PRACTICAL MECHANISM.

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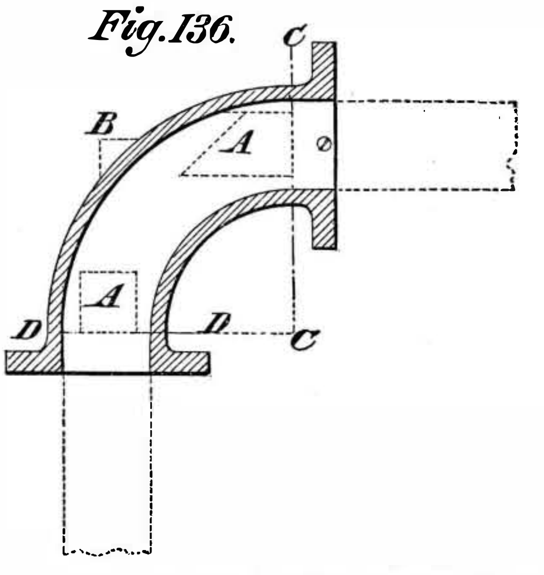
PATTERN MAKING.

Our next example will be a pipe bend, such as is shown in section in Fig. 136. It will be seen upon examination that the bend proper is included in that portion contained within the dotted lines, C C and D D, which meet at the center from which the arcs forming the bend are struck. Those parts exterior to the dotted lines are made separately from the bend proper, and are subjects in plain turning, similar to those already treated upon. It will be noted, however, that in this kind of pattern the core is not so well supported as in our previous examples; and it has, therefore, a tendency to sag or droop towards the center of the arc, and also to rise above its proper level when the metal is poured into the mould. To obviate this, we must make the core, and hence the core prints, extra long, as shown by the dotted lines in Fig. 136. It is usual also to make a provision for fastening these external pieces to the bend proper as follows: The flange is one piece, the bend proper another, and the core print yet another. The core print fits into the flange, and

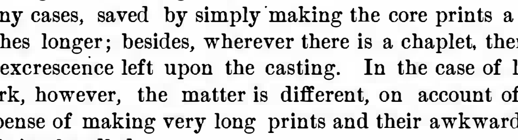
Fig.136.



has a projecting piece extending into a recess or hole, provided in the bend proper to receive it, as shown, and thus is the pattern strengthened. If the core prints are made so short that the core overbalances itself when placed in the mould, the moulderinserts, into the mould, stays or supports to keep the print in position; and these supports are called chaplets. They consist of pieces of thin sheet iron bent to about the curvature of the core and riveted to a piece of wire, the device being pressed like a flat-headed nail into the sand. The piece of sheet iron represents the nail head upon which the core rests, and it is inserted into the cope and nowel so that they project the proper distance. They act to prevent the core from either sagging or lifting by floating upon the molten metal. Then, when the casting is taken from the mould, the projecting wires are chipped off, and that remaining in the casting is riveted. This trouble can be, in many cases, saved by simply making the core prints a few inches longer; besides, wherever there is a chaplet, there is an excrescence left upon the casting. In the case of large work, however, the matter is different, on account of the expense of making very long prints and their awkwardness in being handled.

The bend part of our pattern may be either turned in the lathe or pared by hand; and sometimes it is a difficult matter to decide which of the two will best answer the purpose. To turn up a bend, it is necessary to turn up a ring semicircular in section, as shown in Fig. 137, and of a radius corresponding to that of the required bend. This ring is then cut up into portions of the length of arc required, and about one half is in most cases left over. The advantage of this

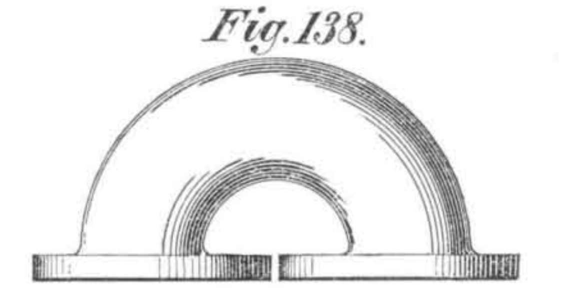
Fig.137.



method is the direct and ready manner in which the required form is obtained; whereas in paring and shaping, the bending by hand, though the operation be ever so skillfully performed, will not be so true as if turned. And when we consider that castings only three thirty-seconds of an inch in thickness are sometimes required, we perceive that the slightest error or deviation from the true shape will be perceptible, and will often result in the loss of a large proportion of the castings. For all small work, then, the turning is of decided advantage; but since such is not always the case with large work, and since the line must be drawn somewhere, a correct decision will always be largely influenced by the facilities afforded by the tools, etc., in the shop. In the example shown in Fig. 138, which is what is called a return bend, the whole of a ring, turned as above described, would be appropriated: therefore, there being no loss of material, the method by turning will in this instance always be preferable.

In fixing the half flanges for work of this kind, not exceeding six or seven inches in size, one screw passing through the center of the pattern into the flange will be sufficient. Care must, however, be taken to hold the flange firmly in its exact position while boring for and during the insertion of the screw. It should not be forgotten to add the small projecting piece, B, shown in Fig. 136, which lies in the center line of each arm of the bend, which is provided to enable the casting to be conveniently swung in the lathe.

Fig.138.



Before quitting examples of this kind, it will be well to once more direct the reader's attention to the core boxes, so as to impress upon him the important fact that, where equal thickness of metal is required, the core box should be as the pattern is. A round pattern demands a round core box; the one is of equal importance with the other. For example, in the designing of a bend, the required thickness is determined by the amount of internal strain to which the casting will be subjected. If, then, we give a round bend and an oval core box, we either make the bend too weak or we cause the manufacturer to pay for so many pounds of metal which he does not require. In the case of castings so thin as to require care to make the metal flow throughout the mould, an unduly thin place or spot will prevent the flow (at that part) of the metal, and thus spoil a large proportion of the castings.

A half core box for either a bend or a T may be made by preparing a block sufficiently large to cut out the whole recess, as shown by the full lines in Fig. 139. In this case, after the block has been surfaced truly on one side and edge, the grain of the wood being in the direction denoted by the arrow, the center lines are marked upon it, and also upon the pattern. We then lay one half of the pattern upon the block, and make the center lines upon them come exactly fair and even; and then we mark upon the face of the block the outline of the pattern, core prints and all. The core prints will of course be the right size of the core; but the outline marks thus produced form a guide to work by, and the distance between these outline marks and the edge of the core will represent the thickness of metal in the finished casting. A margin of stuff in the block is required outside of the outline marks, so as to give the core box sufficient strength. We next trace out a plan of the core, and then, upon the ends or sides of the block, we describe semicircles representing the exits of the recess to be cut out, the block being left so deep as to leave stuff enough below the depth of the recess to afford ample strength. We may now proceed to cut out the core by our hand tools, finishing it with the plane, shown in Fig. 14, and smoothing it with sand paper wrapped around a piece of wood of a sweep or curve a little less in radius than that of the core box recess.

Another method of getting out a core box for a bend is shown by the dotted lines in Fig. 139; and in this instance we make the core box in three pieces, the object being to turn up the end pieces, A A, in the lathe, the manner of procedure being as follows: We get out the two pieces marked A A, and square up the faces truly, and chuck them, with the planed faces placed together in the chuck shown in Figs. 56 and 57, taking care that they are chucked so that, when the hole is bored in them, it will be half in each piece, or, in other words, chucking them truly, with the joint between the two. We then pare out the curved part in the middle section, and then glue on the end pieces, A A, A A, and strengthen the whole by placing battens on the bottom and sides.

Fig.139.

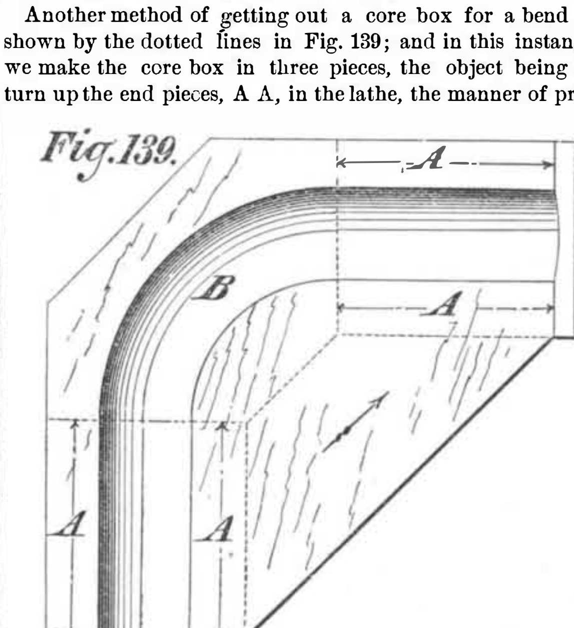
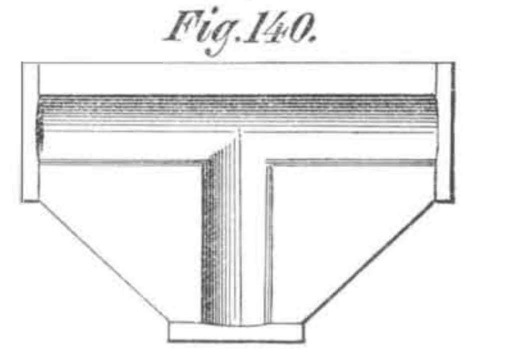


Fig. 140 represents a half core box for a T. In half core boxes, it is necessary to close the openings in the ends or sides by bradding on pieces of light board, taking care to give draught by paring them slightly concave at the top, and thus making the ends of the core similar to the slightly rounded ends of the pattern. When these pieces are omitted, the core maker has to extemporize them. When a full core box is required, as in the case of the oblique T, it is sufficient to mark the shape of the core upon one half only of

Fig.140.



the box; and when this is cut out, we may place the two half boxes together, and trace the second half from the finished one, using a long bent scriber for the purpose of marking.

Cattle Food.

Experience teaches us that cattle thrive best on a mixed diet; all hay or all grain will produce less beef than hay and grain. The animal structure of the ox also demands bulk in food as well as richness: the feeding of concentrated food being only profitable so far as the animal assimilates it, beyond that simply increasing the manure heap at a cost far beyond its value. The ox has approximately eleven lbs. of stomach with only two and one half lbs. of intestines to each one hundred lbs. of live weight; the sheep has less stomach and more intestines, giving a smaller percentage of digestive apparatus; while the pig, for every hundredlbs. of his live weight, has only one and a third lbs. of stomach to six lbs. of intestines.

A steer would thrive well on a bulk of straw, with a little oil meal, that would shrink a sheep and starve a pig. Pork can be produced from clear corn meal, while mutton requires greater variety of food, and beef cattle would become cloyed and diseased with its exclusive use. A thoughtful attention to these broad facts will change much injudicious feeding into cheaper meat production.

One element in the economy of cattle feeding, the use of straw as fodder, has not received the attention its importance demands. On no one point is the average farmer so incredulous as regarding the value of straw to feed, and on many farms the wasteful practice still exists of turning all the straw into the manure heap. If properly made and reasonably well cared for, a large portion of the straw, especially of the oat crop, should be used as cattle food. Early-cut straw is worth for feed two thirds as much as hay, and is three times as valuable in feeding cattle as in the manure heap. Pea haulm and bean straw, especially if in the latter the pods are attached, are of still greater value. The best heat-producing foods are wheat, corn, oats, hay, and bran. Oat straw will develope as large a percentage of heat as oil cake; bean straw even more; and, in this respect, one hundred parts of oat straw are equal to eighty parts of hay. Straw is deficient in flesh-forming material, it requiring one hundred parts oat straw to equal sixteen parts good hay in this particular; yet, fed with cotton seed or linseed cake, it supplies what they lack in heat-giving and respiratory elements.

For the purposes of feeding out oat straw, our oat crop is allowed to over ripen, a large amount of its nutriment being lost without any corresponding benefit to the grain, which never improves after the upper portion of the stem has commenced turning yellow. Oats cut when just turning from the green state, yield more grain as well as greater feeding value in straw. The narrow margins of profit in cattle feeding in this section of the country demand the closest economies in the food supply, and the most thorough investigations and experiments with an article of so little present market value, and one of such abundance with most farmers, as oat straw.—*American Cultivator.*

Uses of Glycerin.

According to Klever, one hundred parts of glycerin will dissolve:

	Parts.		Parts.
Acid arsenious	20·00	Mercury bichloride	7·50
" arsenic	20·00	" bicyanide	27·00
" benzoic	10 to 20·00	" arseniate	50·00
" boracic	10·00	Potassa chlorate	3·50
" oxalic	15·00	" and iron tartrate	8·00
" tannic	50·00	Potassium bromide	25·00
Alum	40·00	" cyanide	32·00
Ammonia carbonate	20·00	" iodide	40·00
" muriate	20·00	Morphia	0·45
Antimony tartrate	5·50	" acetate	20·00
Atropia	3·00	" muriate	20·00
" sulphate	33·00	Soda arseniate	50·00
Barium chloride	10·00	" bicarbonate	8·00
Borax	60·00	" carbonate	98·00
Brucia	2·25	Phosphorus	0·20
Cinchona	0 50	Sulphur	0·10
" sulphate	6·70	Strychnia	4·00
Copper acetate	10·00	" nitrate	0·25
" sulphate	30·00	" sulphate	22·40
Iron lactate	16·00	Veratria	1·00
" sulphate	25·00	Zinc chloride	50·00
Iodine	1·90	" iodide	40·00
Lead acetate	20·00	" sulphate	35·00

Glycerin is particularly valuable as a solvent for gum arabic, as also in paste. Glue, by continued digestion, is soluble in glycerin, gelatinizing on cooling. Glycerin dissolves aniline violet, alizarin, and alcoholic madder extract. A solution of aniline color in glycerin is often used for stamping with rubber hand stamps. Glycerin is employed to extract the perfume from flowers, and the aromatic principle of red peppers. Sulphate of quinine dissolves in ten parts of glycerin when hot, but when cold separates in clots, which, when triturated with the supernatant liquid, gives it the consistence of a cerate, very useful for frictions and embrocations. Fifty parts of warm glycerin will hold in solution when cold one part of salicylic acid. Three hundred parts of water may be added without causing precipitation.