(No Model.) 5 Sheets—Sheet 1.

W. ALLDERDICE.

MACHINE FOR DRAWING COLD METAL BARS.

No. 329,800. Patented Nov. 3, 1885.

Fig. 1.

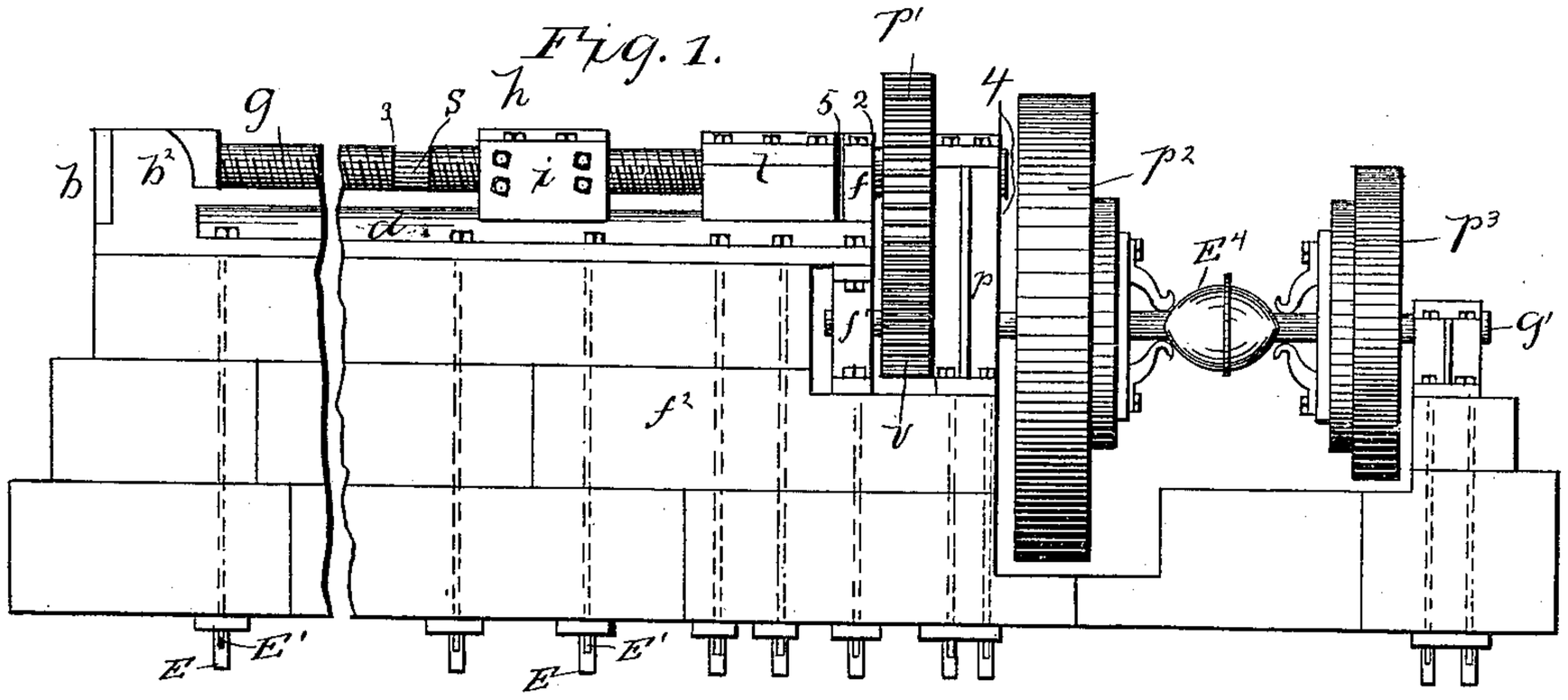

Fig. 2.

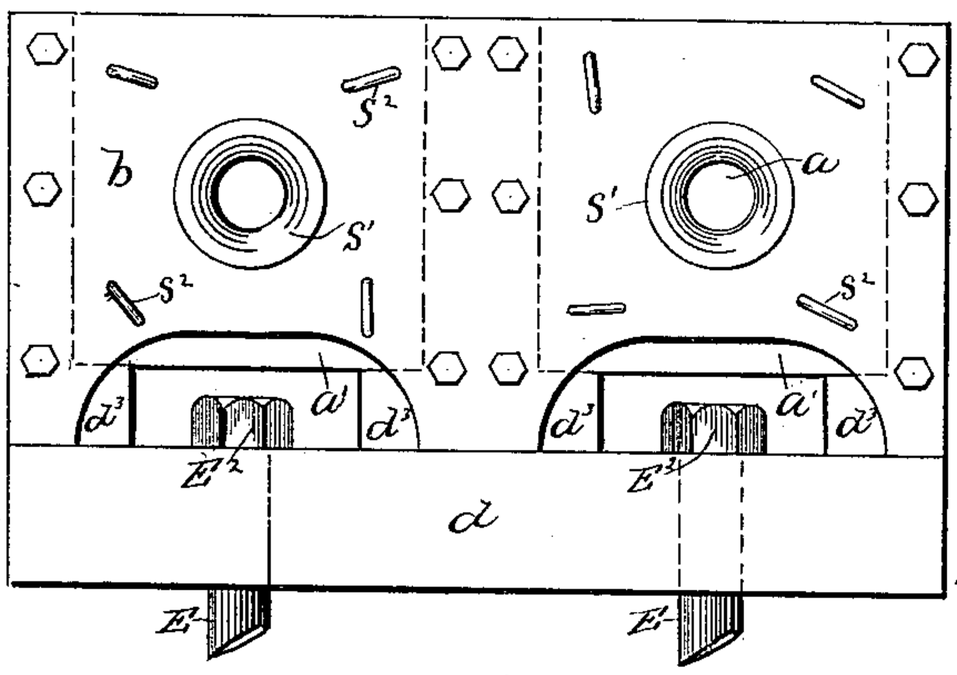

Fig. 4.

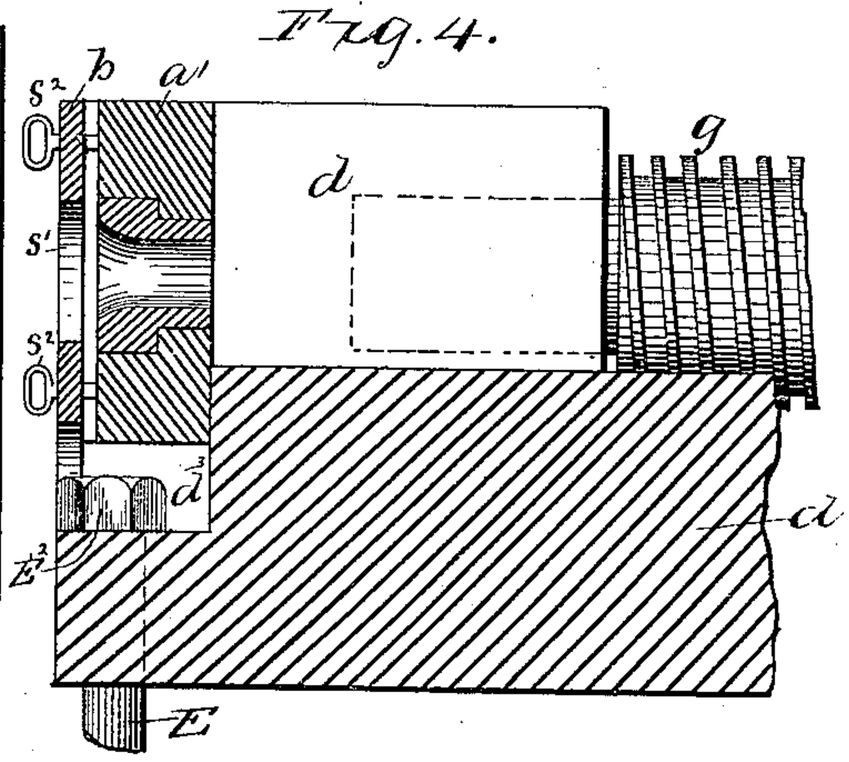

Fig. 3

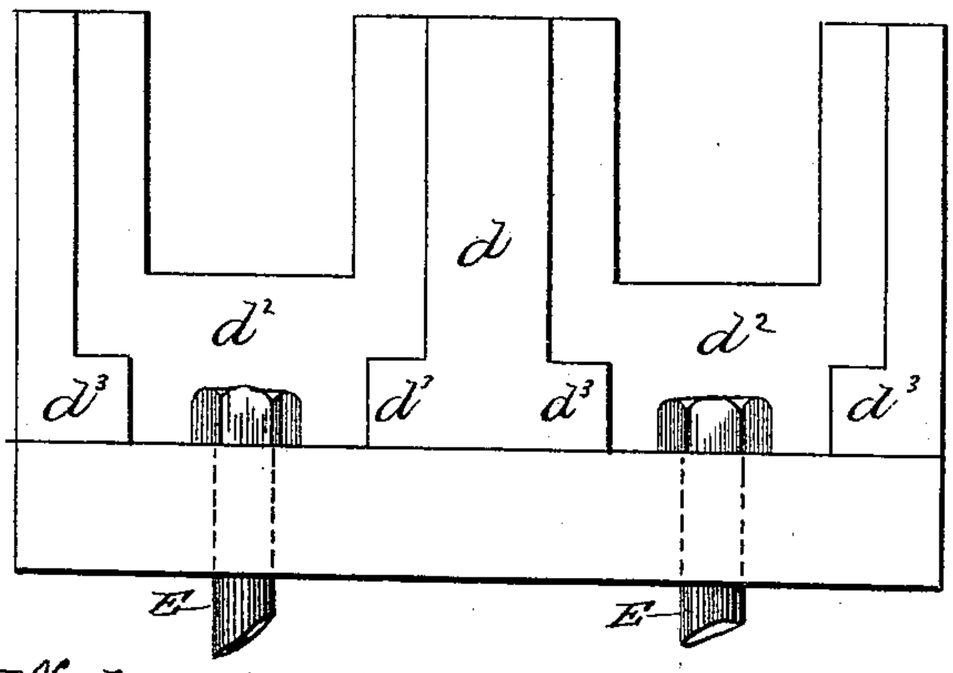

Fig. 5.

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MACHINE FOR DRAWING COLD METAL BARS.

No. 329,800. Patented Nov. 3, 1885.

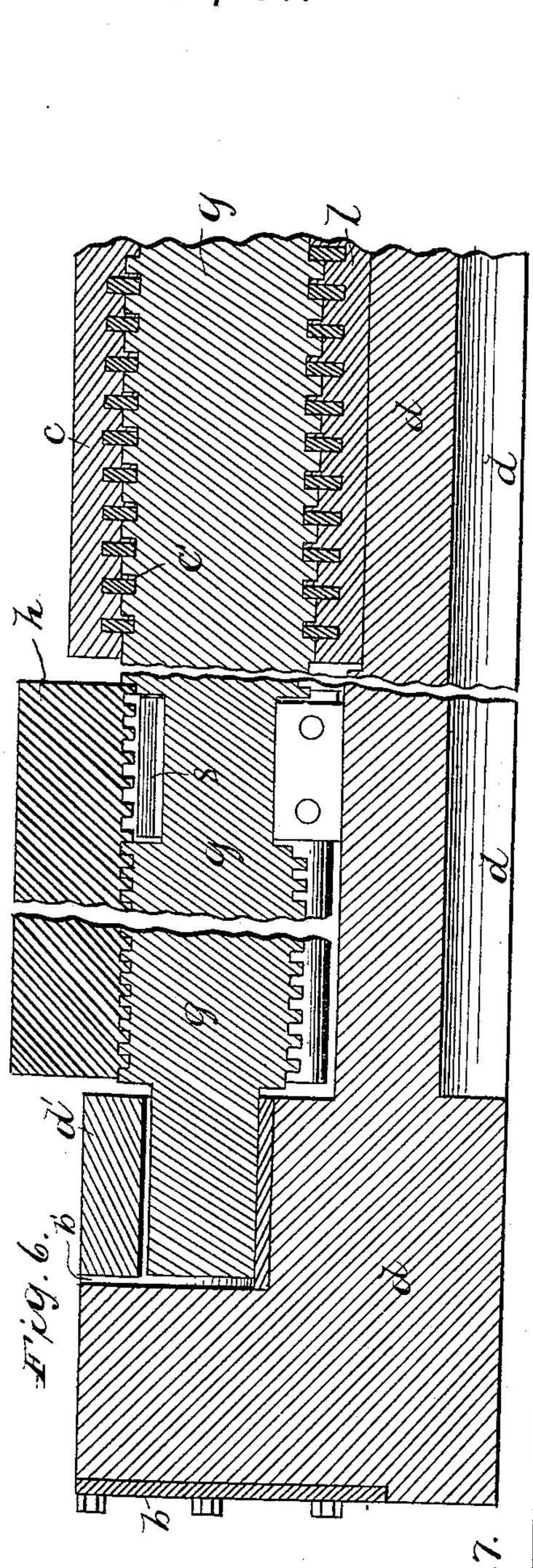

Fig. 6.

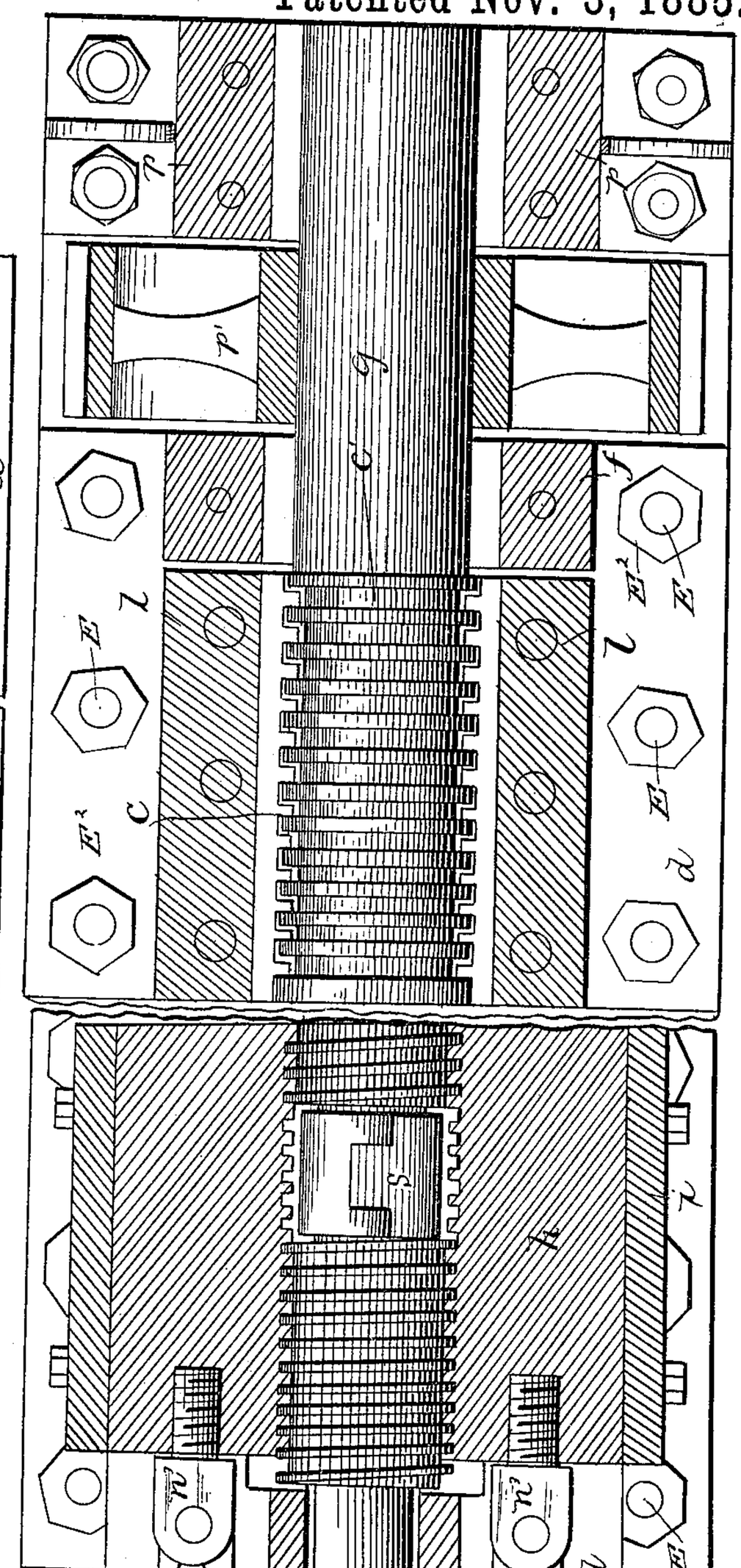

Fig. 7.

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MACHINE FOR DRAWING COLD METAL BARS.

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Fig. 8.

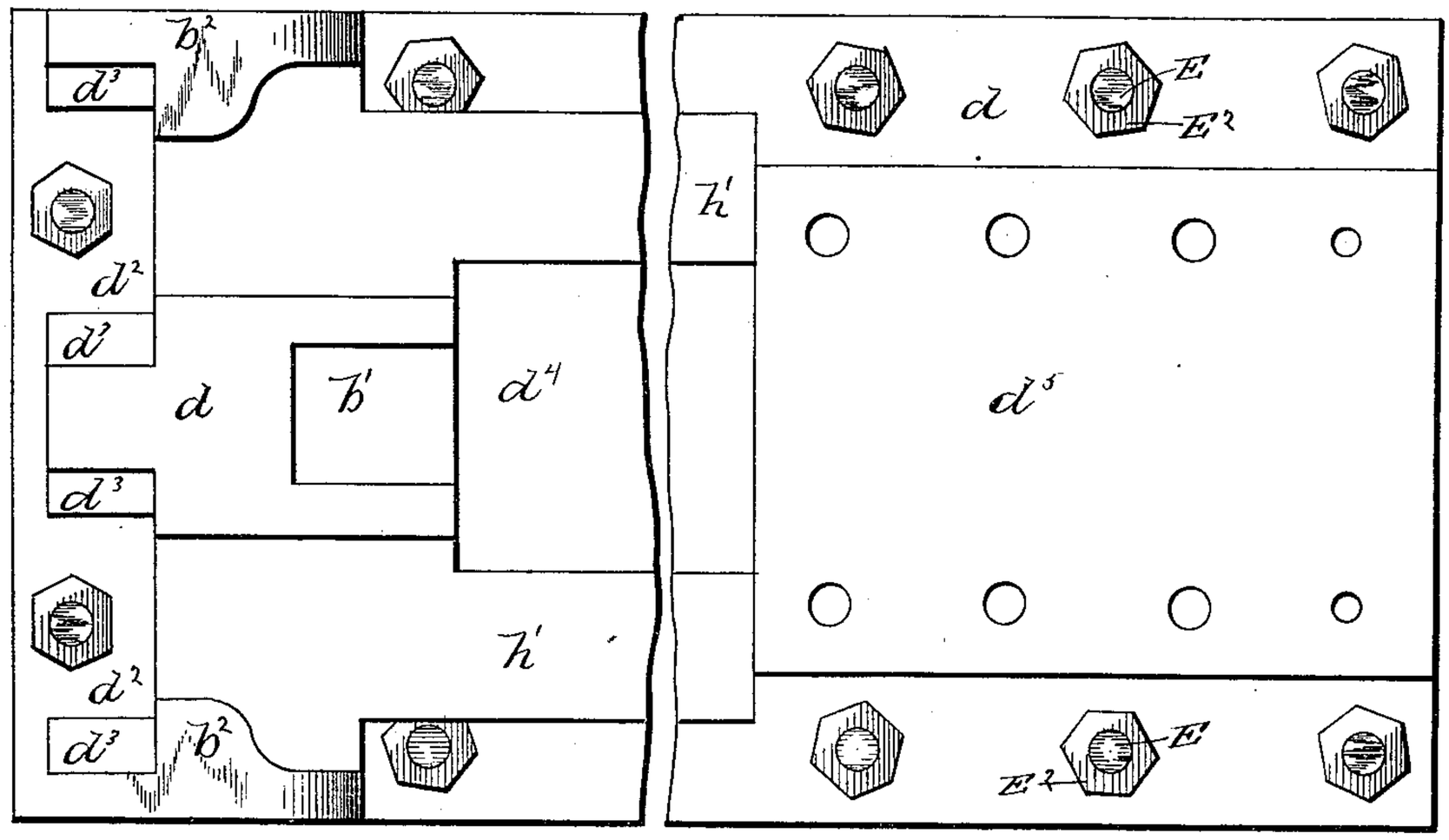
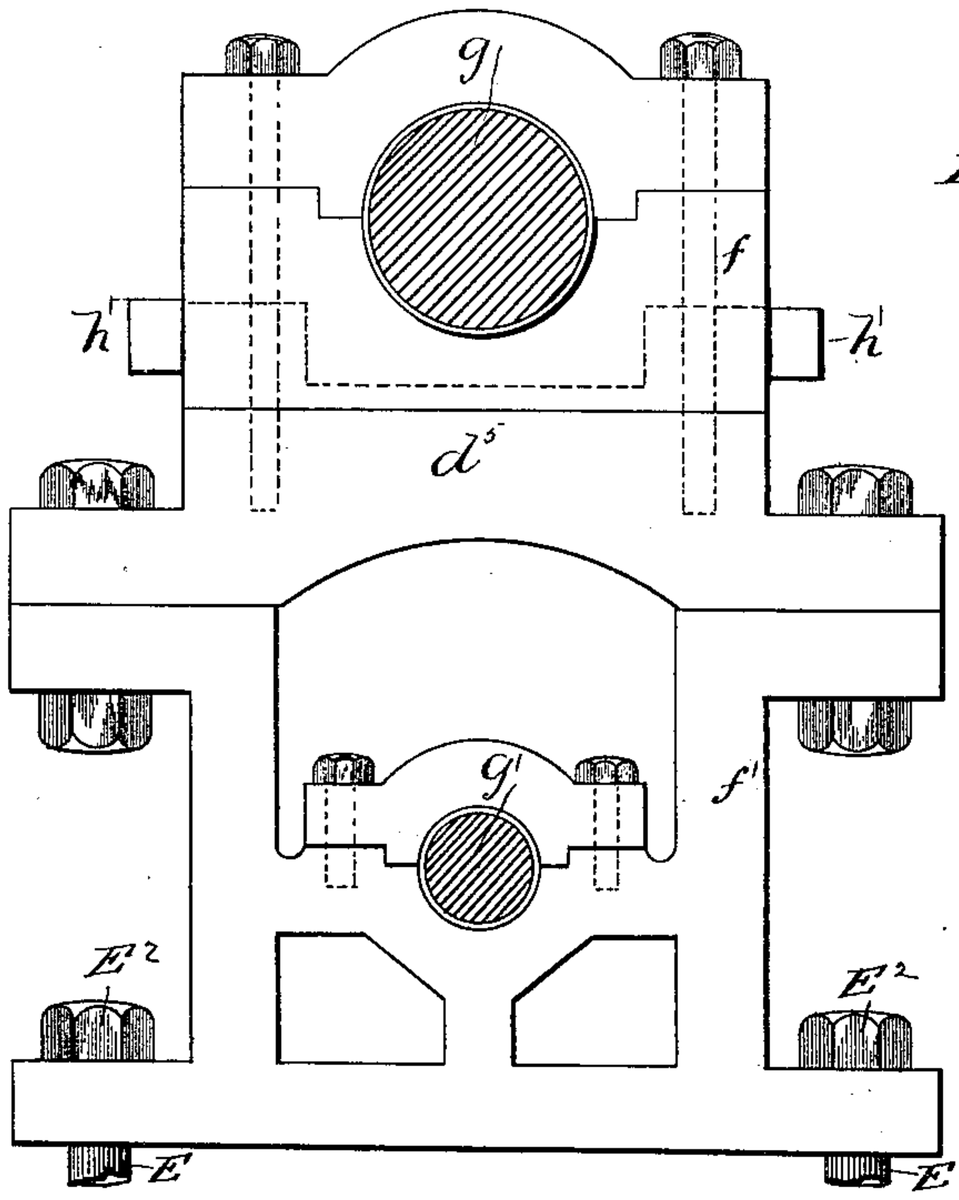


Fig. 9.



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MACHINE FOR DRAWING COLD METAL BARS.

No. 329,800. Patented Nov. 3, 1885.

Fig. 10.

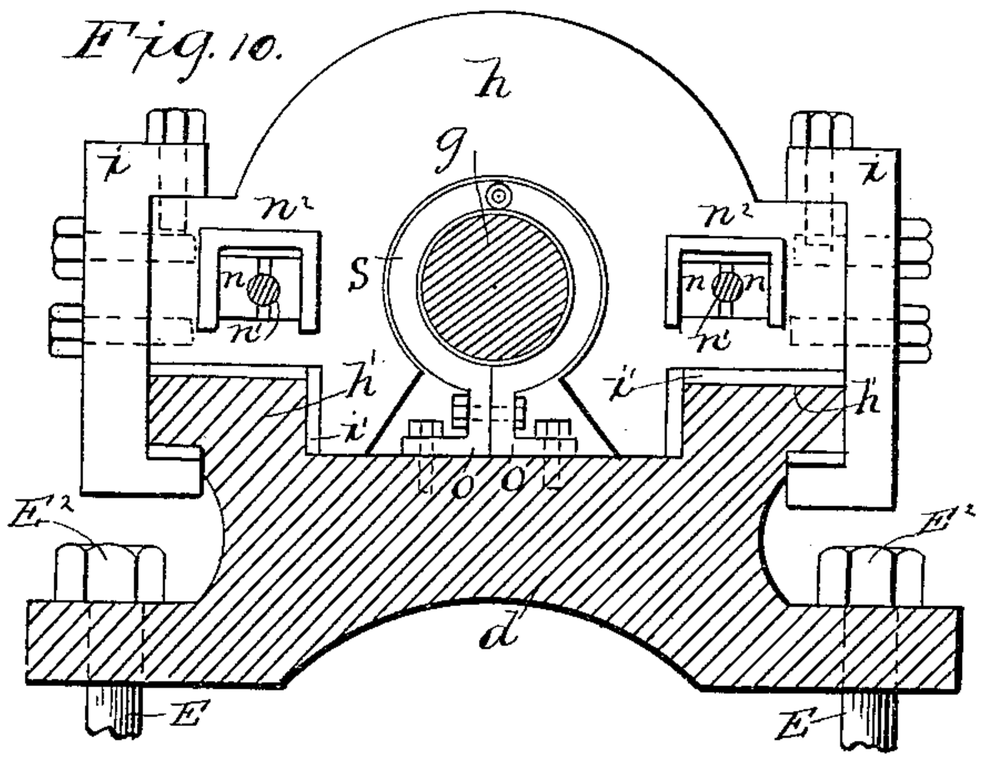


Fig. 12.

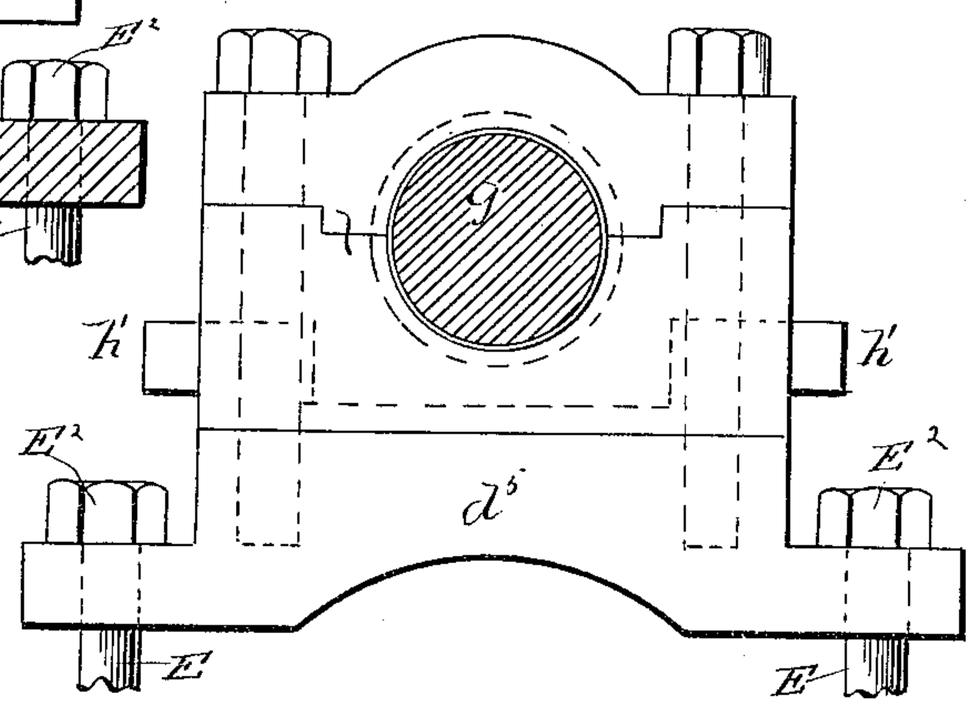


Fig. 11.

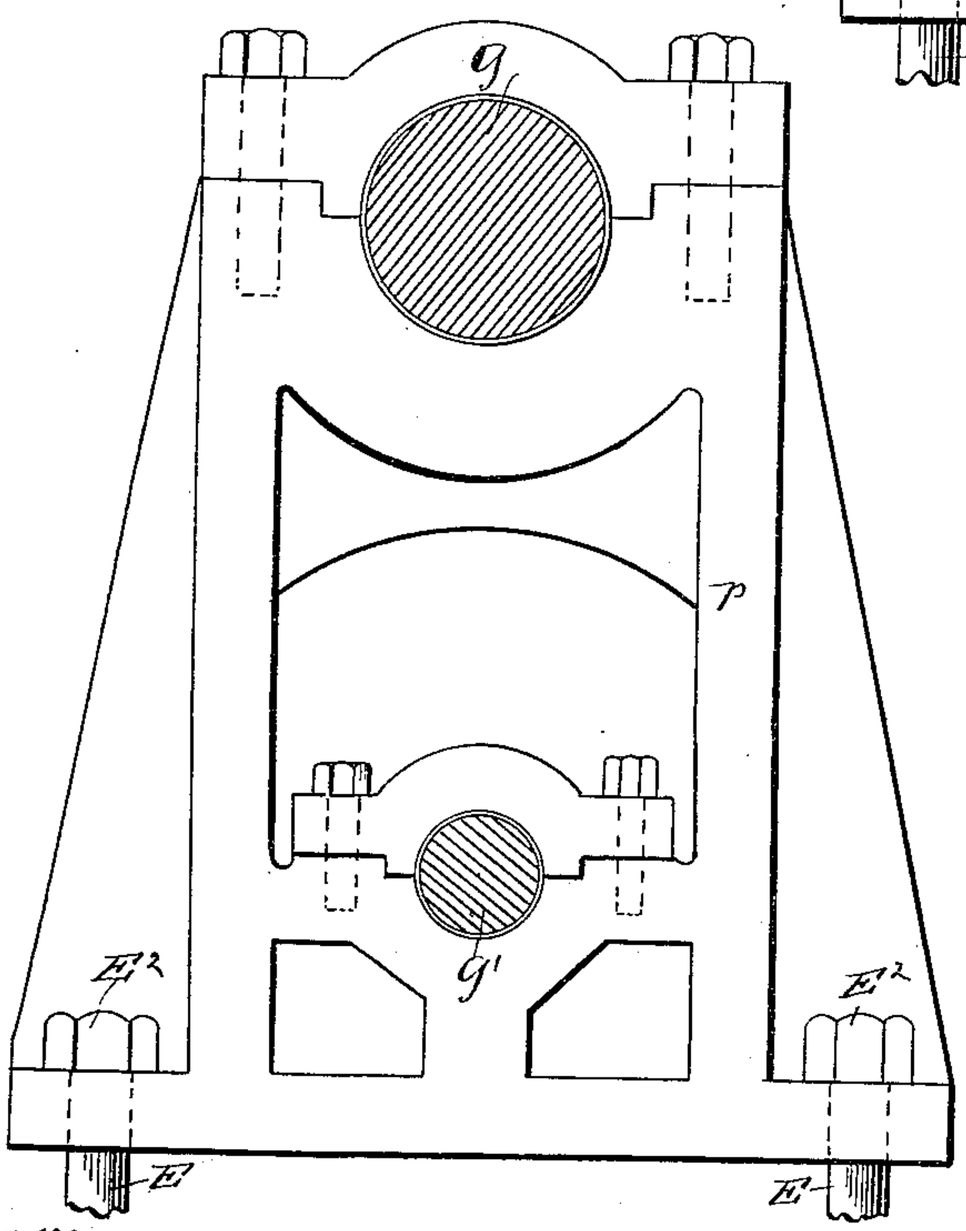


Fig. 13.

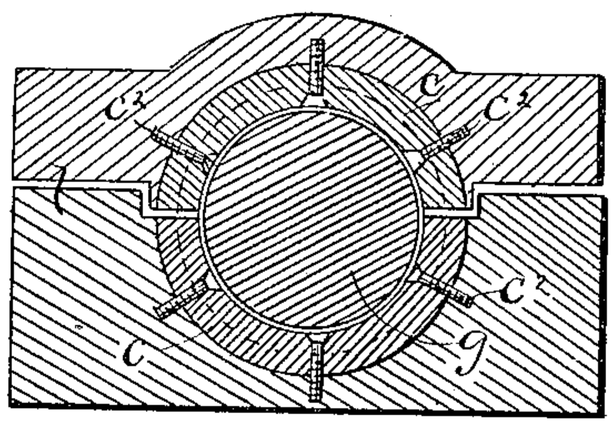
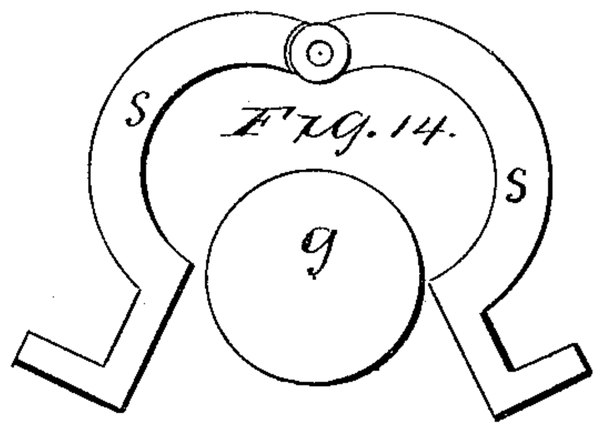


Fig. 14.



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MACHINE FOR DRAWING COLD METAL BARS.

No. 329,800. Patented Nov. 3, 1885.

Fig. 15.

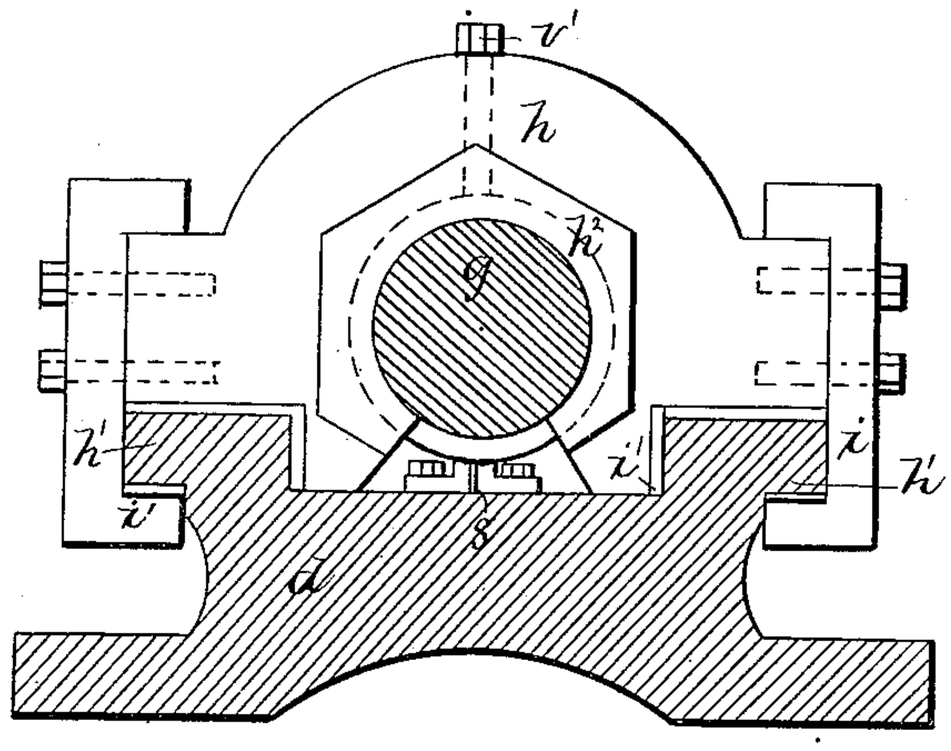
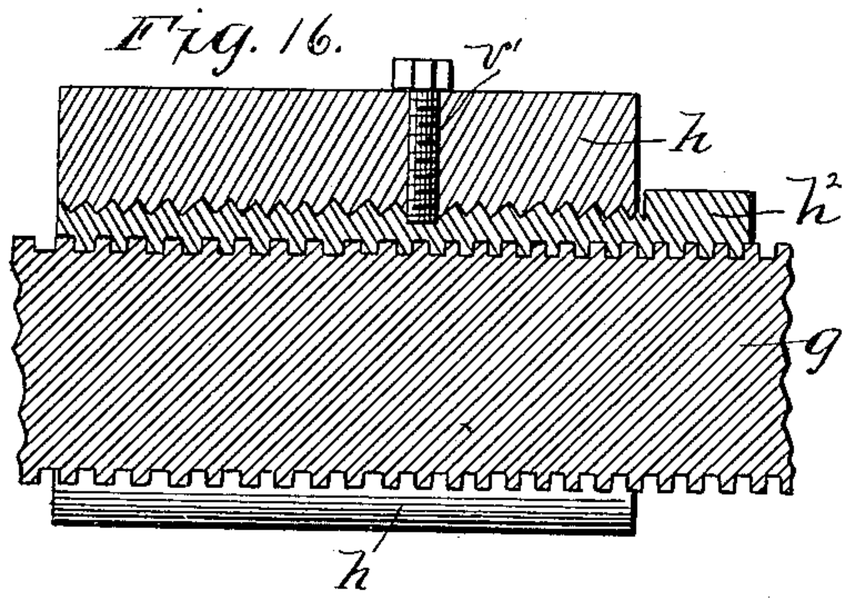


Fig. 16.



Witnesses:
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UNITED STATES PATENT OFFICE.

WINSLOW ALLDERDICE, OF AKRON, OHIO, ASSIGNOR TO THE AKRON IRON COMPANY, OF SAME PLACE.

MACHINE FOR DRAWING COLD METAL BARS.

SPECIFICATION forming part of Letters Patent No. 329,800, dated November 3, 1885.

Application filed January 26, 1885. Serial No. 153,973. (No model.)

To all whom it may concern:

Be it known that I, WINSLOW ALLDERDICE, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a new and useful Improvement in Machines for Drawing, Compressing, and Polishing Cold Metal Bars, of which the following is a specification.

One of the principal features of my invention consists in the construction and relative arrangement of the parts of the machine to enable it to draw several bars through their respective dies at the same time without producing lateral strain on the screw by means of which the bars are drawn.

In the drawings forming a part of this specification, Figure 1 is a side elevation representing the machine and its foundation, with a part between the two ends broken away. All the other figures are upon an enlarged scale. Fig. 2 is an elevation representing that end of the machine which contains the dies. Fig. 3 is an elevation of the same end with the retaining-plate *b* and dies *a* and their holders *a'* removed. Fig. 4 is a vertical longitudinal section of a part of the machine at the line 1 in Fig. 2. Fig. 5 is a horizontal section of die *a* and its holder *a'* on an enlarged scale. Fig. 6 is a vertical longitudinal section through the center of a part of the machine. Fig. 7 is a horizontal section of the machine with a part of it between the ends broken away. Fig. 8 represents a plan of the bed-plate *d* with a part broken away. Fig. 9 is a view at the line 2 in Fig. 1 of one end of bed-plate *d* and the supporting-frame *f* for screw-shaft *g* and the supporting-frame *f''* for counter-shaft *g'*, all bolted together and to the foundation f^2, as shown in Fig. 1. Fig. 10 is a cross-section of screw-shaft *g* and bed-plate *d* at line 3 in Fig. 1, and represents a front end view of draft-block *h* and hinged bearing *s*. The block *h* travels on screw *g*, and draws the metal bars *n'* through dies *a* by means of grippers or jaws *n*, which are held firmly against the bar *n'* by means of clamp n^2. Fig. 11 is an end elevation of pedestal *p* at line 4 in Fig. 1. This pedestal is a frame cast in one piece for the support of screw-shaft *g* and counter-shaft *g'*. Fig. 12 represents the rear end of thrust-block *l* and a cross-section of screw-shaft *g* and bed-plate *d*. This block is formed with annular projections *c*, Fig. 6, which enter annular grooves *c'* in screw-shaft *g*, to hold the shaft against the great draft required in drawing bars *n'* through dies *a*. Fig. 13 is a cross-section of thrust-block *l*, representing projections *c* in the form of half-rings inserted in the block, which is grooved for the purpose. I prefer this form of construction, as the projections *c* should be of softer metal than shaft *g*, in order to lessen the wear of the latter, and when they are formed separately from the block they may be easily and cheaply replaced on becoming worn. They are firmly driven into the grooved block and then fastened in place by screws c^2. Fig. 14 represents on an enlarged scale the hinged bearing *s*, which supports screw-shaft *g* between the ends of the latter. Fig. 15 is a rear end view, and Fig. 16 a vertical section, of draft-block *h* when formed with a hollow bolt, h^2, threaded on the out side to be screwed into block *h*, and screw-threaded inside to receive screw-shaft *g*.

This form of construction of block *h* is preferred, as the hollow screw-bolt h^2 may be of a softer metal than the main body of block *h*, and thus wear screw-shaft *g* less, and also because it can easily be removed when worn out and another be substituted. It is held from turning in block *h* by a screw, *v'*. Block *h*, of which screw-bolt h^2 forms a part, is open at the bottom, as hereinafter described.

The bed-plate *d* is cast in one piece, and formed with a socket, *b'*, to receive one end of screw-shaft *g*, which rotates therein, recesses d^2 d^2, with steps d^3, on which die-holders *a'* rest, abutments b^2 b^2, recess d^4, to the bottom of which the hinged bearings *s* are attached, and the reduced end d^5, to which thrust-block *l* and frames *f f'* are attached. The bed-plate is firmly bolted on a suitable foundation, f^2, by bolts E, which are held at the bottom by linchpins E', and are screw-threaded at the top to receive nuts E^2. One end of shaft *g* is supported in recess *b'*, and is covered by a wood block, *d'*, which is driven over

the bearing part of the shaft. The other end of shaft *g* is supported by and rotates in pedestal *p* and frame *f*, between which a toothed wheel, *p'*, is attached to the shaft. This wheel connects with pinion, *v*, on counter-shaft *g'*, which is rotated first in one direction and then the other by means of driving-pulleys p^2 p^3, connected alternately with a suitable clutch device, E^4, Fig. 1.

Any of the ordinary and well-known clutch devices for alternately rotating pulleys and their shaft in opposite directions may be used for the purpose of reversing the rotation of screw-shaft *g*, and it is therefore unnecessary to particularly describe the same. Block *h* is threaded to connect with and run on the screw-threaded shaft *g*. It is provided with gibs *i i* to connect it with suitable ways, *h' h'*, formed on the upper part of bed-plate *d*. Brass linings *i'* are used on gibs *i* and block *h* to lessen friction. Block *h* is also provided with grippers *n*, hinged to studs n^3, firmly attached to draft-block *h*, on opposite sides of shaft *g*, in a plane with and at equal distances from its axis. These grippers or jaws are closed against bar *n'*, near its end, and firmly compressed against it by driving down clamp n^2 over the gripper-jaws. The rough bar *n'* is of slightly greater diameter than the opening of die *a*, except at and near one end, which is sufficiently smaller to enable the operator to insert it in and through the die to be grasped by grippers *n*. Die *a* is reduced at its rear end to form a shoulder to bear against die-holder *a'*. It should fit the holder *a'* closely, so as to require to be driven into the latter. The opening through die *a* is a tapering curve inward from the front end for about half its length. The remainder of the opening (except at its rear end, which is slightly flaring) is cylindrical and tangential to the curved part—that is to say, a section of the die through its axis, Fig. 5; shows the sides of the opening in the form of a curve and tangent, which causes the reduction of the diameter of bar *n* to be gradually decreasing while the compression is increasing and drawing the bar through the die. Screw-shaft *g* is held in position against the endwise strain upon it while in operation by thrust-block *l*, formed with inner annular projections *c*, corresponding with annular grooves *c'* on shaft *g*. Each projection *c* in groove *c'* forms a bearing to sustain a part of the great strain of the draft, which would be liable to crush the metal if there were but a single bearing. In order that these projections *c* may not wear out the sides of grooves *c'* in the shaft *g* too rapidly, I prefer to make them in the form of half-rings of softer metal than the rest of thrust-block *l* and shaft *g*, and to groove the block to receive them, as shown in Figs. 6 and 13. They should be driven into place in the block and fastened there by screws c^2. Block *l* is bolted to the reduced end d^5 of bed-plate *d*, Figs. 8, 12, just beyond the end of ways *h'*. Frame *f*, forming a support for shaft *g*, is also bolted to the reduced part of bed-plate *d*. Directly beneath frame *f* frame *f'*, forming a support for counter-shaft *g'*, is bolted to the under side of the bed-plate, and also to foundation f^2. Pedestal *p* is a frame, of a single piece of cast metal, bolted to the foundation, and provided with two boxes, one above the other, for shaft *g* and counter-shaft *g'*. Shaft *g* being of considerable length for the purpose of drawing long metal bars *n'*, is reduced at suitable intervals to form journals for hinged bearings *s*, to support it and prevent sagging between its end bearings. It is necessary that these hinged bearings *s* and draft-block *h* be so constructed that the latter will pass over the former. Therefore bearings *s* are made substantially of ring form, hinged at the top, and having shanks *o* at the bottom, formed to be bolted together and also to bed-plate *d* at the bottom of recess d^4. Draft-block *h* is made quite thick and heavy above shaft *g*, in order that it may be open from shaft *g* down to the bottom of recess d^4, to enable it to pass over bearings *s*, and at the same time having sufficient strength to prevent its spreading apart from the strain of the draft and dislodging its threads from those of the shaft. When block *h* is formed with screw-bolt h^2, Figs. 15, 16, the latter, after being screwed into the block, is cut out at the bottom to enable it to pass over bearings *s*. The end plate, *b*, is for the purpose of retaining die-holders *a'* in place. It is bolted to bed-plate *d*, and is formed with openings *s'* for bars *n'* to enter the dies *a*. It is provided with set-screws s^2, by means of which die-holders *a'* are held in place.

In operating the machine herein described, the die-holders *a'*, containing suitable dies, *a*, for the metal bars or rods *n'* to pass through in the process of drawing, compressing, and polishing them, are first placed in position by letting them down into their recesses or sockets d^2, and then pressing them against abutments b^2 by turning set-screws s^2. The ends of bars *n'* having been inserted through dies *a*, and firmly fastened in grippers *n* by clamp n^2, the screw-shaft *g* is rotated to move draft-block *h* on the shaft and draw the bars through the dies. When the rods or bars have been finished by being drawn through the dies, the operator releases them from grippers *n* and removes them. The rotation of screw-shaft *g* is then reversed by means of clutch device E^4 to move back draft-block *h* for the purpose of repeating the operation on other bars. In drawing the bars through the dies the immense strain should be entirely in line with the axis of shaft *g*, and the grippers *n*, of which there may be more than two, if desired, should be so arranged on the end of draft-block *h*, with reference to the axis of shaft *g* that what may be termed the "combined power" required for drawing all of the bars will be in line with the axis of the shaft, as shown and described herein. The dies *a* and grippers *n* are relatively arranged so that the bars *n'* will be parallel with the axis of the shaft *g*.

I claim as my invention—

1. In a machine for drawing, compressing, and polishing cold metal bars, the combination of two or more dies and an equal number of grippers to hold and draw the bars through the dies with a screw-shaft and draft-block, substantially as described.

2. In a machine for drawing, compressing, and polishing cold metal bars, the screw-shaft, draft-block, and two or more dies, with an equal number of grippers to hold and draw the bars, all in such relative arrangement that the strain on the screw-shaft will be in line with its axis, substantially as described.

3. The screw-shaft *g*, reduced to receive bearing *s*, in combination with said bearing, the diameter of the reduced part and bearing being less than that of the screw-shaft at the bottom of its thread, substantially as described.

4. The screw-threaded draft-block *h*, open at the bottom sufficiently to pass the shank of a bearing, *s*, in combination with said bearing and screw-shaft *g*, substantially as described.

5. The screw-shaft *g*, in combination with the threaded draft-block *h*, provided with hinged grippers *n*, and clamps n^2, substantially as described.

6. The thrust-block *l*, formed with a series of annular projections, *c*, and the screw-shaft *g*, formed with a corresponding series of grooves, *c'*, in combination with draft-block *h*, and dies *a*, substantially as described.

7. The bed-plate *d*, formed with abutments b^2, socket *b'*, and recesses d^2 d^2 d^4, substantially as described.

8. The bed-plate *d*, formed with recesses d^2 d^2, having steps d^3, abutments b^2 b^2, socket *b'*, and recess d^4, substantially as described.

9. The bed-plate *d*, formed with depression d^5, to receive frame *f* and pedestal *p*, socket *b'*, abutments b^2 b^2, recesses d^2 d^2 d^4, and ways *h'*, substantially as described.

10. The screw-shaft *g*, formed with grooves *c'*, in combination with draft-block *h*, thrust-block *l*, formed with projections *c*, toothed wheel *p'*, pinion *v*, counter-shaft *g'*, pulleys p^2 p^3, and a clutch device, E^4, substantially as described.

11. The pedestal *p*, of a single piece of cast metal, provided with boxes for shaft *g*, and counter-shaft *g'*, and bolted to foundation f^2, in combination with shaft *g*, thrust-block *l*, and draft-block *h*, substantially as described.

12. The frame *f*, provided with a box for shaft *g*, and bolted to bed-plate *d* and frame *f'* directly beneath frame *f*, and provided with a box for counter-shaft *g'*, and bolted to the bottom of bed-plate *d* and to foundation f^2, in combination with screw-shaft *g*, thrust-block *l*, and draft-block *h*, substantially as described.

13. The thrust-block *l*, formed with sectional rings *c*, secured by screws c^2, in combination with screw-shaft *g*, formed with grooves *c'*, substantially as described.

14. The draft-block *h*, provided with studs n^3, and grippers *n*, in combination with clamps n^2, substantially as described.

15. The end plate, *b*, bolted to bed-plate *d*, and provided with set-screws s^2, in combination with die-holders *a'*, containing dies *a*, and the bed-plate *d*, formed with sockets d^2, substantially as described.

16. The draft-block *h*, provided with gibs *i*, and anti-friction linings *i'*, in combination with bed-plate *d*, formed with ways *h'*, and screw-shaft *g*, substantially as described.

17. The draft-block *h*, screw-threaded to receive the screw-threaded hollow bolt h^2, formed with a female screw-thread to receive screw-shaft *g*, in combination with said shaft, substantially as described.

18. The draft-block *h*, screw-threaded to receive the screw-threaded hollow bolt h^2, formed with a female screw-thread to receive screw-shaft *g*, in combination with the screw *v'* and screw-shaft *g*, substantially as described.

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