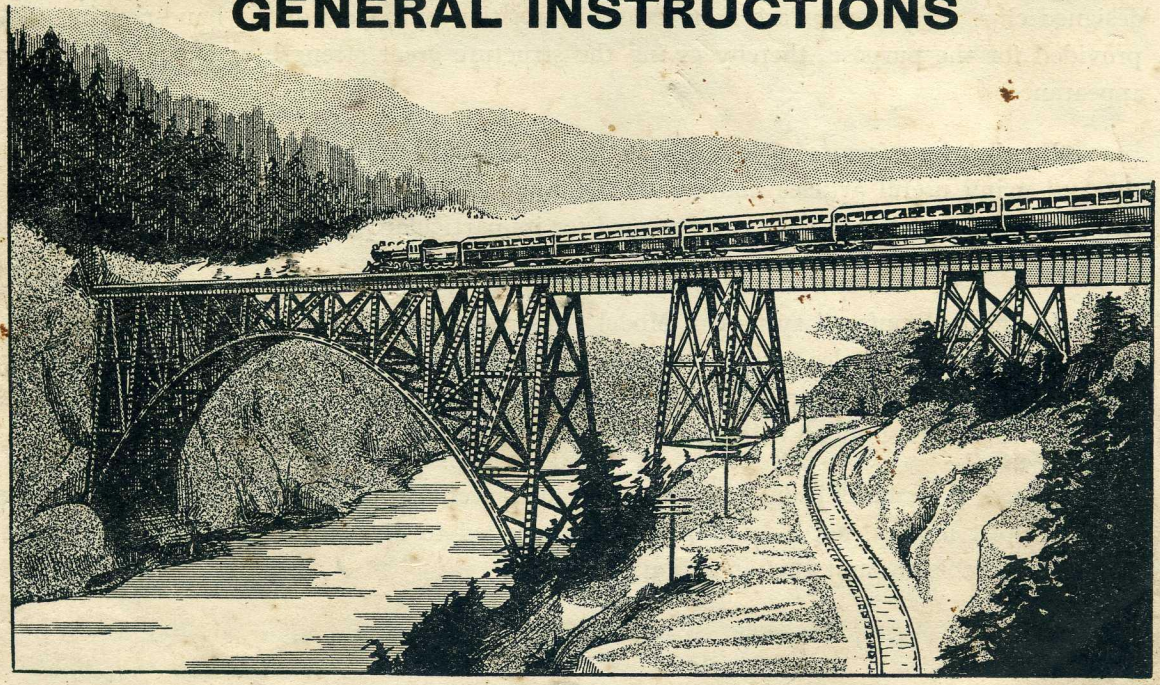
MANUFAX

Registered Trade Mark

GENERAL INSTRUCTIONS



DESCRIPTION

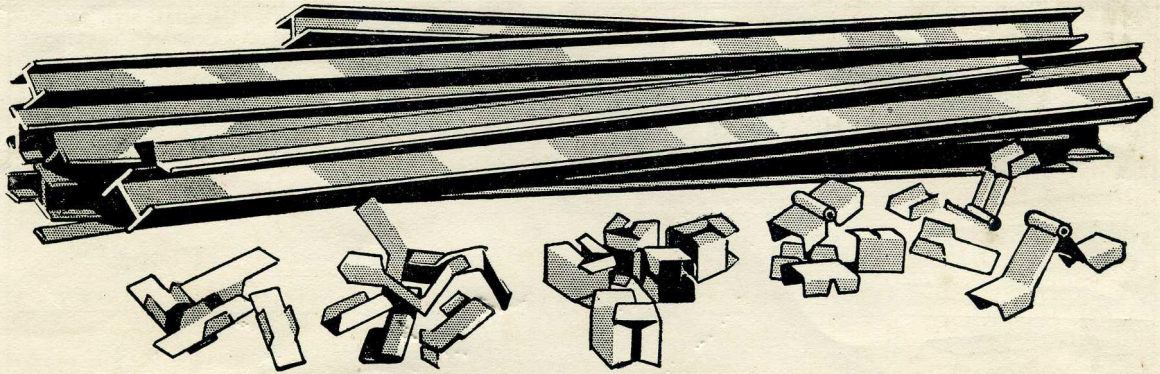
" Manufax " models are built with miniature laminated steel girders of various standard sections which are quickly connected together in a simple manner by the specially designed clips. These clips are then locked in position by means of the hand-riveting tool provided for the purpose, thereby giving the structure great strength and a most realistic appearance.

Nearly every form of steel construction can be faithfully reproduced, designs worked out and many useful articles made with " Manufax." The special tools required are few and easy to use, and each has been designed for its particular purpose in " Manufax " Model Construction.

In the " Manufax " system of Model Construction there are no nuts, bolts or rivets used, and there are no holes to drill. No special skill is required to build the models, especially if the instructions and the drawings are carefully followed. A great variety of models can be built with the tools supplied with any of the " Manufax " outfits.

Although " Manufax " designs are shown lock-riveted, this is, particularly in the case of the simpler models, not essential. If it is intended to dismantle the model later on, it is even preferable to omit this operation.

MATERIAL



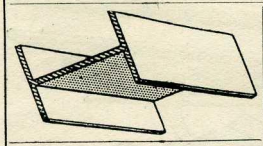
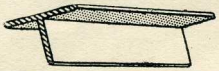
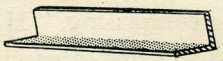
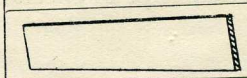
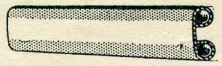
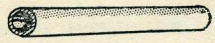
" Manufax " material consists of laminated steel girder sections, comprising " H " Girder, Channel, Tee, Angle, Brace, Tubular, Flat and Rail sections, and steel Clips of special design, which are used for fastening the girders together.

To enable models to be built quickly and easily, and in order to increase the range that can be constructed with the Junior Outfits, " H " girders are obtainable in a number of standardised lengths. (See Price List.) These lengths are always specified where possible in " Manufax " designs and cover the requirements of all but the most advanced series of models.

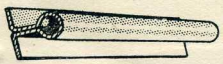
The girder sections are one-eighth full size, and therefore the models constructed with " Manufax " material are true to the scale of $1\frac{1}{2}$" to the foot.

"MANUFAX" GIRDER SECTIONS

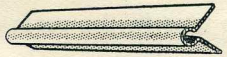
SHOWING THE RELATIONSHIP OF SCALE TO ACTUAL SIZE

SECTION	DESCRIPTION	FULL SIZE (ENGINEERING PRACTICE)	ACTUAL SIZE OF "MANUFAX" SECTIONS TO $\frac{1}{8}$TH SCALE*
	"H" Girder ... ... (3 sizes)	$3'' \times 3''$ $4'' \times 3''$ $6'' \times 3''$	$\frac{3}{8}'' \times \frac{3}{8}''$ $\frac{1}{2}'' \times \frac{3}{8}''$ $\frac{3}{4}'' \times \frac{3}{8}''$
	Channel	$3'' \times 1\frac{1}{2}''$	$\frac{3}{8}'' \times \frac{3}{16}''$
	Tee	$3'' \times 2''$	$\frac{3}{8}'' \times \frac{1}{4}''$
	Angle ... ... (2 sizes)	$1\frac{1}{2}'' \times 1\frac{1}{2}''$ $2'' \times 2''$	$\frac{3}{16}'' \times \frac{3}{16}''$ $\frac{1}{4}'' \times \frac{1}{4}''$
	Brace—Flat Bar ... (4 sizes)	$1\frac{1}{2}''$, $2''$, $2\frac{1}{2}''$, $3''$	$\frac{3}{16}''$, $\frac{1}{4}''$, $\frac{5}{16}''$, $\frac{3}{8}''$
	Brace—Rolled Edge Section	$2\frac{1}{2}''$	$\frac{5}{16}''$
	Brace—Tubular Section (2 sizes)	$1''$, $1\frac{1}{4}''$	$\frac{1}{8}''$, $\frac{5}{32}''$

* In all references the girder sections are designated by the figures of the full dimensions, *e.g.*, $\frac{3}{8}'' \times \frac{3}{8}''$ "H" girder is shown as 3×3, etc.



RAIL SECTION.—Suitable for both gauge "0" and gauge "1" Model Railways.

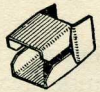


RIDGE CAPPING.—This is used for capping corrugated iron and other roofs.

"MANUFAX" CLIPS

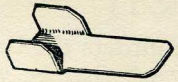
The "Manufax" clips, which are made from thin high-grade sheet steel, are readily fixed in position by bending the lugs round the flanges of the girders, and then lock-riveting if desired.

In the models, which have been specially designed for the beginner, the following clips are most commonly used :—



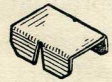
C.1 Socket Clip

C.2 Cross Clip



C.3 End Clip

C.4(A) Half-Staple Clip

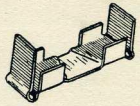


C.4(B) Double Staple Clip

C.5 Web Clip

C.10 Double End Clip

C.11 Hinge



C.23 Coupling

C.24 Adjustable Bearing.

The above clips are amply sufficient to build a great variety of models; for their correct application in the construction of the different types of joints refer to the "Clip and Joint Sheet" which also shows a range of clips as used in the more advanced outfits and models.

The drawings also show where necessary a detailed description of any special joints.

All "Manufax" joints are easily made on the same principle, which, with a little practice, proves extremely simple.

Both Single and Double Staple Clips are obtainable (see Price List), but should it be necessary, Double Staple Clips can be halved at the centre with the Snips (see Fig. 2B) or the Girder Cutter to form two single Staple Clips (see Fig. 10, page 11). The halves should be straightened with the pliers after cutting.

"MANUFAX" TOOLS

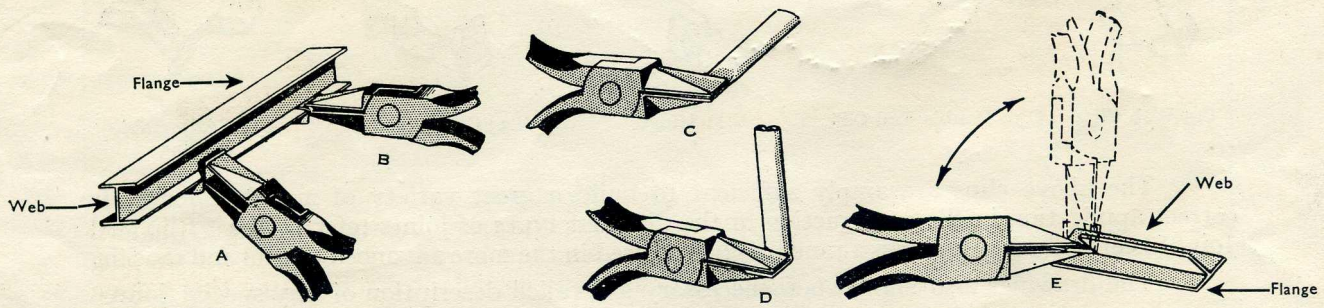
The special "Manufax" tools have been developed as the result of long experience and careful study of the particular requirements of the "Manufax" system of Model Construction.

The most essential tools are the special Pliers, Lock-riveting Tool, Snips and the Girder Cutter.

The Pliers are used for clamping the clips in position by bending the lugs round the appropriate parts of the girders. (See Fig. 1.)

To make the clip a close fit on the girders the bend should always be commenced with the Pliers in the position as shown at "A," that is, with one jaw of the Pliers underneath the clip, and the other jaw just below the top of the lug. Bend the lug over with an upward motion and squeeze tightly, as shown at "B." Do not place the top jaw of the Pliers on the

Fig. 1



edge of the lug, as this would force the clip away from the girder and a neat joint would not then be made.

It is often advisable not to squeeze the lugs down too tightly at the beginning, so that if the clip has not perhaps been quite correctly located it can be easily shifted to the exact position required, when a final squeeze and a rivet lock makes it secure.

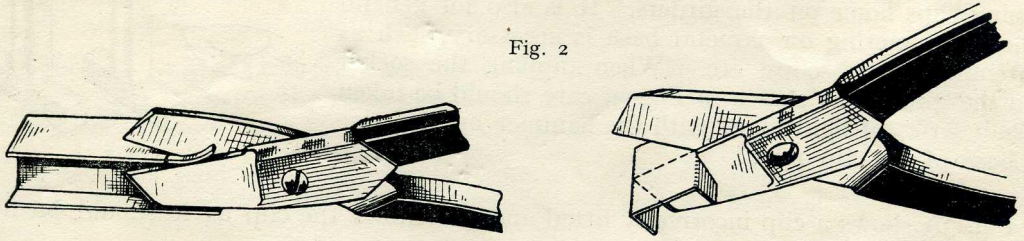
Uses of Pliers (continued).

The Pliers are also used for flattening an end or other part of the Brace section (rolled edge) ready for insertion under the clips, as shown at Fig. 1C, the width of the flattened part of the brace will then be $\frac{3}{8}$", which is the standard width of the girder flanges ; Fig. 1D shows the bending of the flattened brace to any required angle.

To remove pieces of the web off the girder, use the Pliers as shown at " E." First cut the web with the Snips. Hold the piece firmly with the nose of the Pliers hard against the flange and work backwards and forwards until the piece breaks off.

The Pliers may also be used for flattening out distortions in the ends of the girders after cutting.

Fig. 2



(A) (B)

The Snips are used for generally cutting, shaping and trimming the Tee, Angle, Channel and Brace sections, as well as for cutting plain sheets, but it can only be used for shaping or trimming the ends of the " H " girder sections—it is not adapted for cutting this section right through the flanges and web (see Girder Cutter Instructions). Where the " H " Girder Cutter is not included in the outfit special standard lengths of the 3 × 3 " H " girder are supplied.

The illustration, Fig. 2A, shows how the edges of the flange of a " H " girder are trimmed to allow it to fit inside the flanges of another " H " girder—the length of flange so trimmed must be equal to the inside width of the flange to make a neat joint.

The Mandrel. The Hammer and Mandrel are not included in the Junior Outfits, as, although very useful in "Manufax" model construction, it is not absolutely essential to use them in building the more elementary models.

In place of the Mandrel a small length of 3 × 3 "H" girder can be used to advantage, and if another small length is placed between the lugs on the clips on top of the girder any available light hammer, or other tool, can be used for tapping purposes. If desired, these special tools can be obtained separately (see list).

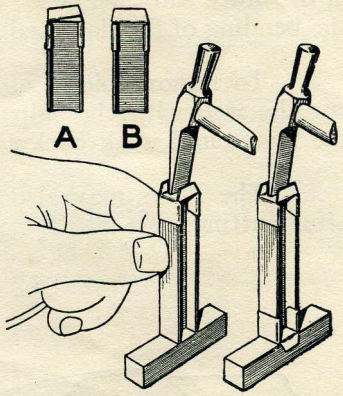


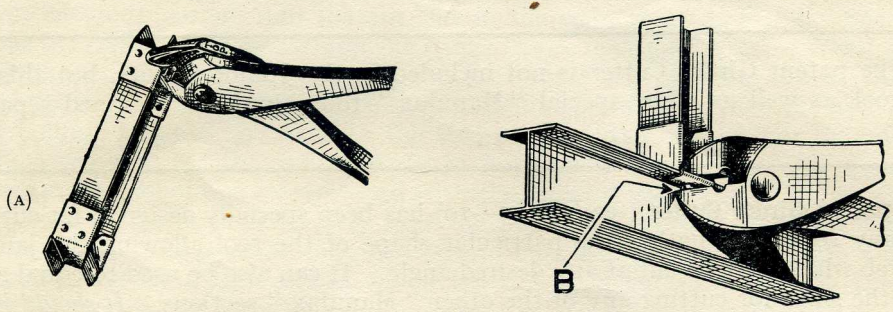
Fig. 3

The Mandrel, which is a steel bar, is for the purpose of tapping clips home on the girders. It is also for general use where hammering on a metal base is necessary, such as straightening girders, clips, etc. When tapping the socket clips on the girders, as shown in Fig. 3, care should be taken to strike a series of light blows with the hammer on the edge of the base of the clip only.

Fig. 3A shows a clip incorrectly fitted and 3B shows the clip as it should be fitted ready for lock-riveting.

When it is required to fit socket clips to both ends of the girder, first fit one on one end of girder and tap lightly, turn the girder on end with the clip down on the Clip Mandrel and fit the other clip, tapping the whole well home before lock-riveting.

Fig. 4



The Locking Tool is supplied for lock-riveting the clips to the girders and is so designed that at the same time it makes realistic rivet heads.

The use of the Lock-riveting Tool is shown in Fig. 4A and B, and unless it is particularly required to have the rivet head below the face, always hold the Locking Tool with the jaw marked "top" upwards. The head will then be in the position shown in Fig. 4B.

When the models are lock-riveted together, they are immensely strong; the clips can, however, still be taken off without difficulty—use a small bradawl, or knife, to lever up the lugs.

The illustrated and detailed instructions supplied with each design will show you where to make the rivet heads. When making the rivet heads on the opposite edge, always see that the top jaw is in line with the centre of the rivet head already made on the opposite side. Clean out recess in top jaw of Locking Tool occasionally.

For cutting wire, use wire cutting pliers, or make a nick with a file and then break. Do not use the "Manufax" tools for this purpose, or for any other purpose than that for which they have been specially designed—otherwise they will be ruined.

GIRDER CUTTER INSTRUCTIONS

The patent Girder Cutter is not included in the Junior Outfits, but this most useful tool, as well as other special "Manufax" tools, may be obtained separately (see list).

The patent Girder Cutter (see Figs. 5—10) has been specially designed for cutting "H" girders to any required length; the particular shape of the tool allowing the jaws to pass along the web which may be cut at any desired angle. It can also be used to equal advantage in place of the snips for cutting any of the other "Manufax" sections. *It should not be used for any other purpose on any account*; if it is put to other uses, the cutting edge will be destroyed.

To cut "H" Girder (see Figs. 5 and 6).—When cutting "H" Girders, measure off on the web and flanges the length required with a rule and mark with a pencil, or sharp point; pass the jaws of the Girder Cutter along the web of the girder from the end, keeping the cutting jaw, which is stamped "top," upwards (Fig. 5). Move the cutter along until the sharp edge is exactly on the required mark, and then cut through. When cut, slide the tool off from either end.

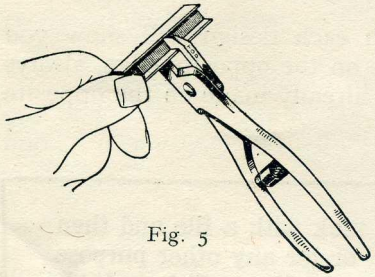


Fig. 5

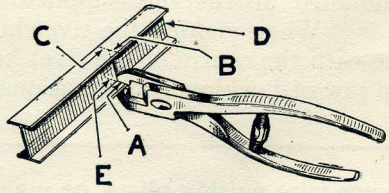


Fig. 6

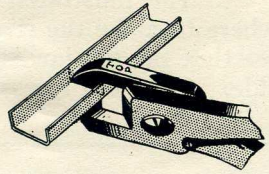


Fig. 7

The marked flanges, in the order A, C, B and E, are next cut in the manner shown in Fig. 6. The end from E being the part required, is held in the left hand and the point of the

top jaw of cutter is pushed into the cut slot in the web, as at A, Fig. 6. See that the top jaw is over the line already marked on the flange before making the cut. When cuts A and C have been made, complete by cutting B and E. These last two cuts can be made from the outside of the flange by bringing the point of the cutting blade in exact line with the previous cuts and holding the tool square with the side of the girder. Although the part D, Fig. 6, may not be required for the actual model in hand, it should be kept for a possible future use. The cut end should be straightened with the pliers if necessary. After a little practice, these cuts can be made so accurately that the piece will drop off as the last cut is made. At first, however, it is possible that the several cuts will not coincide, and the two pieces will remain joined by a thin strand which has not been cut through; by bending one of the pieces backwards and forwards once or twice this is easily broken and the parts separated.

Fig. 7.—*To cut the channel section,* mark off the required length, slide Girder Cutter between flanges to the mark, and cut through the web, then slide Girder Cutter off of channel. Then cut each flange on each side.

Fig. 8.—*To cut the tee* section, mark off required length, on both flange and web. First cut web and then each side of the flange. *Angle* can be cut in a similar manner.

Fig. 9.—*To cut brace and flat bar.* This is cut as shown and needs no explanation.

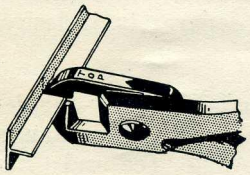


Fig. 8

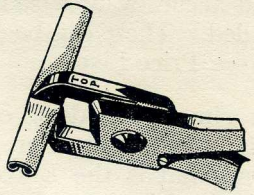


Fig. 9

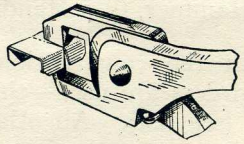


Fig. 10

NOTE.—When the Girder Cutter has been used, there may be a little unevenness left; this can be readily trimmed off with Girder Cutter on file as required.

"MANUFAX" MODEL CONSTRUCTION

All "Manufax" Outfits contain Design Sheets showing a number of models either drawn to full size or giving the actual dimensions. Further supplies of the Design Sheets can be obtained for a large number of instructive and useful models, or, if desired, a Model Design Book can be obtained (see Design and Material Assembly Set list).

Always commence "Manufax" model building by making a few simple practice joints. If the Clip and Joint Booklet is carefully followed, the system is simplicity itself.

After having mastered the joint construction, make a few of the simple models as shown on the drawings. These need not be riveted together, and a greater part of the material can be used again for other models. Fresh supplies of material can be bought separately as required, or Material Assembly Sets may be purchased complete with drawing and full instructions how to build the models. (See Design and Material Assembly Set list.)

The advantage of these Material Assembly Sets is the ease of ordering the material for any particular model, or group of models, also the fact that all the "H" girders are cut to the length required and thus do not necessitate the use of the Girder Cutter. The "H" girders, where necessary, can be easily trimmed to the required size with the Snips.

For ease of manipulation and accuracy of working the special "Manufax" Marking Gauge and Scriber can be recommended. These can be obtained separately, if desired, as well as the Hammer, Clip Mandrel, etc. (see Price List).

In the construction of the simpler models, only standard ready-cut lengths of "H" girders are used—that is, "H" girders that are obtainable in the various necessary lengths (see list). All other sections, that is the Brace, Flat, Angle, Tee and Channel, can be readily cut to the lengths required with the Snips as supplied in the Junior Outfits, or with the Girder Cutter.

If it is required to make the advanced models, and to use other than the standard ready-cut "H" girders, it will be necessary to obtain the patent "H" Girder Cutter.

In the more simple models, dimensions are not given, so that the model-builder can make these to his own requirements as regards size.

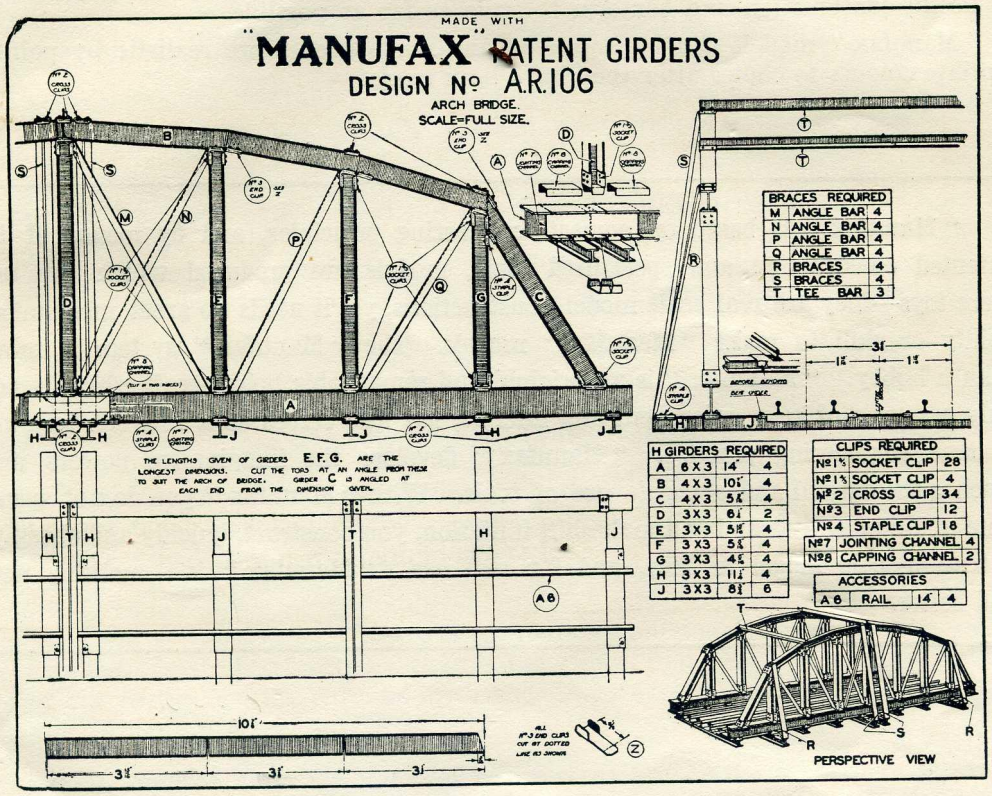
In the more advanced designs dimensions are given, as the models represent some actual useful construction and conform to scale as far as possible.

" Manufax " models can be improved and made even more realistic by painting in appropriate colours to choice after they have been made.

" Manufax " is based on correct engineering principles, and by means of its patented construction and specialised tools, models are produced which are not mere toys—they are real scale model constructions, yet it needs no great mechanical ability or skill to make " Manufax " models. The " Manufax " system is more than a hobby. " Manufax " is an original and remarkable hobby-craft which is not only a source of keen enjoyment and interest, but also serves as a valuable training in true engineering practice. " Manufax " develops the imaginative powers and teaches the careful and accurate use of tools. With " Manufax " you do not spend time and money assembling a makeshift imitation, you construct, quickly and cheaply, a true-to-scale model to keep, and for real use. " Manufax " is something new and better.

Illustration of "Manufax" Design Sheet

(Reduced from full size)



SPECIAL NOTE

Fittings and accessories, such as pulleys, wheels, shafts and other mechanical parts as supplied with other engineering constructional outfits, can be readily used in conjunction with "Manufax" Model Building.

When building with "Manufax" supplies of these fittings, etc., will therefore be found most useful.

The "Manufax" shafts, bearings, etc., can, in most cases, be used with other makes of accessories.

Order Forms for replacement material are included in every "Manufax" Box or Carton issued.

All "Manufax" materials, clips and accessories can be bought separately in any quantity, and tools can be added to the outfits as required.

MANUFAX

The most interesting and fascinating Hobby-craft yet devised, appealing to

DRAUGHTSMEN
ARCHITECTS
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MODEL ENGINEERS
TECHNICAL COLLEGES
MECHANICS
ENGINEERS
ENGINEERING CLUBS
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