No. 705,887. Patented July 29, 1902.

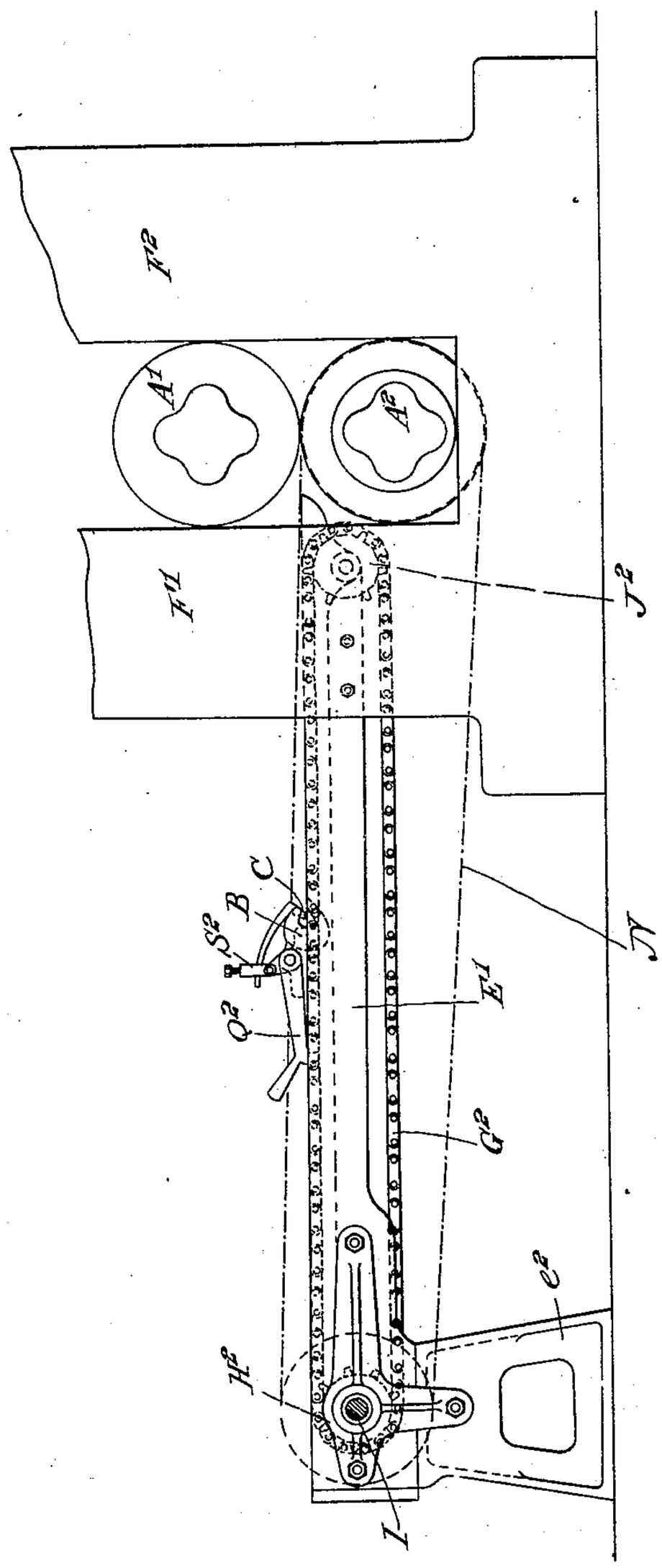
T. WHITEHOUSE.

APPARATUS FOR ROLLING FLAT SHEET METAL.

(Application filed May 2, 1902.)

(No Model.) 4 Sheets—Sheet 1.

FIG 1



WITNESSES.

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Attorneys

No. 705,887. Patented July 29, 1902.

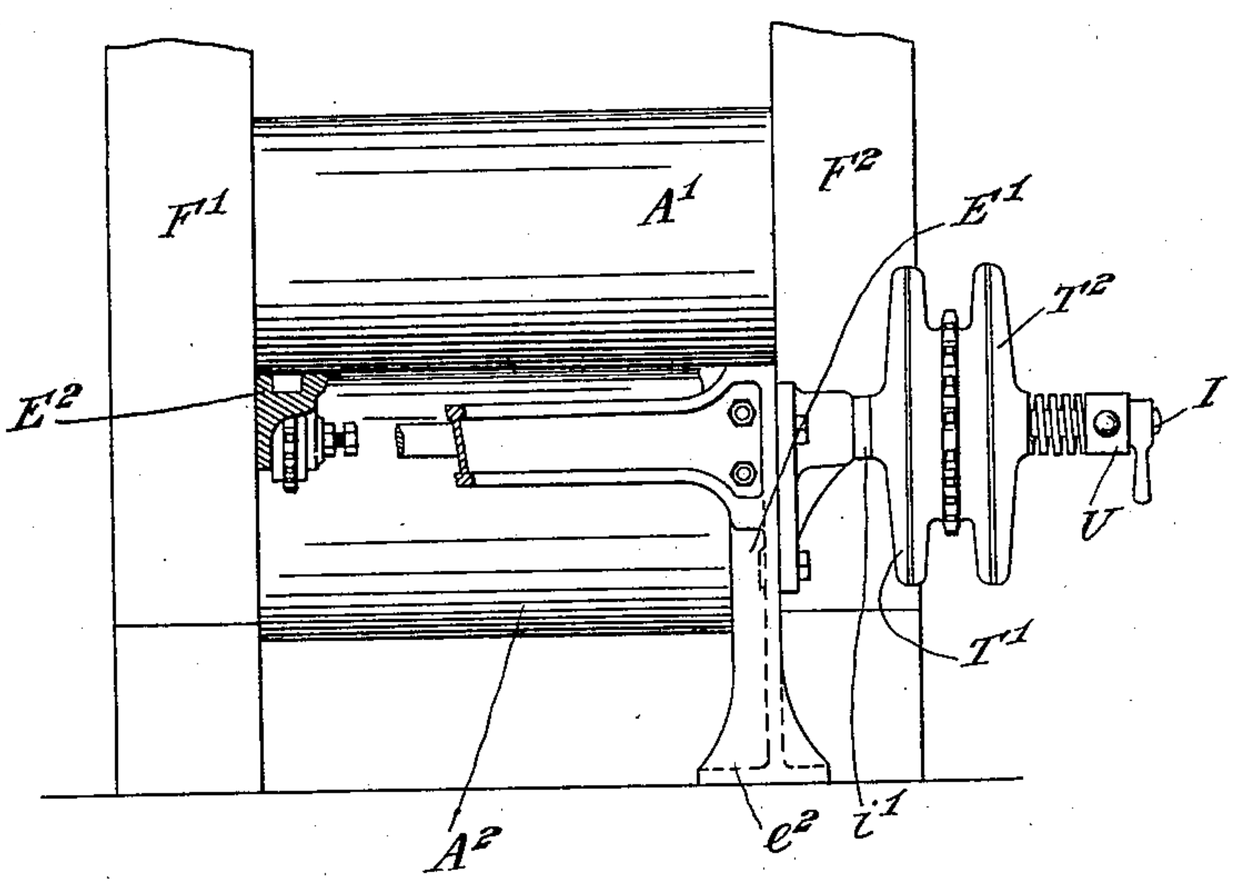
T. WHITEHOUSE.

APPARATUS FOR ROLLING FLAT SHEET METAL.

(Application filed May 2, 1902.)

(No Model.) 4 Sheets—Sheet 2.

FIG 2



WITNESSES.

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No. 705,887. Patented July 29, 1902.

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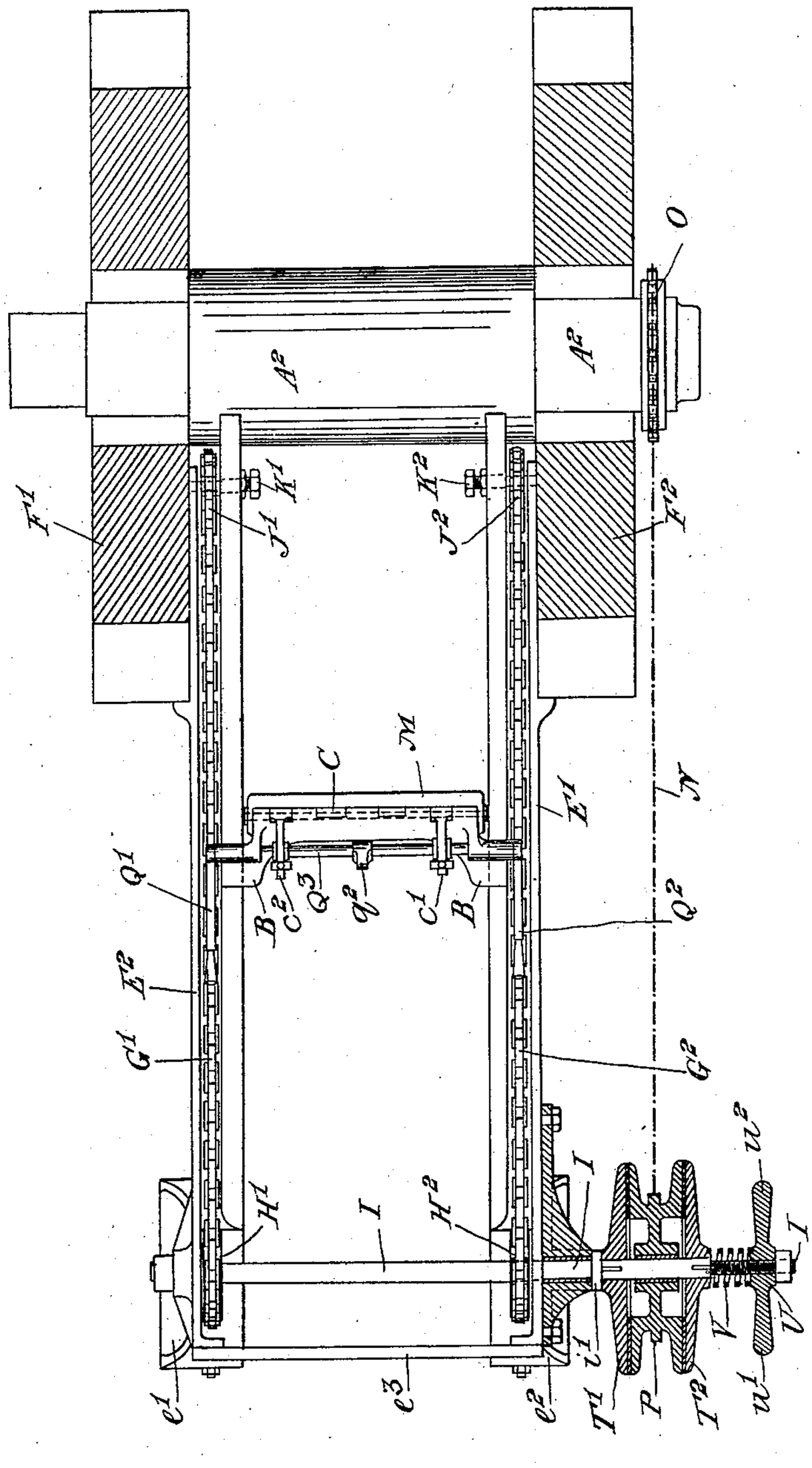
APPARATUS FOR ROLLING FLAT SHEET METAL.

(Application filed May 2, 1902.)

(No Model.) 4 Sheets—Sheet 3.

FIG 3



WITNESSES.

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No. 705,887. Patented July 29, 1902.

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APPARATUS FOR ROLLING FLAT SHEET METAL.

(Application filed May 2, 1902.)

(No Model.) 4 Sheets—Sheet 4.

FIG 4

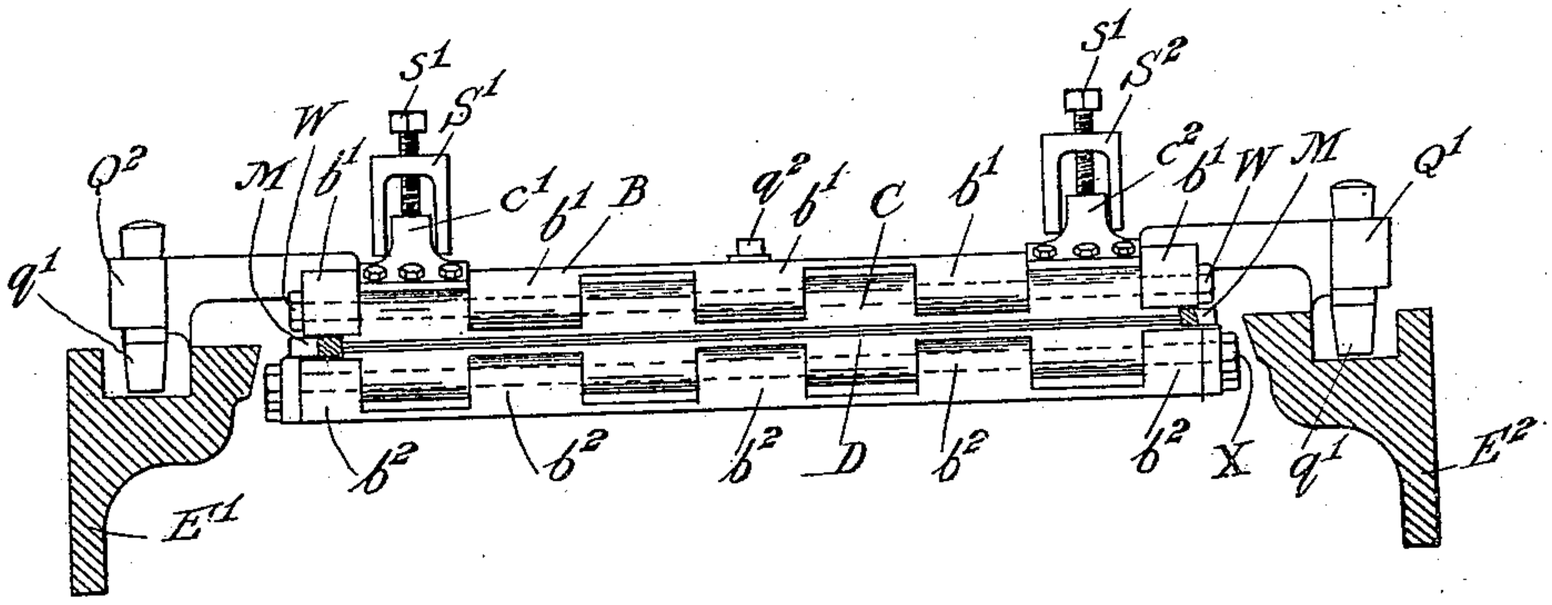


FIG 5

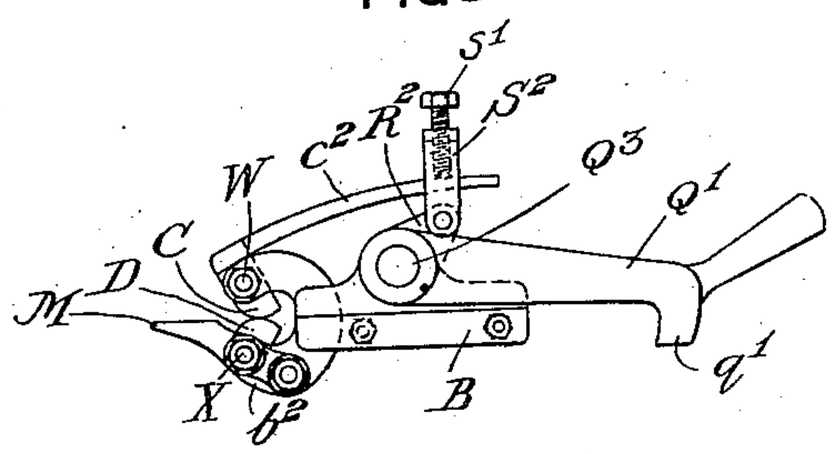
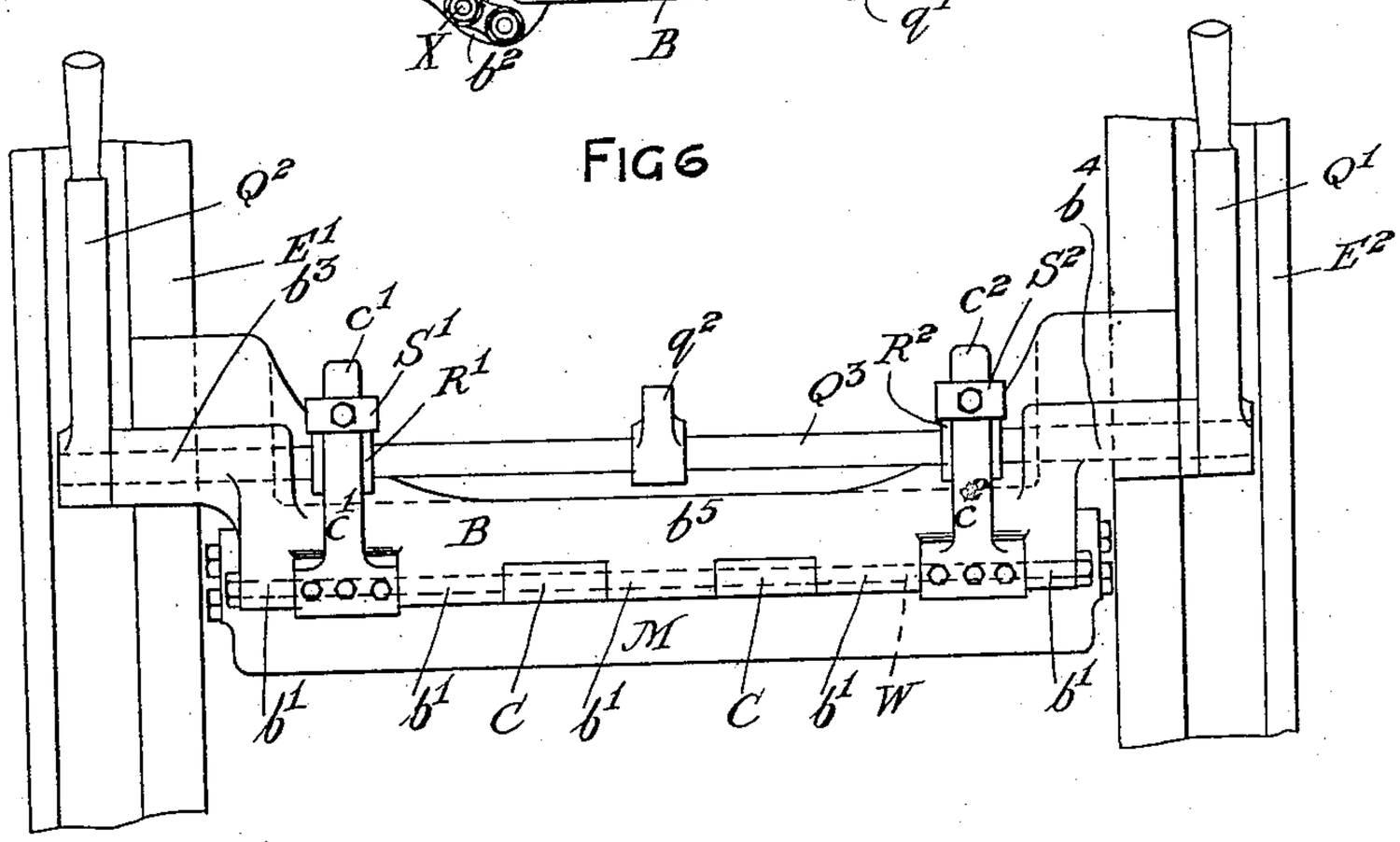


FIG 6



WITNESSES.
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Adelaide Blaire Gleason.

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UNITED STATES PATENT OFFICE.

THOMAS WHITEHOUSE, OF BIRMINGHAM, ENGLAND.

APPARATUS FOR ROLLING FLAT SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 705,887, dated July 29, 1902.

Application filed May 2, 1902. Serial No. 105,654. (No model.)

To all whom it may concern:

Be it known that I, THOMAS WHITEHOUSE, metal-roller, a subject of His Majesty the King of Great Britain and Ireland and of the British Dominions Beyond the Seas, Emperor of India, residing at 59 Algernon road, Dudley road, in the city of Birmingham, England, have invented certain new and useful Improvements in Apparatus for Rolling Flat Sheet Metal, of which the following is a specification.

This invention consists of the herein-described improvements in apparatus for rolling sheet metal perfectly flat, which has heretofore not been satisfactorily accomplished, but the metal sheets after leaving the rolls have been buckled, and it has been very difficult and very laborious and in many cases impossible to get them perfectly flat. This is, however, very easily accomplished by my invention, as herein described. Moreover, my invention can when desired be arranged to impart a splendid polish to the sheet metal at the same time that it is being rolled flat.

My invention is particularly applicable to sheet German silver and sheet-brass, which is required to be perfectly flat and polished; but my invention is also applicable to rolling any other flat-metal sheets which require to be quite flat whether they are to be simultaneously polished or not.

I will describe my invention by referring to the accompanying drawings, on which—

Figure 1 is a side elevation of a pair of sheet-rolls with my invention applied thereto. Fig. 2 is a part-sectional end elevation of the same. Fig. 3 is a part-sectional plan of the same. Fig. 4 is a part-sectional front elevation of the traveling carriage and gripper, part of the same on a larger scale. Fig. 5 is a side elevation of the said traveling carriage and grippers, and Fig. 6 is a plan of the same.

The same letters of reference indicate the same parts in all the figures.

In carrying out my invention I provide at the delivery side of the rolls A' A^2 a draw-bench of peculiar construction, made with a traveling carriage B, provided with gripping-jaws C D, which grip the end of the sheet as it is delivered through the rolls A' A^2. The carriage B is arranged to travel backward from the rolls A' A^2 at a higher speed than the periphery of the rolls A' A^2 themselves, so that the carriage pulls and stretches the sheet as it is passing through the rolls, thereby effectually preventing the sheet from buckling and delivering the sheet from the rolls in a perfectly flat state. Moreover, when the rolls A' A^2 are lapped and polished perfectly true the metal sheet is polished by the rolls simultaneously with the rolling and stretching, so that the sheet is delivered polished and perfectly flat.

The draw-bench above referred to is formed of two side frames E' E^2, planed at the top, so as to form guides for the carriage B, and bolted to the inner sides of the two roll-housings F' F^2 and extending from almost close to the rolls A' A^2 to any distance, according to the longest sheet which is required to be rolled. At the end farthest from the rolls the side frames E' E^2 stand on legs e' e^2 and are bolted together at the proper distance apart by a cross-stay e^3. The carriage B moves along the guides at the top of the side frames E' E^2 and is worked by two endless side chains G' G^2 of the kind usually employed in draw-benches, which pass around sprocket-wheels H' H^2, fixed on the horizontal shaft I, which turns in bearings in the far end of the draw-bench, and said chains also pass around two other sprocket-wheels J' J^2, which turn on cross-pins K' K^2, situated as near as possible to the lower roll A^2. The gripping-jaws C D on the carriage B are made the full width of the sheet which is to be rolled and are perfectly straight, so as to grip the sheet evenly all along, and the top jaw C is jointed by the cross-pin W to lugs b' on the carriage above the sheet, and the jaw D is jointed by the cross-pin X to similar lugs b^2, formed on the carriage below the sheet, and, as will be seen by an examination of Fig. 5, the gripping-jaws C D are inclined toward the direction in which the sheet travels as it is delivered by the rolls, so that the jaws C D act as toggles, and the grip on the sheet increases with the pull. In front of the jaws C D there is fixed a lip M, which is shown in plan view, Fig. 3, and also in Figs. 5 and 6, but is broken off in Fig. 4, and this lip extends all across the jaws, so that the end of the sheet rests on this lip and by it is guided between the jaws to be gripped thereby. The end of the sheet is cut

off straight and square with the sides before the sheet is passed through these finishing-rolls, so as to afford the grippers a good hold.

The shaft I is driven by any convenient means from the roll A^2, such as an endless chain N, which gears with the sprocket-wheel O, fixed on the end of the roll A^2, and also gears with the sprocket-wheel P, which is mounted, as hereinafter described, on the shaft I, and the speed of the shaft I is such that the carriage B will travel at the required speed faster than the periphery of the rolls A' A^2—say about twenty-five per cent. faster, more or less, according to the kind of metal sheet and the thickness of the same.

There are two side dogs Q' Q^2 fixed on the same cross-shaft Q^3, mounted in the lugs b^3 b^4 of the carriage B, so as to lift together and so as to be turned down so that the ends q' of the dogs engage in the endless chains G' G^2 when the jaws C D of the carriage B have gripped the sheet, or these dogs can be turned up free of the chains G' G^2 when the sheet has passed through the rolls A' A^2. When the dogs Q' Q^2 have been turned up beyond the vertical center line of the cross-shaft Q^3, the cam q^2 on the shaft Q^3 comes in contact with the cross-bar b^5 of the carriage B, and thus forms a stop to prevent the dogs being turned over too far. Fixed to the top jaw C are two backwardly-projecting arms c' c^2, which extend over the shaft Q^3, and on the said shaft there are mounted two short levers R' R^2, to which the loops S' S^2 are jointed, these loops embracing the arms c' c^2 and each provided with a set-screw s', which bear on the top of the arms c' c^2, this arrangement having this effect that the act of putting down the dogs Q' Q^2 to engage with the draw-chains G' G^2 turns the levers R' R^2 downwardly, causing the set-screws s' to act upon and depress the lever-arms c' c^2 and turn the top jaw C, so as to close the same onto the sheet and nip it against the bottom jaw D. Also it will be seen that when the dogs Q' Q^2 are lifted out of gear with the draw-chains G' G^2 the levers R' R^2 are turned slightly and the loops S' S^2 and their set-screws s' are raised, so that the arms c' c^2 then lift and turn the top jaw so that the sheet is released.

In order to adjust the tension on the sheet as it is being rolled, the sprocket-wheel P is not fixed directly on the shaft I, but is mounted to turn loosely thereon between the two disks T' T^2, the acting faces of which are or may be covered with leather, so as to increase the friction between their acting faces and the surfaces of the sprocket-wheel O. The disk T' abuts against the fixed collar i', forged on the shaft L, and the other disk T^2 is adjustable by the nut U, which is screw-threaded on the end of the shaft I, and between this nut U and the disk T^2 there is provided a coiled spring V to equalize the pressure. The disks T' T^2 are mounted on feathers on the shaft I, so as to turn therewith, and they thus form a friction-clutch, the friction of which is adjustable by turning the nut U, thus allowing the sprocket-wheel P to lag behind and not turn as fast as the shaft I if the tension on the sheet is too great. Thus by turning the nut U, which is made with handles u' u^2 for this purpose, the tension on the sheet can be adjusted as required, according to the thickness and kind of sheet which is being operated upon.

The apparatus above described is used as follows: The dogs Q' Q^2 are lifted out of gear with the driving-chains G' G^2, and the carriage B is pushed up as close as possible to the rolls. The sheet which has been rolled down almost to the required thickness and only now requires to be finished and has had its end cut perfectly straight and square with the sides is then entered between the rolls, and as its end passes through it travels along the lip M and enters the gripping-jaws C D, and the attendant who is watching then depresses the dogs Q' Q^2, so that they gear with the gear-chains G' G^2, and the carriage is now moved forward, putting the necessary pull upon the sheet as it is passing through the rolls, so as to stretch it to such an extent that it is delivered in a perfectly flat state. The dogs Q' Q^2 are then lifted so as to stop the carriage and release the sheet and the operation repeated as before on another sheet, the friction on the sprocket-wheel I being adjusted by the nut U, so as to give the necessary stretch and pull on the sheet as it passes through the rolls.

The accompanying drawings illustrate what I consider to be the best means of carrying my said invention into practice; but it is to be understood that my invention is not limited to the precise details shown.

What I claim as my invention, and desire to secure by Letters Patent, is—

In apparatus for rolling and delivering sheet metals in a perfectly flat state from the rolls, the combination with the sheet-finishing rolls, of a draw-bench provided with two endless chains G, G', sprocket-wheels mounted in bearings near the rolls over which said chains pass, a driving-shaft I at the opposite end of the bench, sprocket-wheels thereon over which said chains also pass, a carriage B moving on the draw-bench and having gripping-jaws C D adapted to grip the end of the sheet immediately it has passed through the rolls, dogs carried by the carriage adapted to engage and be disengaged from the chains, and means whereby the depression of the dogs causes the jaws to grip the sheet and the dogs to engage the chains, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

THOMAS WHITEHOUSE.

Witnesses:

CHARLES BOSWORTH KELLEY,

THOMAS JOHN ROWE.