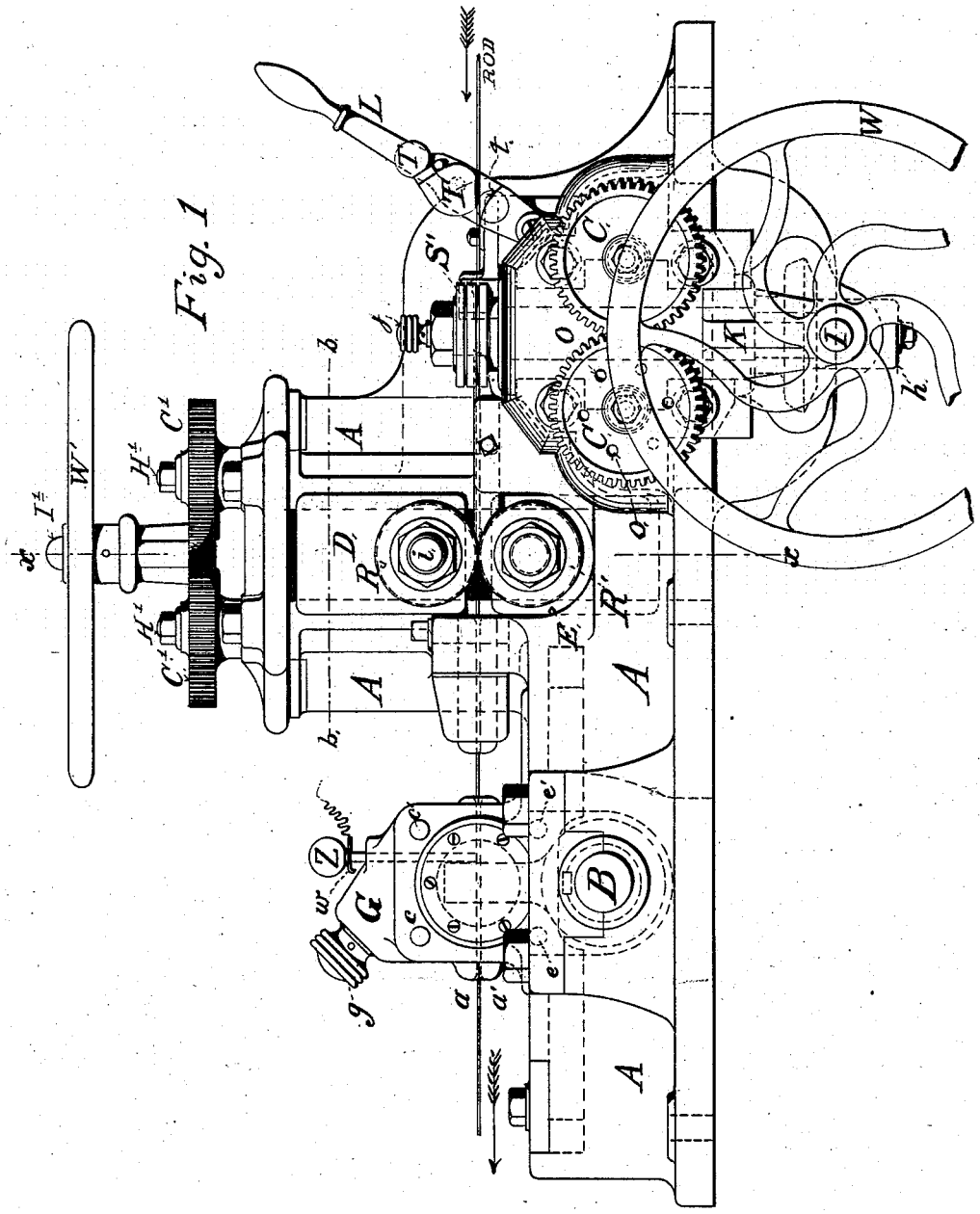
(No Model.) 5 Sheets—Sheet 1.

W. F. DURFEE.

MECHANISM FOR REDUCING METAL STRIPS OR RODS.

No. 260,174. Patented June 27, 1882.

Fig. 1



WITNESSES.
Albert R. Lacey
George Dorsey

INVENTOR.
William F. Durfee

N. PETERS. Photo-Lithographer. Washington, D. C.

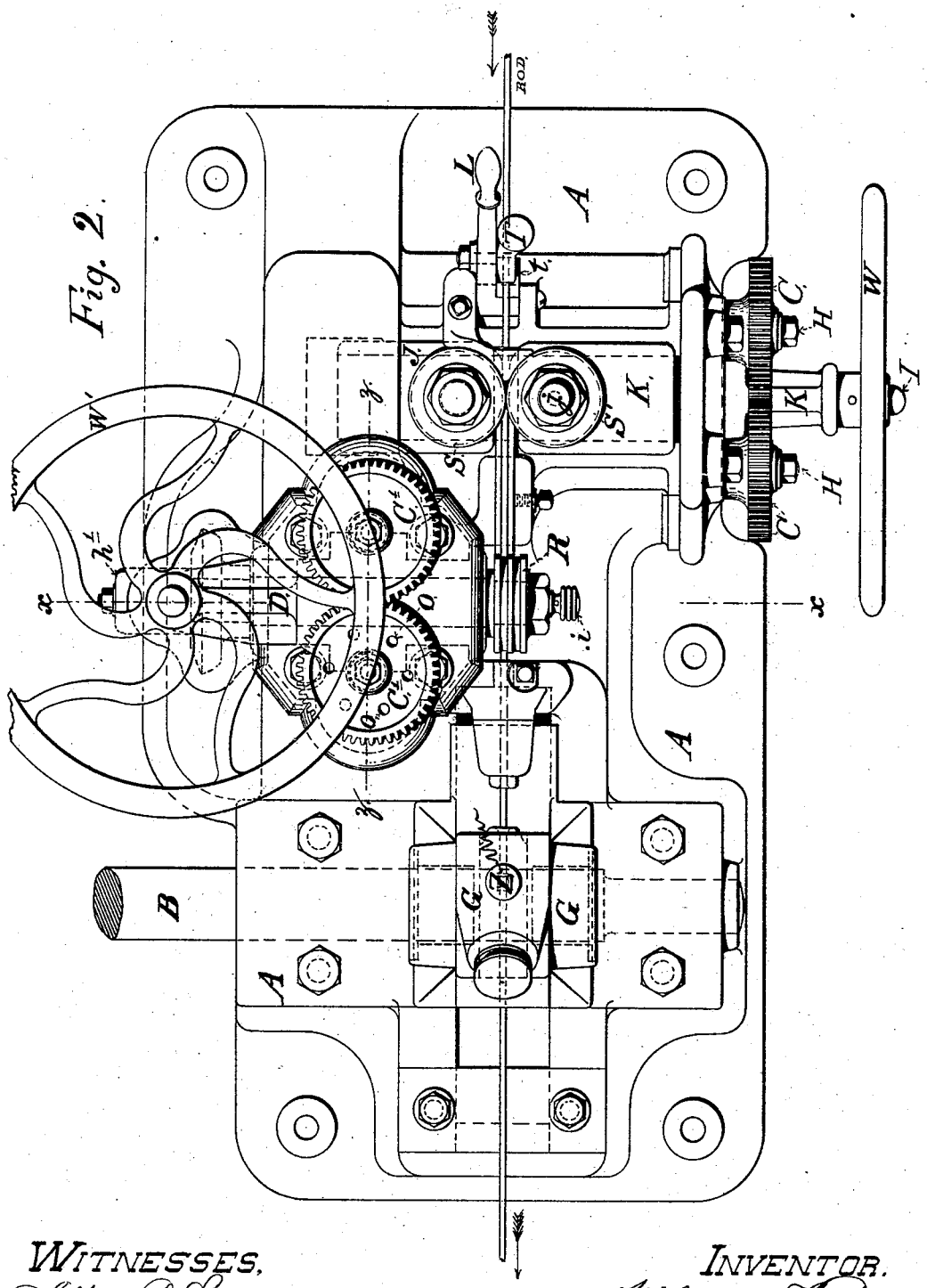
(No Model.) 5 Sheets—Sheet 2.

W. F. DURFEE.

MECHANISM FOR REDUCING METAL STRIPS OR RODS.

No. 260,174. Patented June 27, 1882.

Fig. 2.



WITNESSES.
Albert R Lacey
George Tibby

INVENTOR.
William A Durfee

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 5 Sheets—Sheet 3.

W. F. DURFEE.

MECHANISM FOR REDUCING METAL STRIPS OR RODS.

No. 260,174. Patented June 27, 1882.

Fig. 3

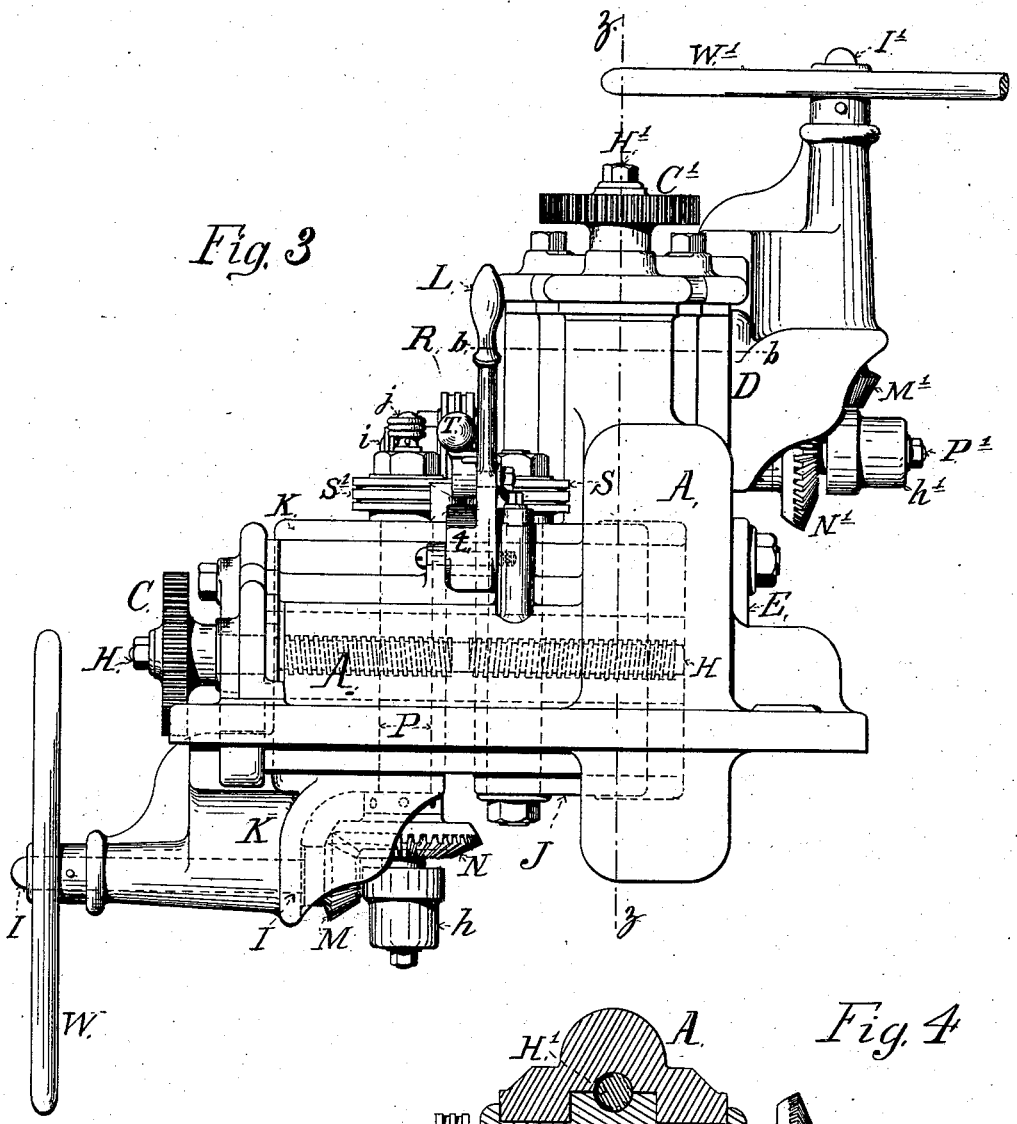
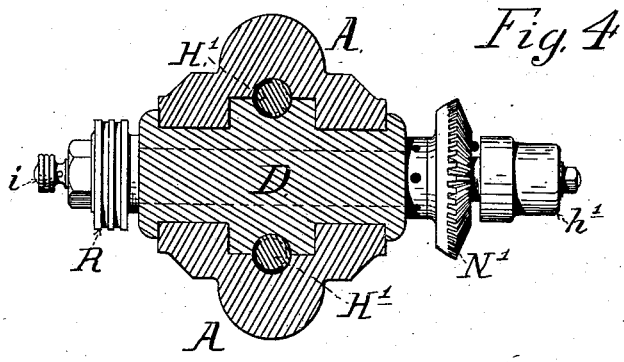


Fig. 4



WITNESSES.

Albert R Lacey

George Gidley

INVENTOR.

William F Durfee

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 5 Sheets—Sheet 4.

W. F. DURFEE.

MECHANISM FOR REDUCING METAL STRIPS OR RODS.

No. 260,174. Patented June 27, 1882.

Fig. 5.

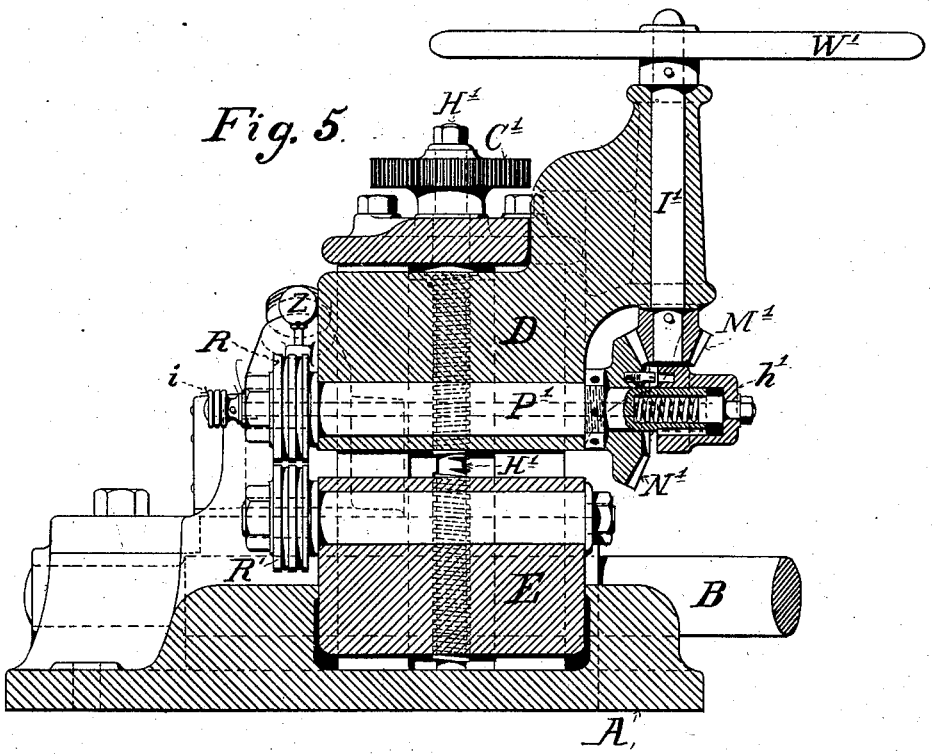


Fig. 7.

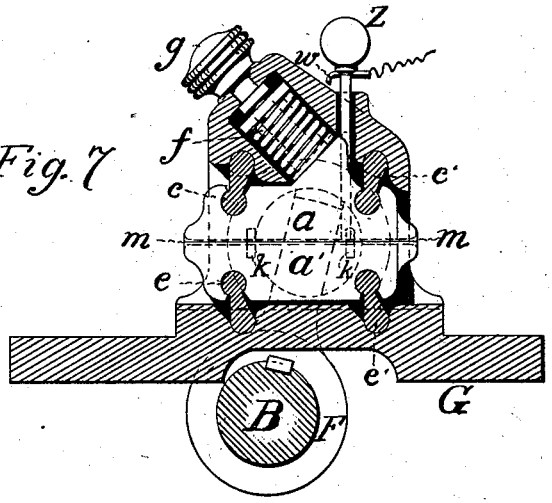
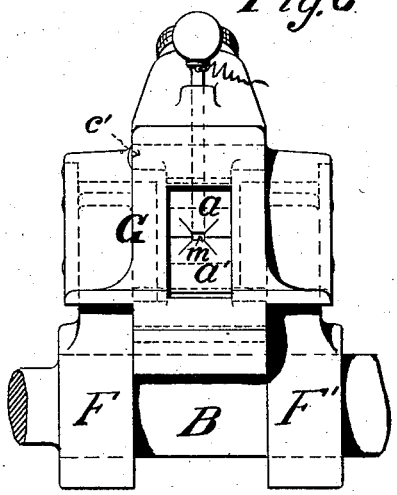


Fig. 6.



WITNESSES.
Albert R Lacey
Geo. Gurley

INVENTOR.
William F Durfee

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 5 Sheets—Sheet 5.

W. F. DURFEE.

MECHANISM FOR REDUCING METAL STRIPS OR RODS.

No. 260,174. Patented June 27, 1882.

Figure 8.

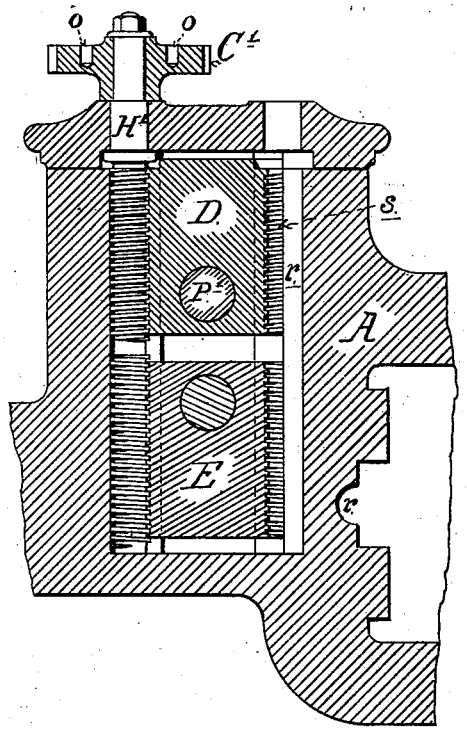


Fig. 9.

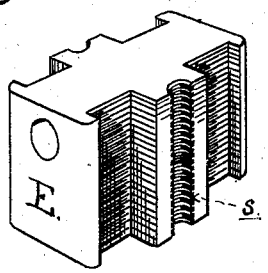
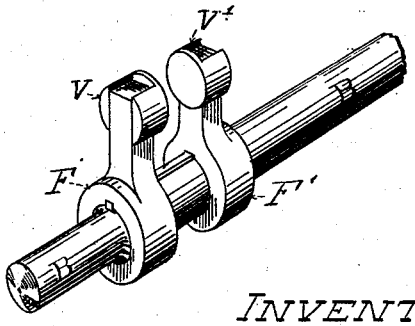


Fig. 10.



WITNESSES
Albert R Lacey.
Geo. C. Dorry

INVENTOR.
William F. Durfee

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM F. DURFEE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE WHEELER & WILSON MANUFACTURING COMPANY, OF SAME PLACE.

MECHANISM FOR REDUCING METAL STRIPS OR RODS.

SPECIFICATION forming part of Letters Patent No. 260,174, dated June 27, 1882.

Application filed November 17, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. DURFEE, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Mechanism for Reducing Metal Strips or Rods, of which the following is a specification, reference being made to the accompanying drawings for a better understanding of the same, in which—

Figure 1 shows a side elevation of the complete mechanism. Fig. 2 represents a plan view of the same. Fig. 3 is an end elevation. Fig. 4 is a horizontal section taken on the line *b b* of Figs. 1 and 3. Fig. 5 is a vertical section on the line *x x* of Figs. 1 and 2. Fig. 6 shows an end elevation of the gripping device detached, Fig. 7 being a sectional elevation of the same. Fig. 8 is a sectional view of a portion of the frame A and the bearing-blocks D and E, taken on the line *z z* of Figs. 2 and 3, and serves to illustrate more clearly the construction and operation of the adjusting-screws H′ upon the bearing-blocks D and E aforesaid. Fig. 9 shows the lower bearing-block, E, in perspective, and exhibits the semi-cylindrical recess *s*, with the screw-thread therein, which receives one of the screws H′. Fig. 10 is a perspective view of the oscillating shaft B detached, and shows the levers and cylindrical blocks which operate the gripping device.

Similar letters of reference indicate like parts throughout the several views.

The essential parts of this machine, as illustrated, are the base or frame A, the hand-lever L, with its pinching device T, the grooved rollers S S′ on vertical axes, the hand-wheel W for revolving the roll S′, the clutch *h* for disconnecting the wheel W from this roll, the gear-wheel C C for regulating (by means of right and left hand screws, to which said gears are attached) the space between the rollers S and S′, the grooved rollers R R′ on horizontal axes, the hand-wheel W′ for rotating the roll R, the clutch *h′* for disconnecting the wheel W′ from this roll, the gear-wheels C′ C′ for regulating (by means of the right and left hand screws, to which said gears are attached) the space between the rollers R and R′, and the reciprocating gripping apparatus G.

The manner in which this machine operates is substantially as follows, to wit: The metal to be reduced to a uniform cross-section is supplied to the machine in rods of indefinite length and of a cross-section slightly in excess of that which it has when delivered from the machine. The end of the rod is made to enter the lower grooves in the rollers S S′ (which rollers act upon the vertical surfaces or edges of the rod) by means of the pinching device T, attached to the lever L. This pinching device consists of an eccentric button, T, pivoted to the side of the lever L, which, when said lever is moved toward the rollers S S′, presses upon the upper surface of the metal rod, and thus forces its lower side in close contact with the curved upper surface, *t*, (see Figs. 1 and 2,) of a projection on the side of the lever L. When the lever L aforesaid is moved away from the rollers S S′ the button T automatically releases its hold from the rod of metal. The lever L is operated by the hand of the attendant, while at the same time he turns the rollers S S′ by means of the hand-wheel W, which acts on said rollers through the intervention of the horizontal shaft I, bevel-gears M N, and the vertical shaft P, to the upper end of which the roll S′ of the pair S S′ is secured. When said rollers have obtained a firm hold on the metal rod the lever L, with its pinching device T, is released from the rod, and the attendant continues to turn the rollers S S′ until the metal enters one set of the grooves in the surfaces of the rollers R R′, (which rollers act upon the horizontal surfaces of the rod,) which it is made to do by the attendant turning the rollers R and R′ by means of the hand-wheel W′, which acts on said rollers through the intervention of the vertical shaft I′, bevel-gears M′ N′, and the horizontal shaft P′, to one end of which shaft the roll R of the pair R R′ is secured. When the rollers R R′ have obtained a firm hold on the rod of metal the attendant, by turning the hand-wheels W and W′, causes the rod to progress through and between the rollers S S′ and R R′ in the direction indicated by the arrow until it enters the gripping and pulling apparatus. The pairs

of rollers S S′ and R R′ aforesaid are adjusted (each pair independently of the other) by means of the right and left hand screws H H and H′ H′, which act upon the bearing-blocks J K, Figs. 2 and 3, and D E, Figs. 1, 3, 4, 5, and 8, carrying the axes of the several rolls.

The screws H H, regulating the proximity of the rollers S S′ to each other, are made to act in unison by means of two spur-gears, C C, which gear together and are secured to the outer ends of the screws H H, (see Figs. 2 and 3,) said gears being operated by means of a pin-wrench inserted in the holes *o o* in the surface of one of said gears. The screws H′ H′, for regulating the distance asunder of the rollers R R′, are actuated in a similar manner, a section of one of the gears exhibiting the pin-holes being shown in Fig. 8. The construction of the screws H′ H′ aforesaid and the bearing-blocks D E is more particularly shown in the drawings, Figs. 8 and 9, the first of which is a vertical section on the line *z z* of Figs. 2 and 3, the right-hand adjusting-screw being omitted to show more clearly the vertical semi-cylindrical recess *r* in the frame A, in which recess the adjusting-screw H′ turns. Fig. 9, which is a perspective view of the bearing-block E detached, exhibits the screw-threads *s s* cut in the sides of the block, with which the screws H′ H′ engage.

The construction and operation of the bearing-block D are similar to that of E, and the bearing-blocks J and K are similar to E and D.

The object of the adjustment of the rolls as described is to cause the rod of metal being acted upon to be reduced to the desired cross-section, and at the same time to preserve the center of the vertical thickness of the rod in the same plane with the center of the gripping device G.

As soon as the gripping device G (previously referred to as having received the end of the rod of metal) has obtained a firm hold on said rod the hand-wheels W and W′ are disconnected from their respective pairs of rolls by throwing out the clutches *h h′* by means of the knobs *i* and *j*. This action permits the hand-wheels W and W′ to remain stationary while the rod of metal is being pulled along through between the several reducing-rollers by the intermittent action of the gripping apparatus G aforesaid. This gripping apparatus consists, in part, of a horizontally-sliding block, G, to which a reciprocating movement is communicated through the oscillating shaft B and the levers F F′, attached thereto. These levers and the method by which their vibration communicates a reciprocating movement to the gripping device G are more clearly shown in Fig. 10, wherein are shown the blocks V V′, in which work the levers F F′, respectively. These blocks are inclosed in cylindrical recesses on each side of the gripping device G.

In a longitudinal opening in the block G aforesaid are placed the two gripping-jaws *a a′*, which have corresponding grooves in their adjacent faces, forming the opening *m m* to admit the passage of the rod which is to be reduced. The upper one of these jaws, *a*, is suspended at its ends by the two equal and parallel links *c c′* in such a manner that said jaw may be moved horizontally a limited distance, and at the same time have a slight vertical movement. Acting angularly against the upper surface of said jaw *a* is the adjustable pressure-spring *f*, which may be given a greater or less tension through the intervention of the hand-screw *g*.

The lower gripping-jaw, *a′*, is supported by the links *e e′*, (which are similar to those already described in connection with the upper jaw, *a*,) and is operated isochronously with the jaw *a* by the dowel-pins *k k*, Fig. 7, which will permit the adjacent faces of the jaws to advance or recede vertically while they move horizontally in unison. The links *c c′* and *e e′* are so located that they will not lie in a vertical line when the metal to be gripped is between the adjacent faces of the jaws *a a′*.

It will be seen that if the bar of metal to be operated upon be passed through the groove *m* of the gripping device and said device moved in the direction toward the reducing-rollers R R′ while the bar aforesaid remains stationary the only resistance to the free movement of the device will be the friction of the faces of the jaws *a a′* against said bar of metal, caused by the tension-spring *f*. If we now attempt to reverse the direction of motion of the gripping device G aforesaid, the jaws *a a′* will clamp the bar rigidly between them and carry it until the movement of said device shall cease. The extent of motion of this gripping device may be varied by changing the degree of oscillation given to the shaft B, thereby reducing the desired amount of metal at each alternate movement of the device.

Passing through the upper jaw, *a*, of the gripping device is a vertical weighted rod, Z, the lower extremity of which rests on the bar of metal being operated upon, so that when the last extremity of said bar of metal has passed under the vertical rod Z said rod drops and causes the extremity of the insulated wire *w*, which is attached thereto and forms one pole of an electric circuit, to come in contact with the metallic body of the gripping device G, to which is attached the other pole of the same circuit, thereby producing an electric action in an electro-magnet, or any equivalent device for actuating any suitable mechanism which will disengage the vibrating shaft B from the motive power, and thereby stop the operation of the machine.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of the lever L, having eccentric button T and curved projection *t*, the grooved rollers R R′ S S′, hand-wheels W W′, intermediate gearing connecting said rollers and hand-wheels, and the gripping mech-

anism consisting of the sliding block G and the gripping-jaws *a a'*, links *c c' e e'*, spring *j*, hand-screw *g*, and pins *k k*, supported in said block substantially as and for the purpose described.

2. The combination of the block G, the gripping mechanism, the blocks V V', inclosed in recesses formed in the block G, the shaft B, and the levers F F', connecting the blocks V V' with said shaft, whereby a reciprocating movement is imparted to the gripping mechanism, substantially as described.

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

WILLIAM F. DURFEE.

Witnesses:

ALBERT R. LACEY,

GEORGE TERRY.