tacks are used to attach vinyl plastic gimp. They are decorative and come in several colors.

Metalene nails, generally made of steel, have large, rounded heads $\frac{1}{4}$ to $\frac{1}{2}$ in. in diameter. See Fig. 1-16. They are available in several colors in packages of 1000. Their most frequent use is for attaching and decorating vinyl gimp trim.

Furniture nails are made of either brass or steel. Heads are large, measuring $\frac{1}{4}$ to $\frac{1}{2}$ in. (6 mm to 1.2 cm) in diameter. Made in several designs, shapes and finishes, these fasteners are color coordinated to a variety of furniture coverings.

They may be used for:

1. Decorative purposes.
2. Attaching gimp to furniture.
3. Attaching coverings to furniture.

Like metalene nails, furniture nails are packaged in quantities of 1000. See Fig. 1-17.

Fig. 1-17. Furniture nails also have decorative heads. Top. Smooth finish. Bottom. Hammer finish.

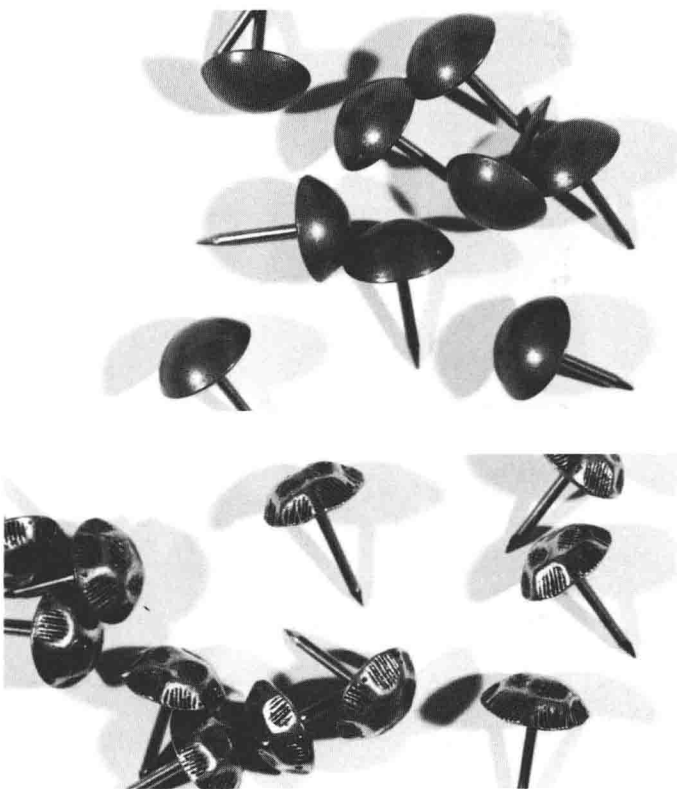


Fig. 1-18. Staples, such as these, are meant to be used in tack guns. Single bars are loaded into the gun. Spring action feeds staples to the driving head one at a time.

Staples are pieces of wire bent to a "U" shape. They have a sharp point at either end to make driving easier. Lengths range from $\frac{1}{4}$ to $\frac{9}{16}$ in. (6 mm to 1.4 cm). They are made up in bars by temporarily attaching the staples to one another horizontally. See Fig. 1-18. The bars, of uniform length, are inserted into a gun which drives the staples one by one. The gun is powered by electricity, air pressure or by a strong spring. Usually the staples are packaged in quantities of 5000. They are useful for attaching a variety of materials to furniture frames.

Sinuous (no sag or zig-zag) clip nails are made of hardened steel, 14 gage or heavier and in lengths of $\frac{3}{4}$ to 1 in. They are usually barbed or cement coated for greater holding strength and are used to fasten spring clips to furniture frames. Sinuous nails are sold in 1 lb. packages or in larger quantities, Fig. 1-19.

Upholstery-covered buttons are used as decoration and to shape final covering and padding materials. Buttons are covered by hand or machine to match the final covering material used. You can generally purchase covered buttons from upholstery supply companies.

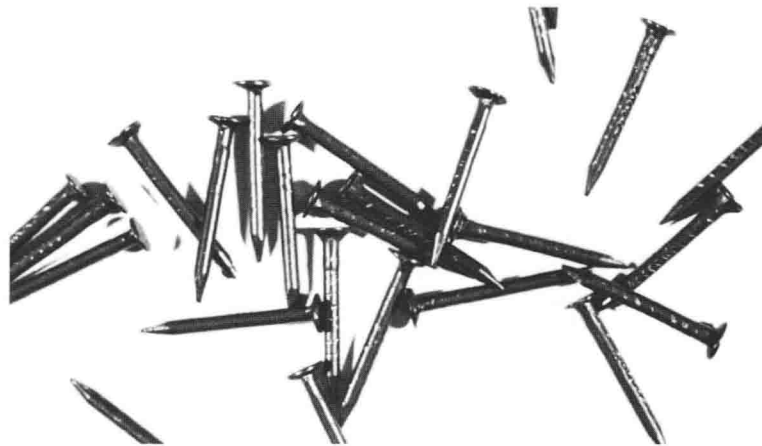


Fig. 1-19. Heavy nails are needed to secure clips for sinuous springs.

Upholstering Methods

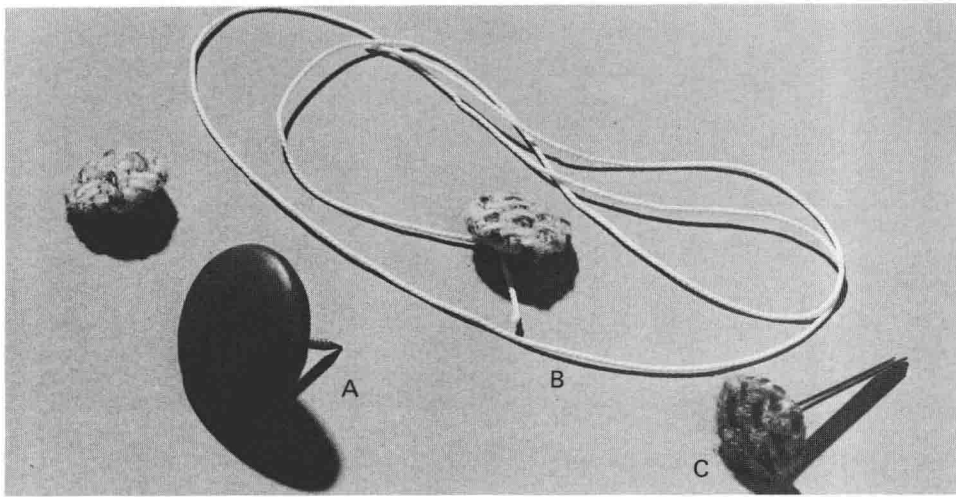


Fig. 1-20. Upholstery-covered nails add interesting detail to upholstery seats and backs. A—Nail type. B— Eyelet and string type. C—Clasp type.

Three methods are used to fasten buttons:

1. Clasp.
2. Eyelet and string.
3. Nail. See Fig. 1-20.

Hog rings, so called because they resemble the rings placed in the snouts of pigs, are popular as fasteners because they are quickly and easily used. They are made of 14 or 15 gage steel wire bent into "U" shaped grippers. See Fig. 1-21.

Available in lengths of $\frac{1}{2}$ to $\frac{3}{4}$ in. (1.2 to 2 cm), the rings are sold by the pound. A specially designed pliers installs them by a crimping action that closes the points across each other forming a somewhat irregular circle. Hog rings are used to attach burlap, sisal pads, seat covers and other materials to springs.

Edge wire clips, used to fasten edge wire to springs, are stamped from strip steel. They are made in lengths from $\frac{3}{4}$ to $1\frac{3}{8}$ in. (2 to 3.5 cm) and in inside widths

of $\frac{9}{32}$ to $\frac{3}{8}$ in. (7 to 9 mm). They are made in various shapes and must be installed with a special pliers. See. Fig. 1-22.

Metal spring clips are designed to fasten sinuous springs to furniture frames. They may be purchased in quantities of 100 or 1000, Fig. 1-23.

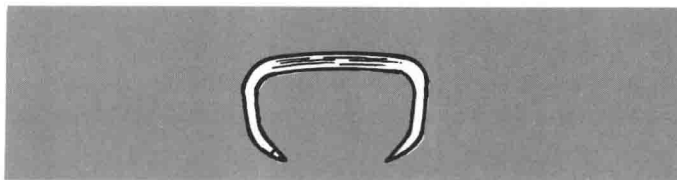


Fig. 1-21. Hog rings have pointed ends to pierce material as they are closed with a pliers.

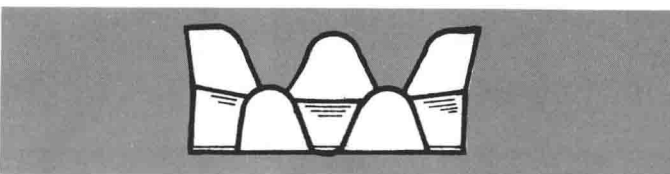
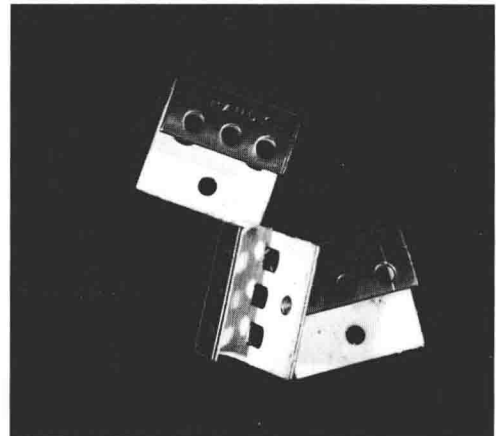


Fig. 1-22. Edge-wire clip is designed to wrap around top spiral of coil spring and spring edge when building seat and back spring units. Special pliers are needed to close it.



1-23. Sinuous spring clip must be strongly made to hold spring under constant tension.

Upholstering Materials



Fig. 1-24. Coil springs with widening spirals at each end are called "double coil" springs.

SPRINGS

Springs are made of steel wire in several sizes, gages and shapes to serve a variety of purposes.

Upholstery springs are made with single or double coils and are used for seats. Seat springs are made of heavy wire, 9 to 11 gage, and range from 4 to 14 in. high. These are available in hard, medium and soft firmness, Fig. 1-24.

Innerspring (Marshall) units are coil springs individually sewn in muslin or burlap pockets. These pockets are fastened together in strips or ready-made units. Innerspring units are used in seats of overstuffed furniture, furniture backs, cushions, and sometimes arms. Spring wire is generally 15 gage and coils are 3 in. in diameter by 3 1/2 to 6 in. high, Fig. 1-25.

Sinuuous (sagless, no-sag, or zig-zag) springs, Fig. 1-26, are made from a continuous length of wire which is bent into a zig-zag shape and rolled into a coil. They are used for furniture seats (usually 7 to 9 gage) and backs (generally 10 to 12 gage). Special metal

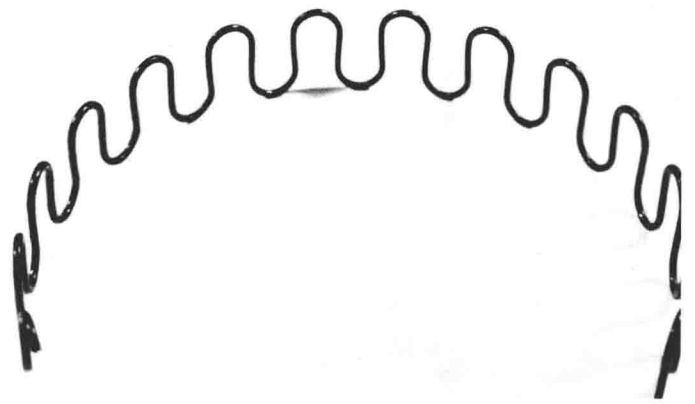


Fig. 1-26. Slimline furniture often uses the sinuous spring pictured. Curves give it spring action.

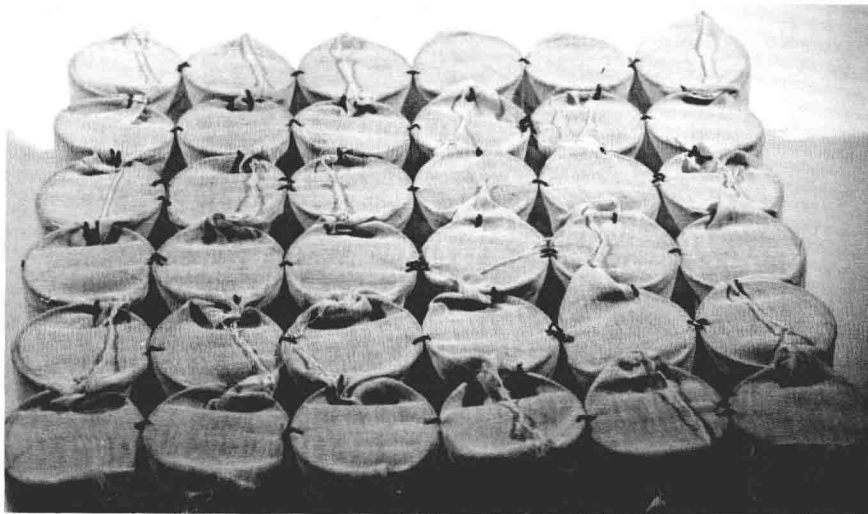


Fig. 1-27. Helical springs act as fasteners to distribute weight of other springs they are fastened to. They are 1 3/8 to 6 in. long and are 15 to 17 gage.

clips, as shown in Fig. 1-23, are used to attach the spring sections to furniture frames.

Helical springs are short, lightweight springs with a hook at either end. They are often used to anchor sinuous springs, particularly outside rows, to furniture frames. See Fig. 1-27.

Fig. 1-25. Innerspring or Marshall units are small coil springs individually encased in muslin pockets.



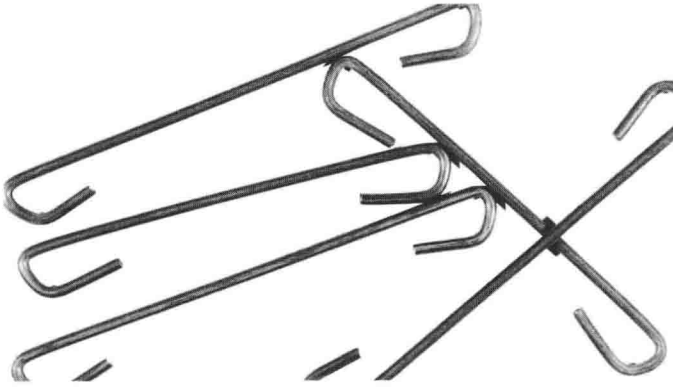


Fig. 1-28. Metal connecting links are used to distribute weight between sinuous springs.

Metal connecting links are generally used to interconnect sinuous spring rows providing even distribution of the seating load. These links are usually available in 2 to 4 in. (5 to 10 cm) lengths, Fig. 1-28.

PADDING

Fiber mat, a coarse, resilient material made from fibers of the sisal plant, is used for platform foundation padding, and to pad arms and backs of furniture. It usually comes in 50 ft. (15 m) rolls, 24 in. (61 cm) wide, Fig. 1-29.

White wadding is a thin cotton padding usually sold in rolls 12 yd. (11 m) or more in length and 32 in. (81 cm) wide. See Fig. 1-30.

Curled hair, made of refined hair from hogs and other animals, is available loose by the pound or in rubberized pads 24 in. (61 cm) wide by 1 to 3 in. (2.5 to 7.5 cm) thick. Rubberized hair is ideal for foundation padding or as padding over springs, Fig. 1-31.

Foam rubber, Fig. 1-32, is manufactured in flat solid sheets 1/4 to 1 1/2 in. (6 mm to 3.7 cm) thick. Its resistance to compression ranges from medium to firm.

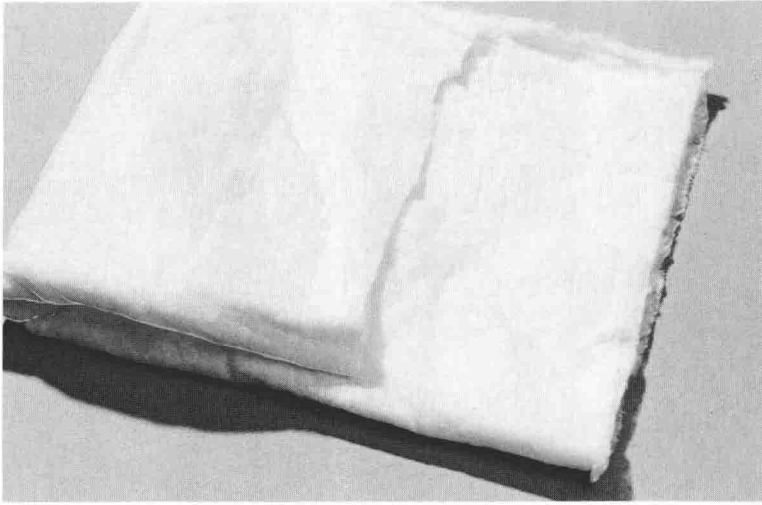


Fig. 1-30. White wadding provides thin layer of very soft padding.

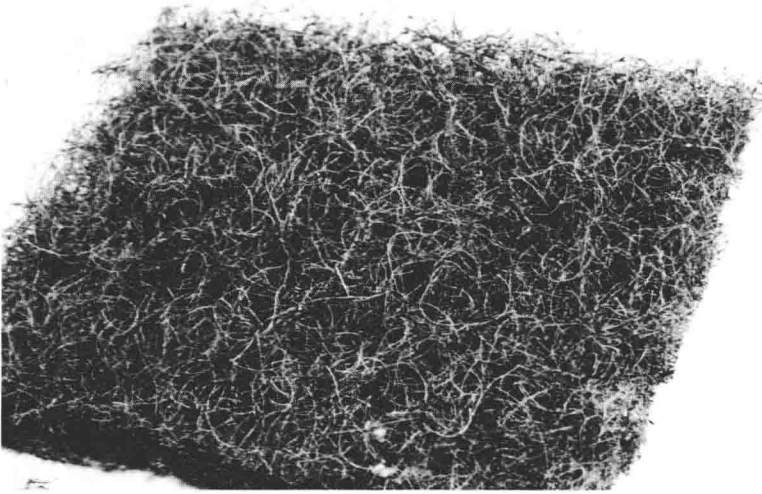


Fig. 1-31. Rubberized curled hair is sold in mats of uniform thickness.

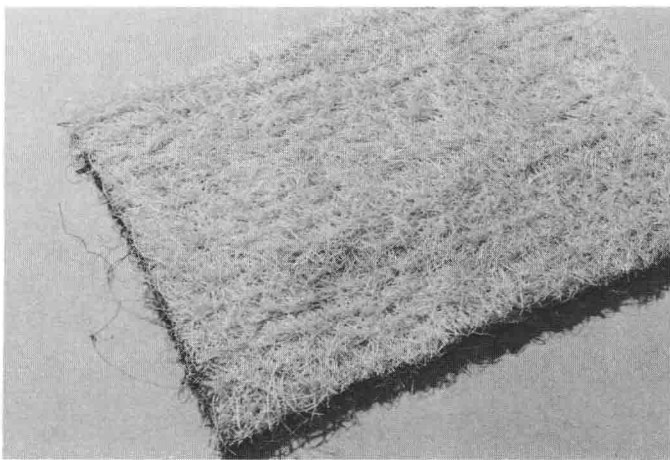


Fig. 1-29. Sisal matting provides a firm foundation for additional platform padding.

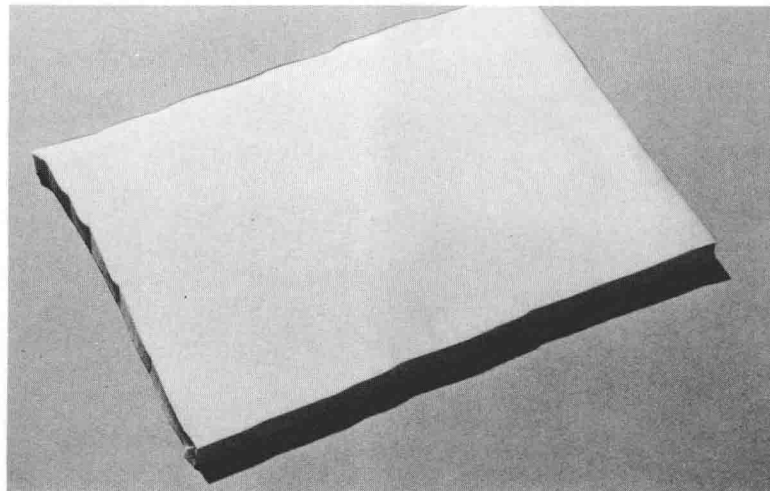


Fig. 1-32. Foam rubber is popular as padding for chairs, benches and stools.