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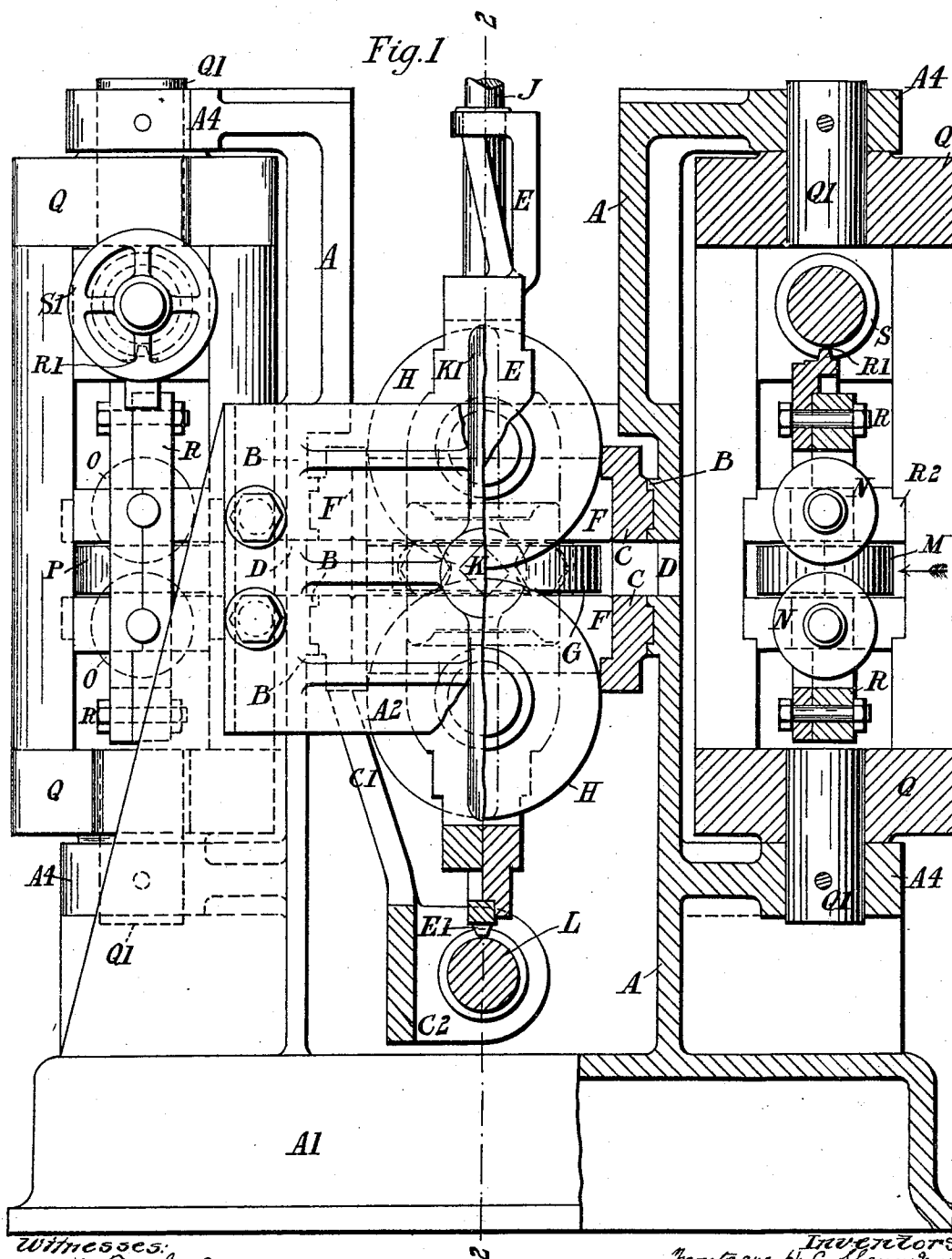
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M. H. C. & R. E. C. SHANN.

MACHINE FOR BENDING OR SETTING SHIPS' FRAMES.

No. 581,375.

Patented Apr. 27, 1897.



Witnesses:

J. M. Fowler Jr.
Thomas Schmitt

Inventors
Montague H. C. Shann and
Richard E. C. Shann.
by Charles F. Church
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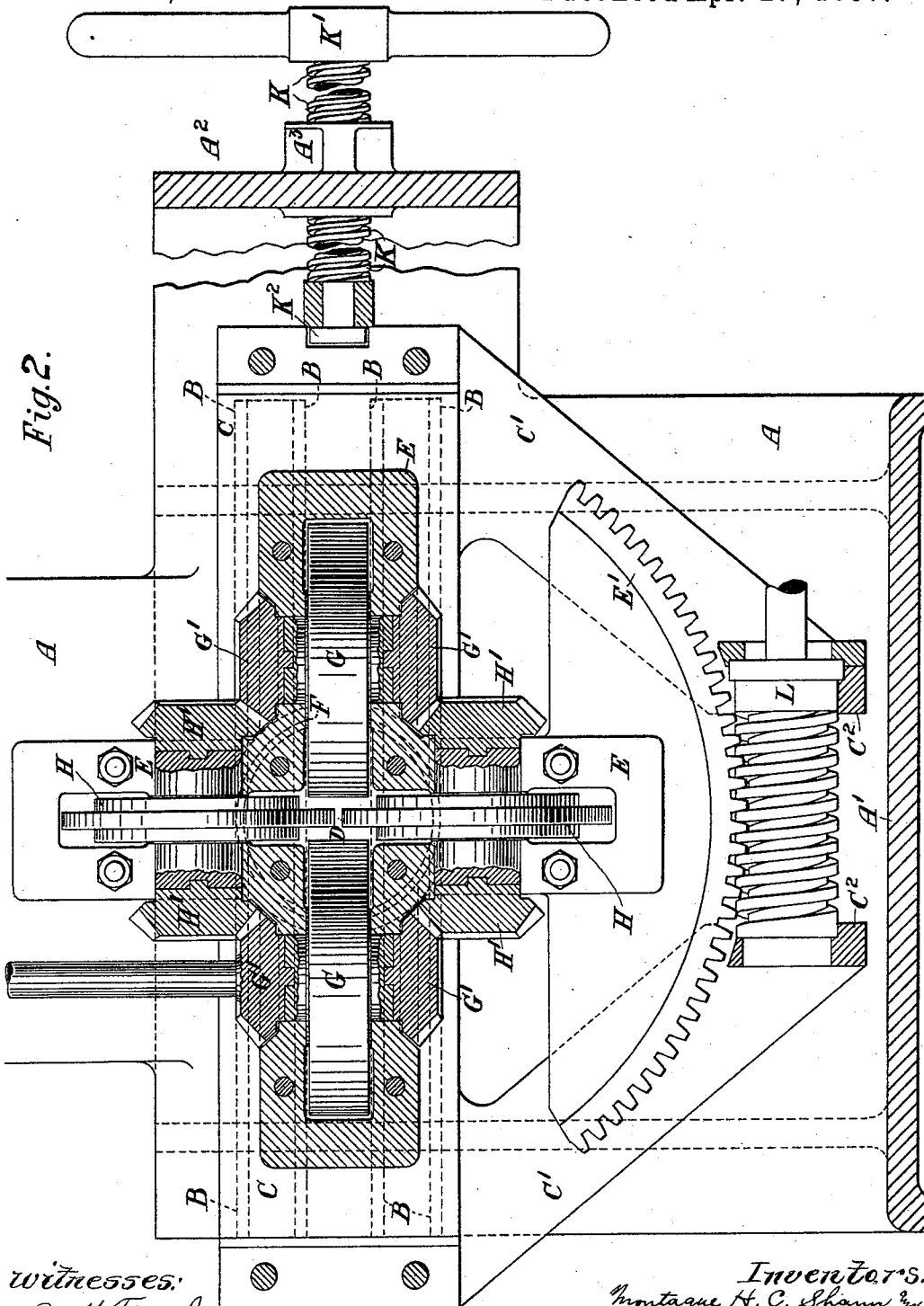
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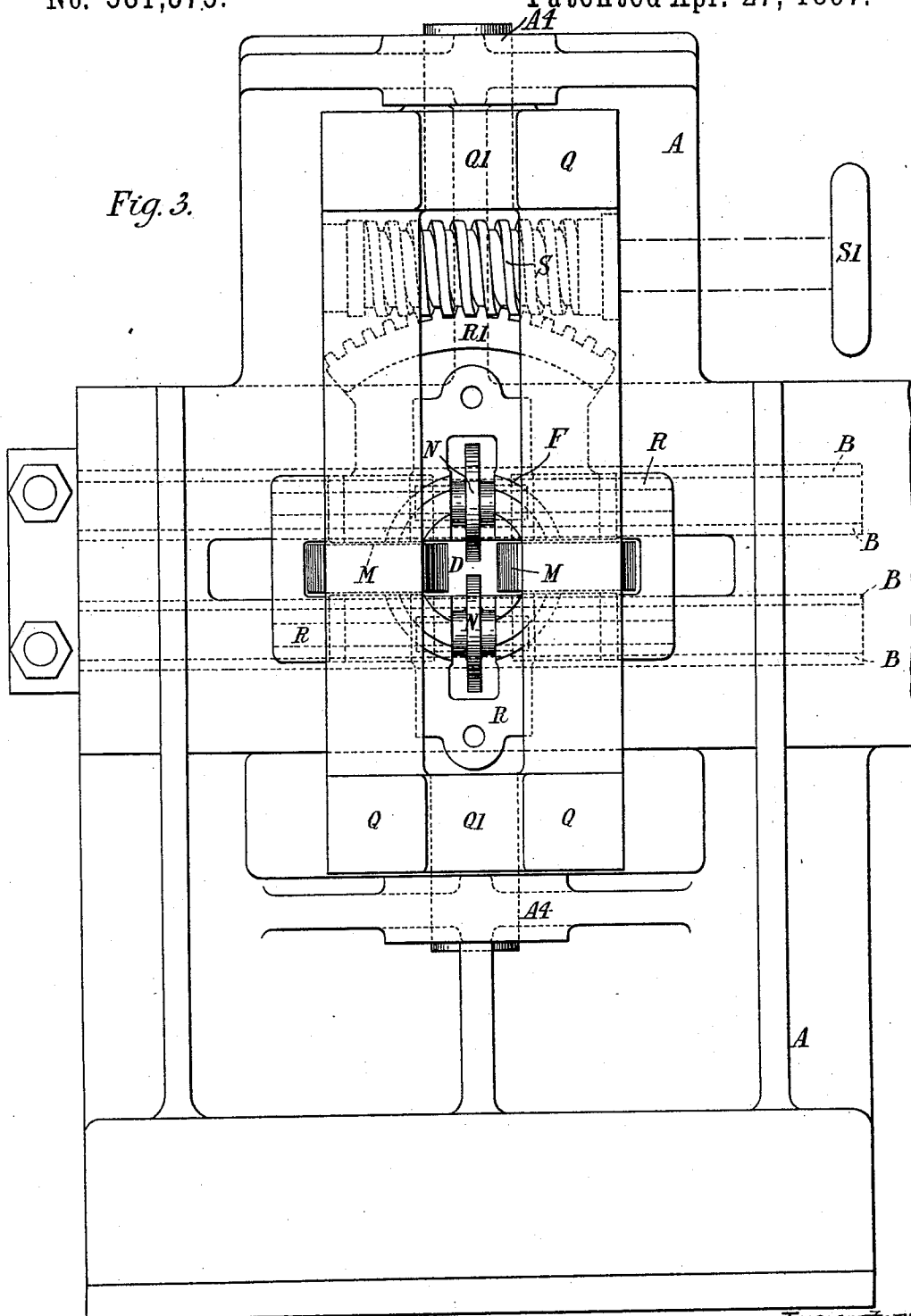
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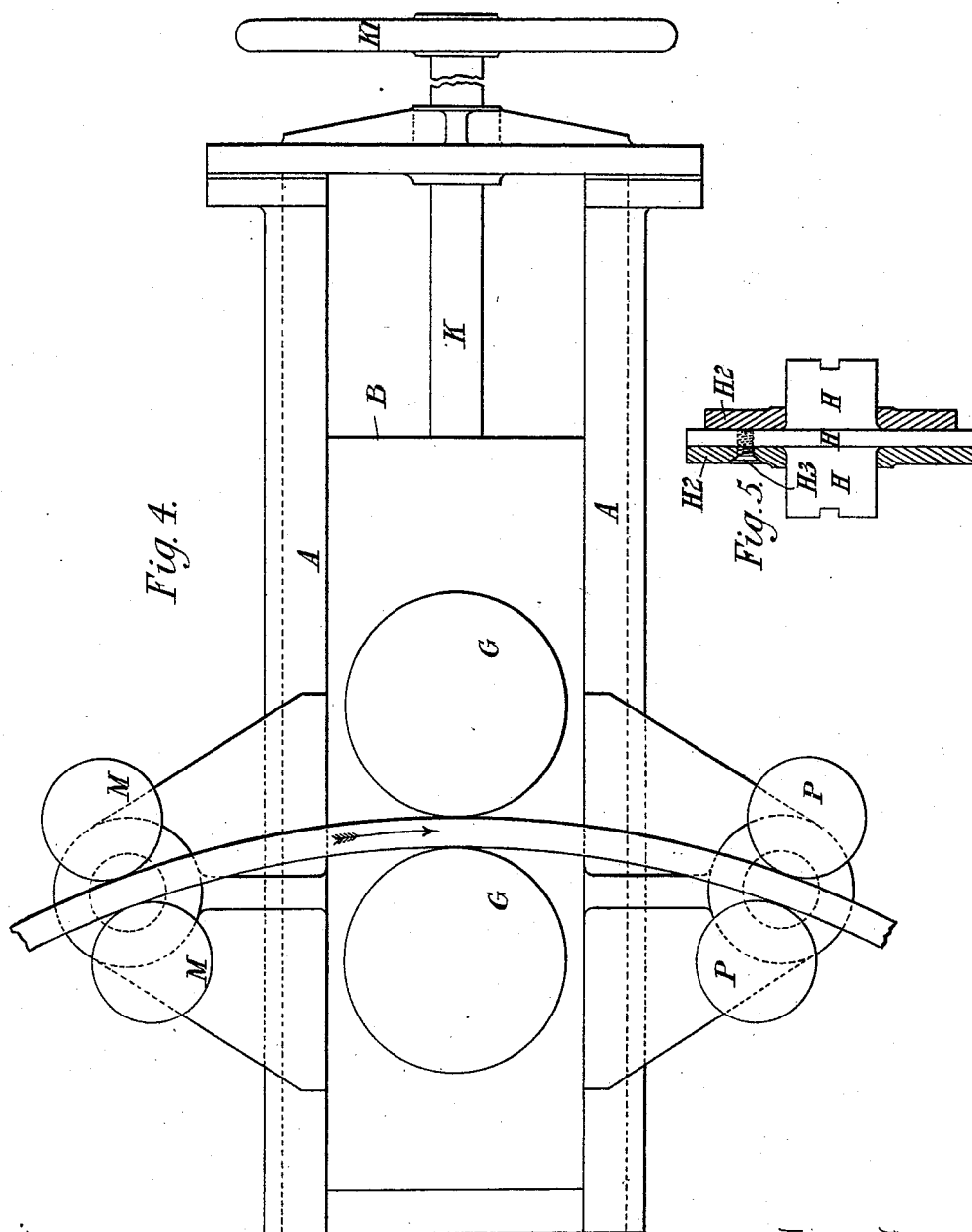
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UNITED STATES PATENT OFFICE.

MONTAGUE HERBERT CHURCHILL SHANN AND RICHARD ERNEST CHURCHILL SHANN, OF LONDON, ENGLAND, ASSIGNORS TO THE SHANN ROLLS DEVELOPMENT SYNDICATE, LIMITED, OF SAME PLACE.

MACHINE FOR BENDING OR SETTING SHIPS' FRAMES.

SPECIFICATION forming part of Letters Patent No. 581,375, dated April 27, 1897.

Application filed September 28, 1896. Serial No. 607,275. (No model.)

To all whom it may concern:

Be it known that we, MONTAGUE HERBERT CHURCHILL SHANN and RICHARD ERNEST CHURCHILL SHANN, subjects of the Queen of England, residing at London, in England, have invented certain new and useful Improvements in or Relating to the Bending or Setting of Ships' Frames, of which the following is a specification.

This invention relates to a metal-bending machine advantageously applicable to the bending or setting of ships' frames as well as to the bending of other bars and the like. The machine is characterized by two or more sets of rolls, each set being composed of two or more rollers and capable of rotating about an axis lying in and parallel with the channel or passage through which the metal to be bent is passed, in order that the metal may be twisted about its own axis. One of the sets of rolls is also adjustable in a direction transverse to that in which the metal is fed through it, in order to be able to give the metal the desired curvature along its length. Certain of the sets are also pivoted to rotate about an axis transverse to the channel or passage aforesaid, in order that the plane in which their axes are contained may always be normal to the curve to which the metal is being bent, so that the dimensions of the channel or passage-way in the several sets of rolls for taking a given section of bar are constant and need no alteration for differing curvatures of the bar, whereas if the plane of the axes were not kept normal to the curve, but allowed to lie aslant across it, the gap would need to be increased in width in the plane of curvature.

In the accompanying drawings, Figure 1 is a side elevation, partly in section and with parts broken away, of one construction of metal-bending machine according to this invention. Fig. 2 is a transverse section on the line 2 2 of Fig. 1. Fig. 3 is an end view of the machine. Fig. 4 is a diagrammatic plan view thereof; and Fig. 5 is a view, hereinafter described, of a detail of the machine.

Like letters indicate like parts throughout the drawings.

The direction in which the metal bar to be bent traverses the machine is indicated by the arrow in Fig. 1.

The framing of the machine is formed by two upright standards A, arranged parallel to and facing each other on a box bed-plate A'. On the internal faces of these standards are formed longitudinal guides B, in which engages a casing C, in the center of which is a passage D, through which the metal under treatment passes. This passage extends right through the machine, as will hereinafter appear. Within the casing C the framing E of one set of rolls is free to slue, this framing being carried upon trunnions F, supported in bearings in the casing. The rolls of this set are preferably four in number, two of which, G, Fig. 2, in the position in which they are now shown are horizontal and two, H, vertical. These all turn freely in their bearings in the framing E and carry pinions G' H', which engage with one another, preferably in the manners shown in Fig. 2, the whole being driven by a suitable motor through the driving-shaft J, which rests in bearings in the upper part of the framing E. Although there are four rolls in this set and in the other sets also, a set may be constituted by any other number of rolls suitably arranged.

The casing C has an extension C' formed on it terminating in lugs C², which form bearings for a worm L, with which engages a toothed segment E', formed upon the lower part of the framing E, by means of which worm and segment the whole framing E, carrying the set of rolls, may be slued as desired about an axis which is in and parallel with the channel through which the metal to be bent is passed.

A plate A² is bolted to the two frame-standards A opposite one end of the guides B, and in the center of this plate is a screw-threaded boss A³, within which works a horizontal screw K, on the outer end of which is a handle K', while the inner end is formed with a cheese-head K², which engages with the casing C, carrying the bearings for the frame E. By rotation of this screw the casing C, carrying the frame E and set of rolls G H, may be moved

in the guides B in a direction transverse to that in which the metal is fed through the machine.

The bar, before and after passing between the rolls G H, hereinbefore described, is operated upon by other sets of rolls, one set in front of and another behind the rolls G H. One of the sets, comprising rollers M N, Fig. 3, will now be described together with its appurtenances, the other set, comprising the rollers O P and its appurtenances, being similar in construction and operation do not need to be specially described. In the drawings, Fig. 1, one set is shown in section and the other in elevation.

Q is a frame with trunnions Q', which latter are received in lugs A' on the frame-standards A, so that the frame Q can turn freely about its vertical axis. In this frame is another and smaller frame R, in which are journaled rollers M and N, similar, respectively, to the rollers G and H in the frame E. On the frame R is a toothed segment R', engaging with a worm S, journaled in bearings in the frame Q and provided with a hand-wheel S'. The frame R has trunnions R', which rest in bearings in the frame Q and are the same plane as the trunnions F of the frame E. By rotating the hand-wheel S' the frame R with its rollers M N can be rotated on its trunnions R' about an axis in and parallel with the channel through which the metal to be bent is passed, like the frame E aforesaid. Thus the set of rolls M N have two adjustments about the bar being bent, one adjustment being employed in curving the bar and the other in twisting it, the former occurring automatically, inasmuch as the frame Q is quite free to turn about its vertical axis.

If desired, the worms L and S may be supported in any usual or convenient manner which will permit of their being moved into and out of gear with the toothed racks E' and R', respectively.

By means of the screw K the framing E can be adjusted transversely, so that its central opening is brought into or out of line with the central openings of the other two sets of rolls and the bar can pass straight through these openings or be bent into a curve, which, according to the arrangement of the machine in the present instance, will lie in or approximately in the horizontal plane. If the bar is being curved in the horizontal plane, each frame Q turns automatically about its vertical axis, so that whatever be the amount of curvature the axes of the several rolls of all the sets will always lie in planes which are normal to the curve. This is particularly advantageous for the reasons hereinbefore set forth and is indicated in the diagram Fig. 4. If the frames E and R be given, by means of the toothed segments E' R', angular adjustment about the axis of the bar under treatment, that bar will be given a twist about its own axis, and the amount of this twist may be varied, as desired, in the

length of the bar by suitably varying the angular adjustment of the frames R and E. The adjustments of each frame are quite independent of those of its neighbors. Pointers and graduated scales may be employed to insure exactitude in these adjustments. In practice it is found advisable to impart the twist to the bar first and to give it such curvature as may be desired afterward, and not to attempt to curve and twist the bar simultaneously. By this machine ship-bars can be so bent that when in place the web of the section will lie throughout their length at right angles to the skin-plating, no matter how curved the latter may be. This result, which has never before been cheaply and conveniently effected, enables reverse-frames of any desired form to be readily made in one piece with the main frames.

In the accompanying drawings the passage-way between the rolls of the several sets is shown as being of H form, which enables T, L, and H section-bars to be dealt with; but, if desired, the outer circumference of each roll can be constituted in part by a removable ring or rings, and by employing removable rings of appropriate section the profile of each roller is varied, and the passage-way between the rolls can be altered, as desired, to suit bars of different cross-sectional form and dimensions. Such a device is illustrated in Fig. 4, wherein H is the body of the roll in elevation and H² are removable rings adapted, in the example shown, for the treatment of T-bars. The rings may be loose or may be fixed to the body H by screws. In the drawings one of them is shown as secured by a screw H³, the other being free to turn.

For one of the frames Q with its sets of rolls fixed guides for the bar might in certain cases be substituted, although that would not be the preferred form of the machine.

The machine may be employed only to twist bars or only to curve them. In the former case the devices for giving adjustment to the roll-frames across the passage for the bar would be omitted, and in the latter case the devices for giving rotary adjustment to the frames would be dispensed with.

Instead of making only the center set of rolls transversely adjustable the other sets may be similarly adjustable as well as or instead of them.

We claim—

1. A metal-bending machine characterized by two or more sets of rolls (comprising the rolls G H M and N) each set being capable of rotating about the passage-way D through which the metal to be bent is passed, in order that the metal may be twisted about its own axis, the sets of rolls being also adjustable relatively to each other in a direction transverse to that in which the metal is fed through the machine in order to be able to give the metal the desired curvature lengthwise, certain of the sets (rolls M and N) being also pivoted to rotate about an axis transverse to

that channel in order that the plane in which the roller-axes of those sets are contained may always be normal to the curve to which the metal is being bent, so that the gap or passage in each set needs no variation for differences in the curvature of the bar being bent.

2. A metal-bending machine characterized by two or more sets of rolls (comprising the rolls G H M and N) the sets of rolls being adjustable relatively to each other in a direction transverse to that in which the metal is fed through the machine, in order to be able to give the metal the desired curvature lengthwise, certain of the sets (rolls M and N) being also pivoted to rotate about an axis transverse to that channel in order that the plane in which the roller-axes of those sets are contained may always be normal to the curve to which the metal is being bent.

3. A metal-bending machine characterized by two or more sets of rolls (comprising the rolls G H M and N) each set being capable of rotating about the passage-way D through which the metal to be bent is passed, in order that the metal may be twisted about its own axis, the sets of rolls being also adjustable relatively to each other in a direction transverse to that in which the metal is fed through the machine in order to be able to give the metal the desired curvature lengthwise.

4. In a metal-bending machine, the combination with the frame-standards, the longitudinal guides formed on the inner faces of said standards, the casing mounted to slide on said guides, the roller-frame carried by said casing, the rolls mounted in said frame, the screw

for moving the casing in its guides, and the rolls carried by frames mounted in the frame-standard; substantially as described.

5. In a metal-bending machine, the combination with frame-standards, the casing mounted to slide longitudinally on the inner faces of said standards, the roller-frame carried by trunnions supported in bearings in the casing, the rolls carried by the frame, the extension formed on the casing, the worm mounted in bearings in said extension, the toothed segment formed on the lower part of the roller-frame, with which the worm engages, whereby the frame may be turned on the trunnions, as and for the purpose set forth.

6. In a metal-bending machine, the combination with the frame-standards, the casing mounted on said standards, the roller-frame carried thereby, the rolls in said frame, the frames Q mounted to turn on a vertical axis in the frame, standards in front of and behind said first-mentioned rolls, the roller-frame carried by trunnions supported in bearings in frames Q, the worm journaled in bearings in said frame, the toothed segments on the roller-frame, with which the worm engages, whereby said roller-frame may be rotated on the trunnions; substantially as and for the purpose set forth.

In witness whereof we have hereto set our hands in the presence of the two subscribing witnesses.

MONTAGUE HERBERT CHURCHILL SHANN.

RICHARD ERNEST CHURCHILL SHANN.

Witnesses:

ALFRED J. BOULT,

HARRY B. BRIDGE.