

(No Model.)

2 Sheets—Sheet 1.

J. H. STERNBERGH,  
PUNCHING AND SHEARING MACHINE.

No. 452,855.

Patented May 26, 1891.

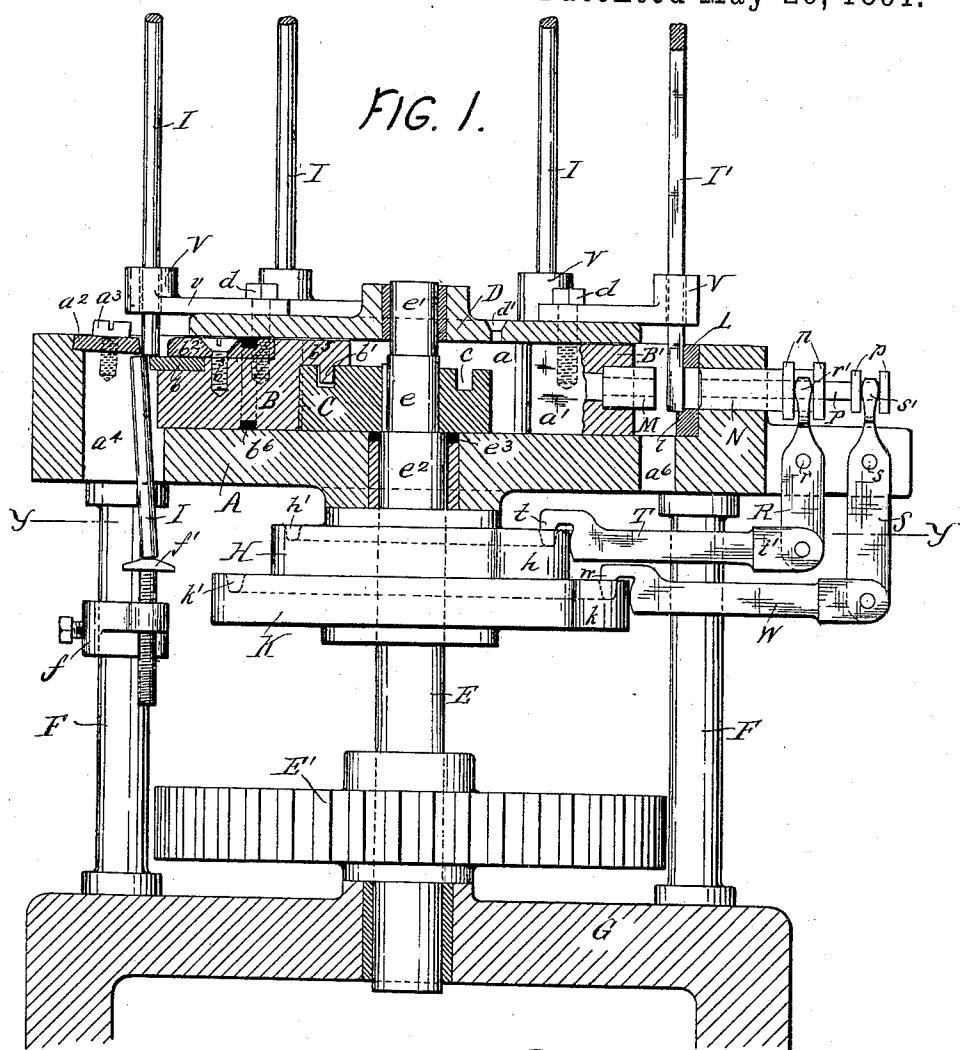


FIG. 4.

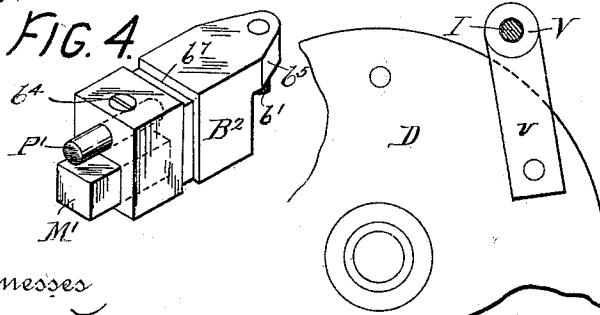


FIG. 5.

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Witnesses

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(No Model.)

2 Sheets—Sheet 2.

J. H. STERNBERGH.

## PUNCHING AND SHEARING MACHINE.

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FIG. 2.

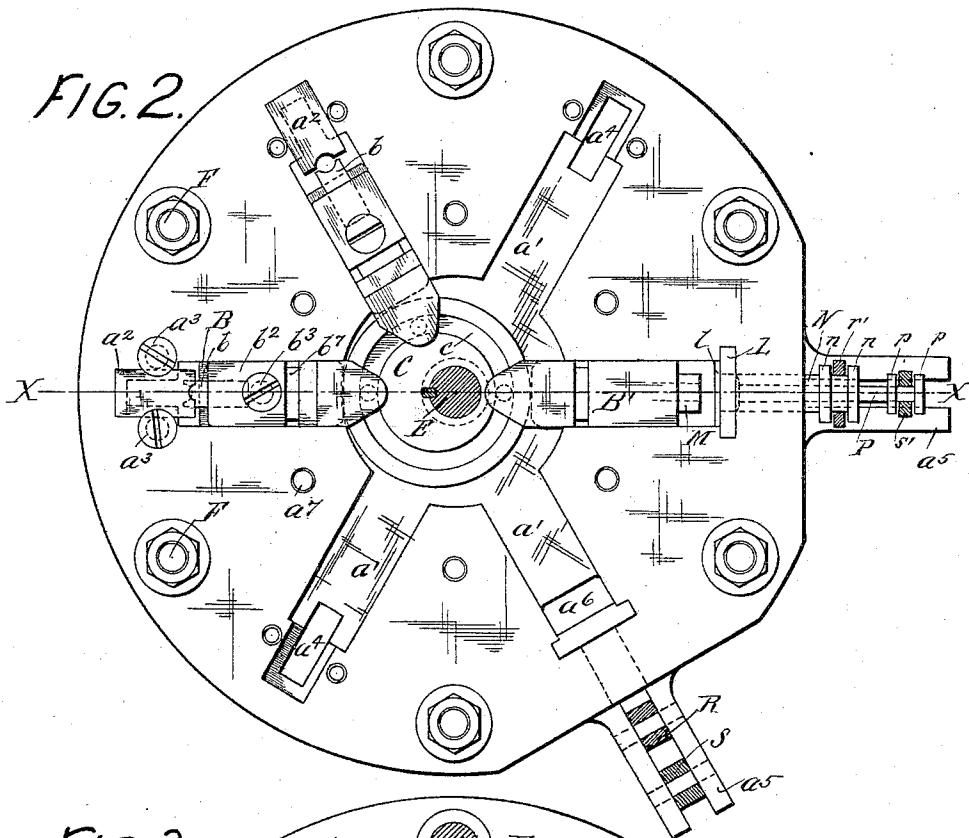
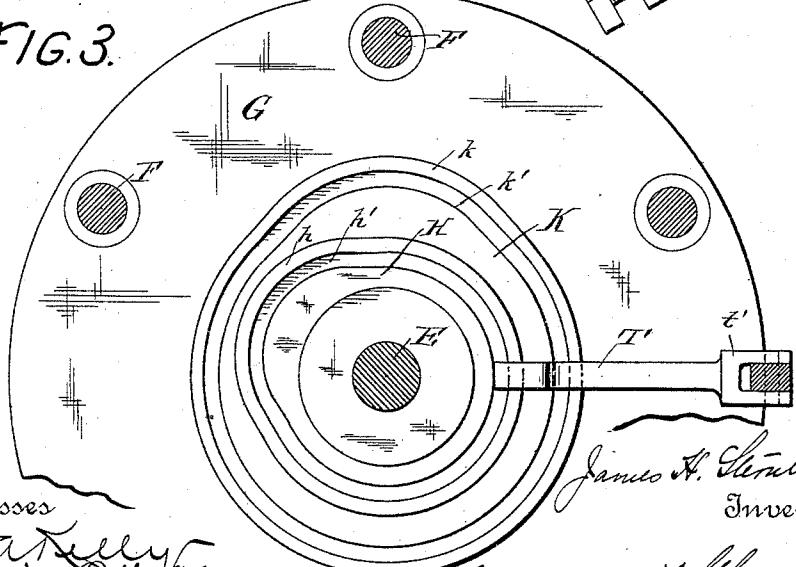


FIG. 3.



Witnesses

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# UNITED STATES PATENT OFFICE.

JAMES HERVEY STERNBERGH, OF READING, PENNSYLVANIA.

## PUNCHING AND SHEARING MACHINE.

SPECIFICATION forming part of Letters Patent No. 452,855, dated May 26, 1891.

Application filed August 7, 1890. Serial No. 361,313. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES HERVEY STERNBERGH, a citizen of the United States, residing at Reading, in the county of Berks, State 5 of Pennsylvania, have invented certain Improvements in Machines for Punching, Shearing, &c., of which the following is a specification.

This invention relates to machines adapted 10 more especially for working malleable metals, such as wrought-iron.

The object is to provide a compact machine, which may be adapted to perform a variety 15 of work—such as punching, shearing, or die-forging—more expeditiously and automatically than has heretofore been done; in other words, one which will turn out a maximum of work while requiring a minimum of attendance.

20 The principle of the invention consists in operating in succession circular series of punches, knives, or other tools, as the case may be, by means of a central shaft connected therewith by suitable operating mechanism, each member of a series being arranged 25 to act in turn upon one of a number of metal bars, which are automatically fed onward after each action upon them, thus multiplying the amount of work ordinarily done at 30 each rotation of the operating-shaft to an extent dependent on the number of dies or cutters in the series, and at the same time making the machine as nearly automatic as possible in its action, new bars to be operated 35 upon being merely placed in position, as required.

The drawings, in connection with the following description, will more clearly reveal the invention, and its novel features are specifically pointed out in the claims.

40 Figure 1 is a sectional elevation of a machine embodying the invention. Fig. 2 is a plan view of the same with the cap-piece or cover removed. Fig. 3 is a sectional plan through Y Y of Fig. 1. Fig. 4 is a perspective view of a modified tool-carrier or slide. Fig. 5 is a partial plan view of the cap-piece, showing one of the bar-guides attached thereto.

45 The machine as represented consists of a bed-plate G, to which are secured vertical

columns F, arranged to support a circular table or frame A, which carries the dies or cutters, and a central vertical operating-shaft E, having a bearing at its lower end in the bed-plate G and near its upper end e<sup>2</sup> in the 55 table or frame A. This shaft is rotated in any convenient manner, as through a gear-wheel E', and at its upper end above the bearing e<sup>2</sup> is provided with a cam or eccentric C, which is rotated in a cylindrical recess a in the center of the table. From this recess slots or slideways a' extend radially toward the periphery of the table. These radial slots a' are adapted to receive and guide 60 tool-carriers or slides to which punches, knives, or dies are secured. In the drawings the table is represented as having six of these slideways, four of which are adapted for shearing, two of them being fully arranged for 70 shearing round bars. In the remaining two a mechanism for carrying out more complicated operations on the same principle is shown, and will be described later.

75 Referring to the shearing mechanism, the tool-carriers or slides B, which are guided in the slideways a', are held in engagement with the cam C by means of pins b', which loosely enter a circular groove c in the upper surface of the cam while the periphery of the latter 80 bears upon the rounded inner ends of the slides below their projecting portions b<sup>5</sup>, which carry the pins. The slides are thus alternately pushed outward and pulled inward by each rotation of the cam. Fixed knives 85 a<sup>3</sup> are removably secured to the frame A with their shearing-edges tilting slightly downward by means of screws a<sup>4</sup>. The moving knives b are secured to the slides B by means of recessed plates b<sup>2</sup> and screws b<sup>3</sup>. The cap 90 piece or cover D, which is bolted against the upper surface of the table by means of bolts d, which screw into the tapped holes a<sup>7</sup>, serves to hold the slides B in their guideways without preventing their free radial movement 95 and also furnishes a bearing for the extension e' of the shaft E.

In working the machine the bars of metal to be punched, sheared, or otherwise operated on are placed vertically above the fixed 100 tools, forming a circular series of parallel bars I I, equal in number to the slides which

are used. Adjustable stops, as  $f'f'$ , secured to the columns F, may be used to limit the vertical movement of the bars I, the lower ends of which are loosely held by guides V, 5 movably secured to the table A, while the upper portion may be steadied by any suitable means. (Not shown.) The continued rotation of the cam C presses the slide B outward, and the bar I is sheared as the cutters 10 pass each other, the sheared portion passing through the opening  $a^4$  in the table into a suitable receptacle, while the main portion of the bar rests upon the knife b until the inward movement of the slide permits it to drop 15 automatically to the stop  $f'$  ready to be operated upon at the next revolution of the cam. Each bar in the series is thus operated upon at each revolution of the shaft and the attendant need only place new bars in position, as required. 20

To provide for conveniently and economically lubricating the machine, I convert the central cylindrical recess a in the table A into an oil-well, which is supplied through an opening  $d'$  in the cover D. The oil flows out into the slideways  $a'$ , but is prevented escaping therefrom by suitable packing  $b^6$ , which is set in grooves  $b^7$ , extending around the slides, as shown most clearly in Fig. 4, and a similar 25 packing  $e^8$  stops its escape around the shaft-bearing  $e^2$ .

It is evident that the functions of different machines may be combined in one by using slides with different kinds and sizes of tools, 30 or that the output of the machine, when adapted exclusively for one kind of work, will be much greater than with the ordinary form of machines in which each revolution of the shaft performs but one operation, while at the same time the attendance required is very 35 limited. As already stated, however, my machine may be adapted to perform more complex operations than that described, and I have therefore illustrated a mechanism for forming nuts or washers, which shows the applicability of my invention to operations requiring two or more simultaneous or consecutive 40 co-operating movements.

The hollow punch M is secured to a slide 45 B', a portion only of which is shown in Fig. 1, and its outward movement cuts off a portion of metal from a bar placed between the punch M and a die L, fixed in the frame or table A, which die may be provided with a shoulder l to stop the bar. The portion of 50 metal cut off is pressed against the die L and against a crowner N in forming a nut. While thus held a piercer P is pressed inward through the hollow crowner and punches a 55 hole in the nut-blank, the core going into the hollow main punch M, from which it may be 60 expelled in any ordinary manner. The movement of the piercer P is effected by means of a lever S, fulcrumed in the jaw formed by 65 arms  $a^5$ , projecting from the table, the lever

being operated by a grooved cam K on the shaft E, or in any suitable manner. The piercer having done its work, the punch M and crowner N are simultaneously moved inward, the latter being operated through the lever R by a cam H on the shaft, and the nut is forced out of the die and dropped into a receptacle. 70

The projections  $k$  and  $h$  of the cams K and H may be so shaped and set with relation to each other and the cam C as to effect the several movements of the parts in proper co-operative order, and by modifying the mechanism as each particular case will readily suggest to an expert the machine may evidently 80 be adapted to perform a variety of work other than that specifically described. By combining a perforating-punch P' and a blanking-punch M' in the same slide B<sup>2</sup>, as shown in Fig. 4, two operations may be effected simultaneously by one movement. 85

Any convenient number of slides carrying similar or different tools may be employed in one machine, thus combining the functions or capacity of a number of ordinary machines in a single one, and making it possible for a single attendant to turn out a much greater product. 90

Having thus fully revealed my invention and clearly described how the same may be 95 practically applied, I do not intend to limit myself to the exact construction shown; but what I claim is—

1. The combination, with a table or frame, a circular series of fixed dies, and a corresponding series of radially-movable dies adapted to operate in connection with these fixed dies, of a revoluble shaft carrying cam mechanism with which the movable dies are operatively connected, whereby they are successively actuated with a positive inward and outward movement, substantially as set forth. 100

2. The combination, with a table or frame, a circular series of fixed dies therein, and a corresponding series of radially-movable dies adapted to operate in connection with these fixed dies, of a revoluble shaft carrying cam mechanism with which the movable dies are operatively connected, guides for holding the blanks in position to be operated upon, and stops for supporting the lower ends of the blanks, substantially as set forth. 110

3. A machine for punching, shearing, &c., the table or frame of which is provided with a cavity or recess adapted to serve as an oil-receptacle, radial slideways leading from this cavity, slides located in these ways, a rotary shaft, and a cam thereon operatively connected with the slides, substantially as set forth. 120

4. The combination, with a table or frame, a circular series of fixed dies therein, a series of radially-movable dies located inside of the fixed dies, and one or more movable dies located outside of said fixed dies and adapted 130

to operate in connection therewith, of a revoluble shaft carrying cam mechanism with which the movable dies are operatively connected, substantially as set forth.

5 5. The combination, with a fixed die L, a crowner-die N, movable therein, and a piercer P, guided within said crowner-die, of a separate movable die M and mechanism for operating said movable dies to produce co-oper-

ating movements thereof in connection with 10 the fixed die, substantially as set forth.

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

JAMES HERVEY STERNBERGH.

Witnesses:

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EDWIN L. MAYER.