

No. 624,429.

Patented May 2, 1899.

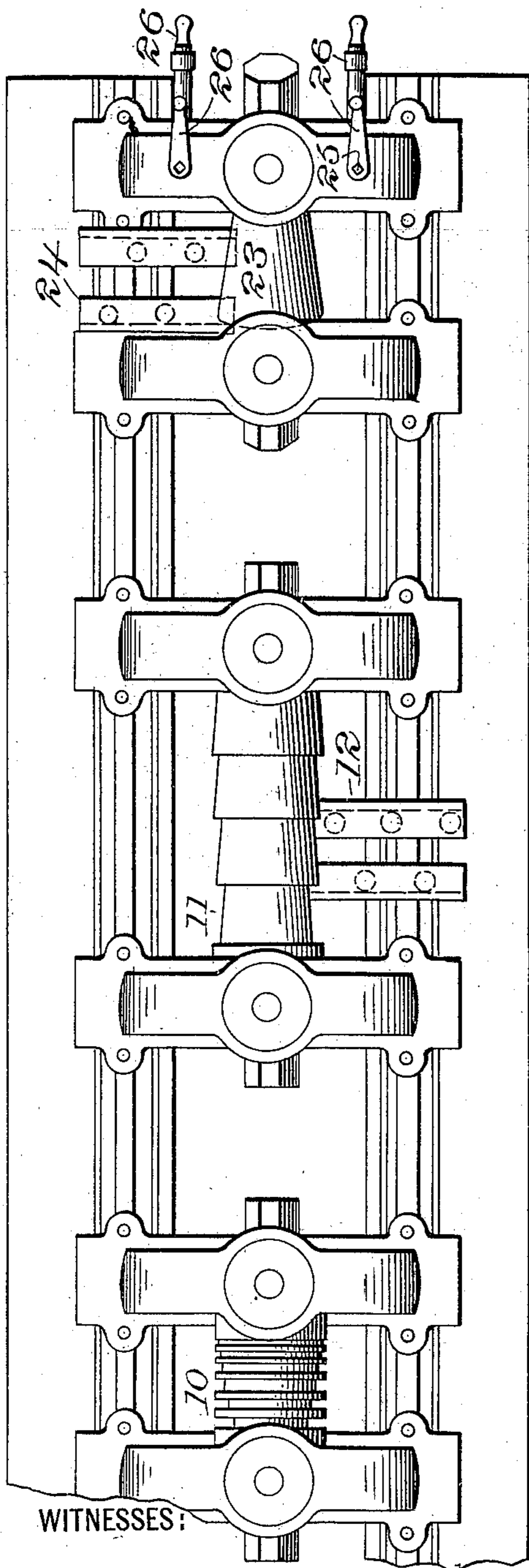
C. F. BROOKER.

MACHINE FOR ROLLING COPPER FORMS.

(Application filed Mar. 6, 1899.)

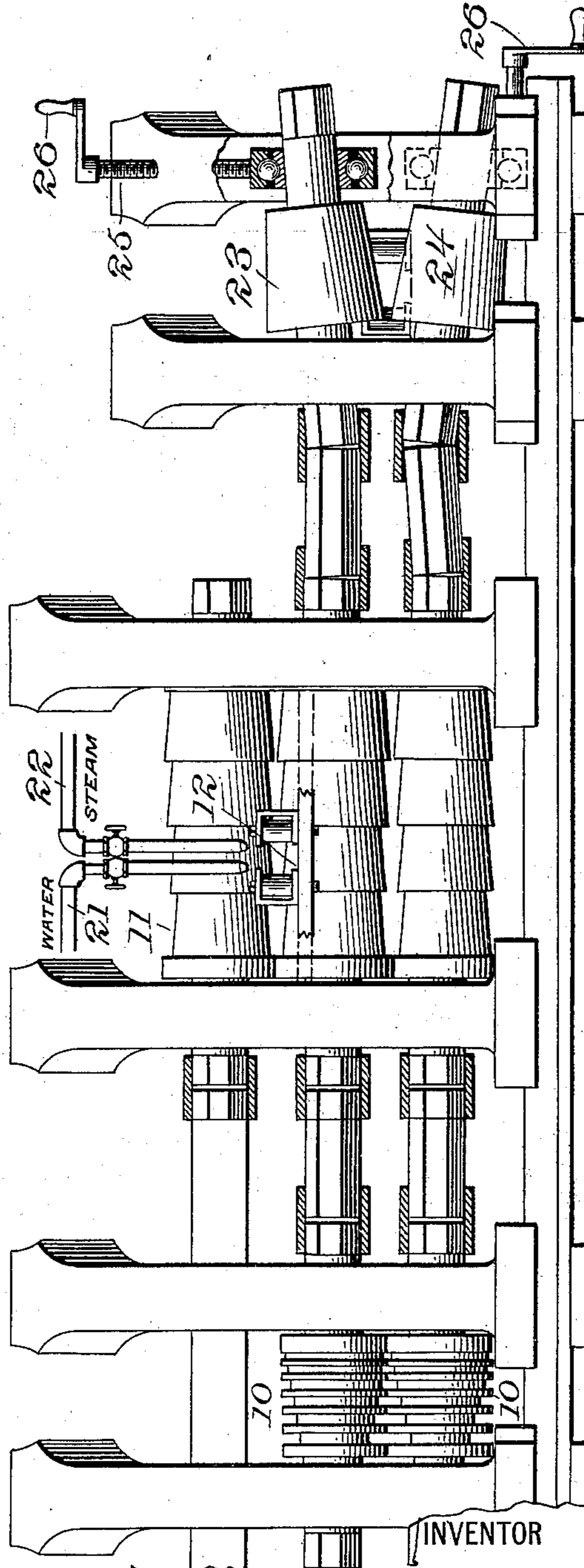
(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

J. E. Pearson  
W. H. Humphrey.  
Fig. 1.



INVENTOR

Fig. 2.  
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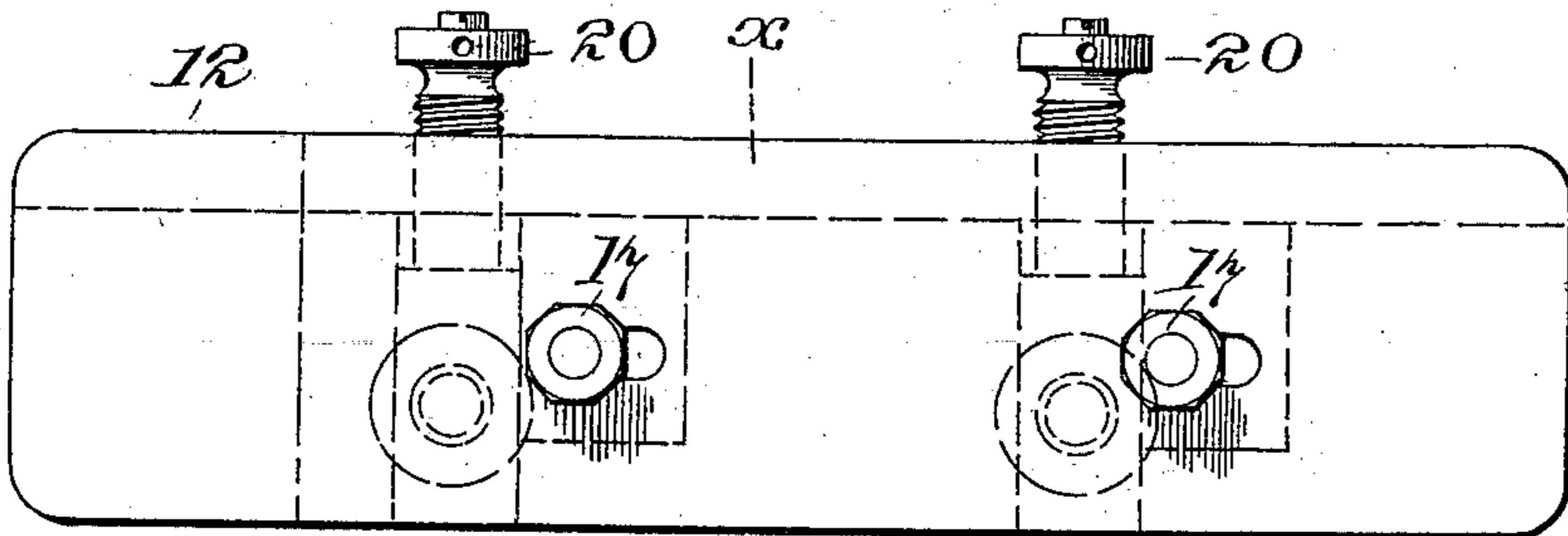


Fig. 4.

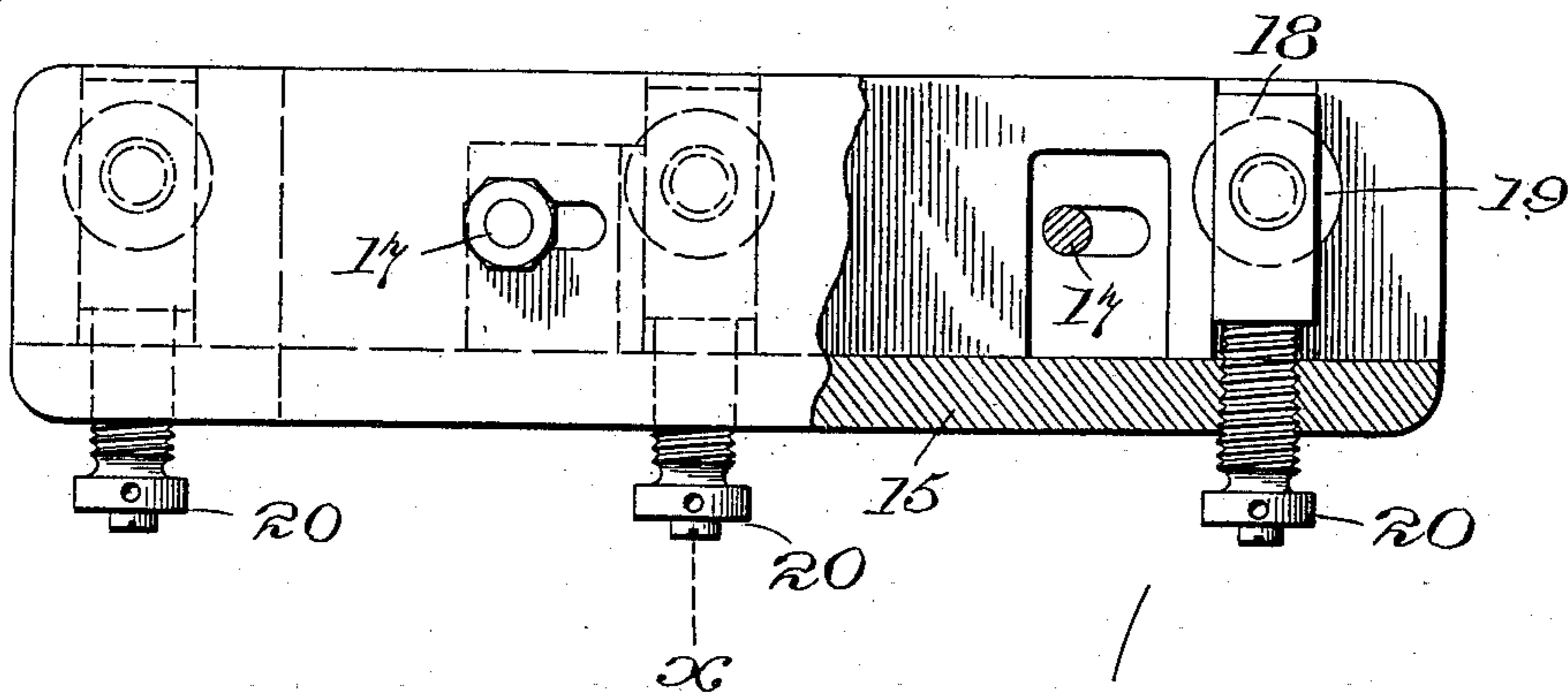
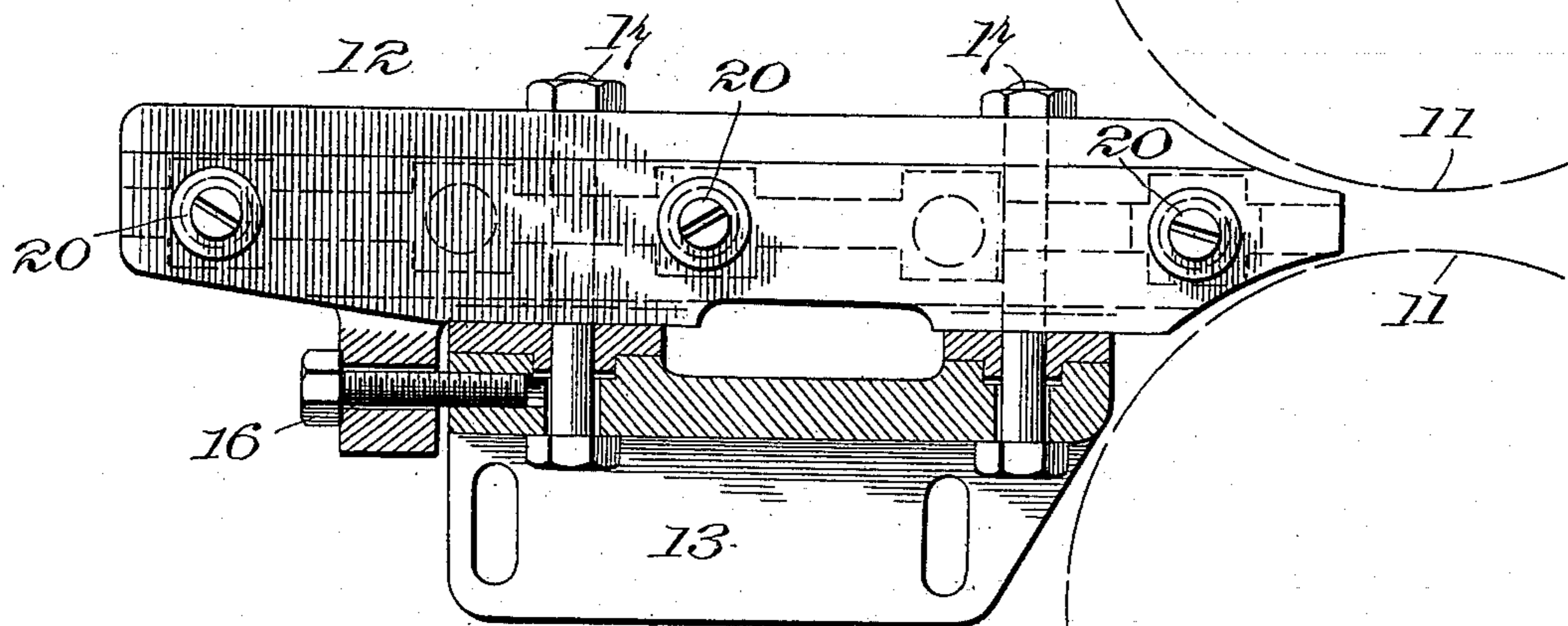


Fig. 3.



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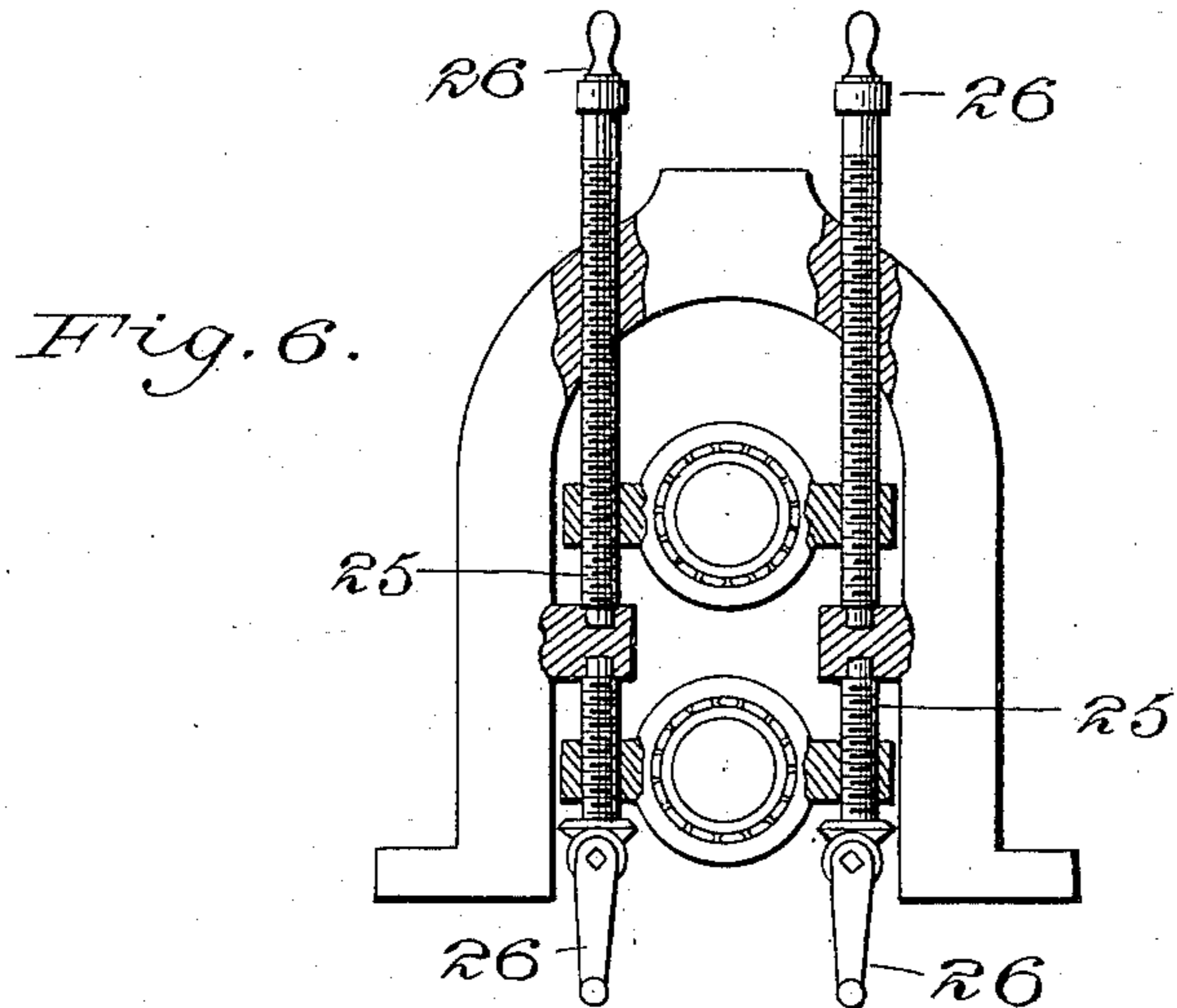
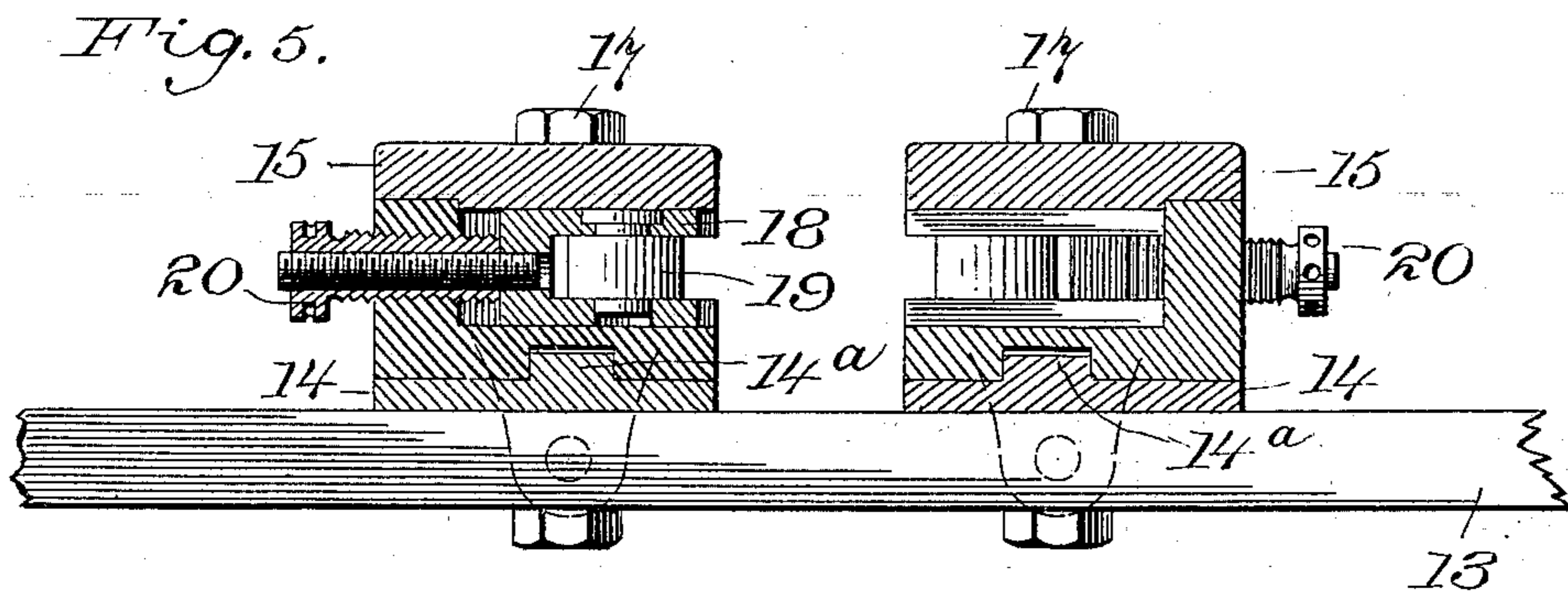
C. F. BROOKER.

MACHINE FOR ROLLING COPPER FORMS.

(Application filed Mar. 8, 1899.)

(No Model.)

3 Sheets—Sheet 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

CHARLES FREDERICK BROOKER, OF ANSONIA, CONNECTICUT, ASSIGNOR TO  
THE COE BRASS MANUFACTURING COMPANY, OF CONNECTICUT.

## MACHINE FOR ROLLING COPPER FORMS.

SPECIFICATION forming part of Letters Patent No. 624,429, dated May 2, 1899.

Application filed March 6, 1899. Serial No. 708,030. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES FREDERICK BROOKER, a citizen of the United States, residing at Ansonia, State of Connecticut, have invented a Machine for Rolling Copper Forms, of which the following is a specification.

My invention consists in a machine constructed to roll copper forms and also in the combination, with the rolls of such machine, of a suitable guide device.

The object of my invention is to roll copper forms—such as bars, strips, plates, and other similar articles—instead of drawing them, as has heretofore largely been the practice.

I will describe my invention as employed in the manufacture of commutator-bars for dynamo-electric machines, motors, and other similar apparatus.

In the accompanying drawings similar letters of reference indicate like parts.

Figure 1 is a plan view with a train of rolls such as I may employ in making commutator-bars. Fig. 2 is a front view of such train. Figs. 3, 4, and 5 are respectively a side view, a plan, and a transverse section, on line  $x-x$  of Fig. 4 looking to the left, of a special guide and straightening device used in combination with a pair of rolls and which combination relates to one portion of my invention. Fig. 6 is an end view, partially in section, of one of the supporting-standards for the rolls at the extreme right of the roll-train and shows such a device as may be used for regulating the distance between a pair of rolls.

To carry my invention into effect as applied to a commutator-bar, I proceed as follows: A commercial pig of copper is heated to the required temperature and then passed in the usual manner through suitable roughing and flattening rolls (not shown in the drawings) until it has reached the condition of a strip of copper of the required thickness. At this point my method of treatment commences. Such strip is first passed between a pair of disk-rolls 10, which determine the width of the strip. The strip is then passed between a pair of beveled rolls 11, which determine the shape of the commutator-bar.

The strip in passing such rolls is led into a guide 12, located behind the rolls, and which guide is of a peculiar construction, as shown in Figs. 3, 4, and 5. This guide consists, essentially, of a supporting-base 13 and may be adjusted upon a suitable framework (not shown) and placed behind any one of the different bevels upon the rolls 11. Mounted upon the base 13 and provided with guides 14 are the housings 15, arranged to move horizontally and to be adjusted relatively to the beveled rolls 11 by means of a pair of adjusting-screws 16, only one of which is shown. A tongue-and-groove arrangement 14<sup>a</sup> between each lower housing and its guide permits longitudinal adjustment and prevents lateral displacement of the housings.

17 represents bolts by means of which the position of the housings after having been determined and adjusted by means of the screw 16 may be fixed. Mounted in the housings and arranged to move transversely therein are the boxes 18, carrying the horizontally-rotating rolls 19.

20 are adjusting-screws by means of which the position of the vertical rolls may be determined.

In the drawings two horizontally-rotating rolls are shown upon one side of the guide and three upon the other. I do not limit myself to the number of rolls which may be used. The construction shown is that which I find best adapted to act both as a guide and straightener for the strip as it passes through the guide.

It will be observed upon reference to Fig. 5 that the horizontally-rotating rolls 19 are situated back of the inner faces of the housings 15, or, in other words, opposite series of rolls are located in opposite rectangular openings in the housings. By means of this arrangement of parts it will be observed that the strip under treatment is caused to traverse a definite path between the rolls, and hence the strip is subjected to a definite compression along its whole length, or, in other words, the strip is given a definite configuration, which corresponds to the configuration of that portion of the rolls through which it passes. Further, by reason of the shape of the guides the strip is prevented from curl-

ing upward or downward and from expanding laterally.

If desired, the surface of the strip under treatment may have formed on it a superficial and integral layer of copper oxid, and in order to produce such layer and to compact and compress it the surface of the strip is treated in the following manner: Mounted in front of the train carrying the beveled rolls 11 are the pipes 21 22, which are respectively connected to a source of water and to a source of steam. I may use either one of these pipes. In practice the water or the steam, or both, are allowed to flow continuously in sufficient quantity upon the heated strip and the beveled rolls 11, with the effect of altering the character of the surface of the strip. In other words, certain constituents of the water or steam unite with the highly-heated surface of the copper strip and chemically transform such portion of the copper as is exposed to their action into a material the base of which is copper and which is a poor conductor of electricity. In practice I have found that this chemical action attacks the body of the copper over its surface uniformly, so that the layer which is formed is entirely coherent—that is, it is not formed as a scale, but is integral with the body of the copper. Further, I have found that such layer may be compressed and compacted and form a highly-polished surface upon the body treated. To bring about this latter condition, it is my practice to pass the strip after passing the beveled rolls 11 and guide 12 through the pair of beveled rolls 23 and guide 24. The rolls 23 I prefer to make adjustable in order that they may accommodate themselves to the bevel previously formed upon the body passing the beveled rolls 11. This is accomplished by means of suitable screws 25 and cranks 26. (Shown in Fig. 6.) Any suitable arrangement of adjusting devices may be employed.

Having thus described my invention, I claim—

1. In a machine for rolling metal forms, the combination with a pair of beveled rolls, of a guide located back of the rolls in the line of feed, said guide comprising a base, a pair of oppositely-disposed housings, and means for effecting an independent and longitudinal adjustment of said housings.

2. In a machine for rolling metal forms, the combination with a pair of beveled rolls, of a guide located back of the rolls in the line of feed, said guide comprising a base, a pair of oppositely-disposed longitudinally-adjustable housings, guide-rolls carried within said housings, and means for effecting an independent and transverse adjustment of said guide-rolls.

3. In a machine for rolling metal forms, the combination with a pair of beveled rolls, of a guide located back of the rolls in the line of feed, said guide comprising a base, a pair of

oppositely-disposed housings, means for effecting an independent and longitudinal adjustment of said housings, a series of rolls carried in said housings, and means for effecting an independent and transverse adjustment of said guide-rolls.

4. In a machine for rolling metal forms, the combination with the rolls, of a guide, spaced and transversely-adjustable guide-rolls journaled in opposing sets, said sets being independently adjustable in the direction of the feed and coacting parallel members composing said guide, carrying said sets of guiding devices and movable with the latter, substantially as described.

5. In a machine for rolling metal forms, the combination with the rolls, of a guide, spaced and transversely-adjustable guide-rolls journaled in opposing sets, said sets being independently adjustable in the direction of the feed, and coacting parallel housings composing said guide and having opposing longitudinal recesses in their adjacent faces, said housings being movable with and carrying said sets of guide-rolls in their recesses, substantially as described.

6. In a machine for rolling metal forms, the combination with the rolls, of a guide, consisting of a pair of housings, each housing comprising separable sections arranged the one above the other and provided with longitudinal slots, a base for said housings, bolts penetrating said base and projecting through said slots, boxes arranged between said sections, means for adjusting said boxes transversely of said housings, guide-rolls contained by said boxes, the adjacent walls of said housing and said boxes being removed and the guide-rolls being situated behind the plane of the faces of their respective housings, and a tongue-and-groove arrangement between the lower section of each housing and said base and extending in the direction of the feed of said guide, substantially as described.

7. In a machine for rolling metal forms, the combination with the rolls, of a guide, consisting of a pair of housings, each housing comprising separable sections arranged the one above the other and provided with longitudinal slots, a base for said housings, bolts penetrating said base and projecting through said slots, boxes arranged between said sections, means for adjusting said boxes transversely to said housings, and guide-rolls contained by said boxes, the adjacent walls of said housings and said boxes being removed and the guide-rolls being situated behind the plane of the faces of their respective housings, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

CHARLES FREDERICK BROOKER.

Witnesses:

E. T. COE,

C. E. STEELE.