

P. W. JONES.  
METAL SHAPING MACHINE.  
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924,907.

Patented June 15, 1909.

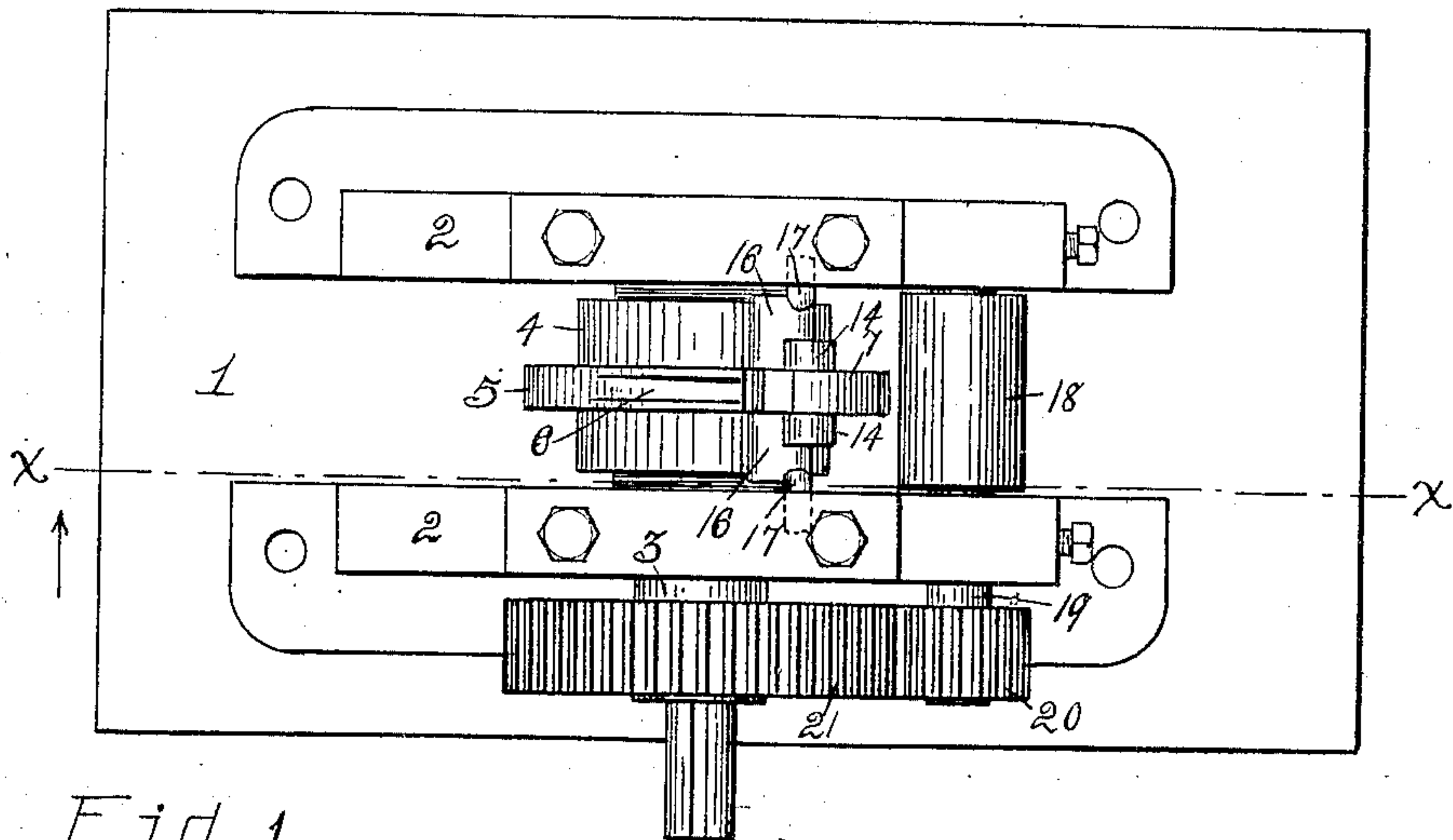


Fig. 1.

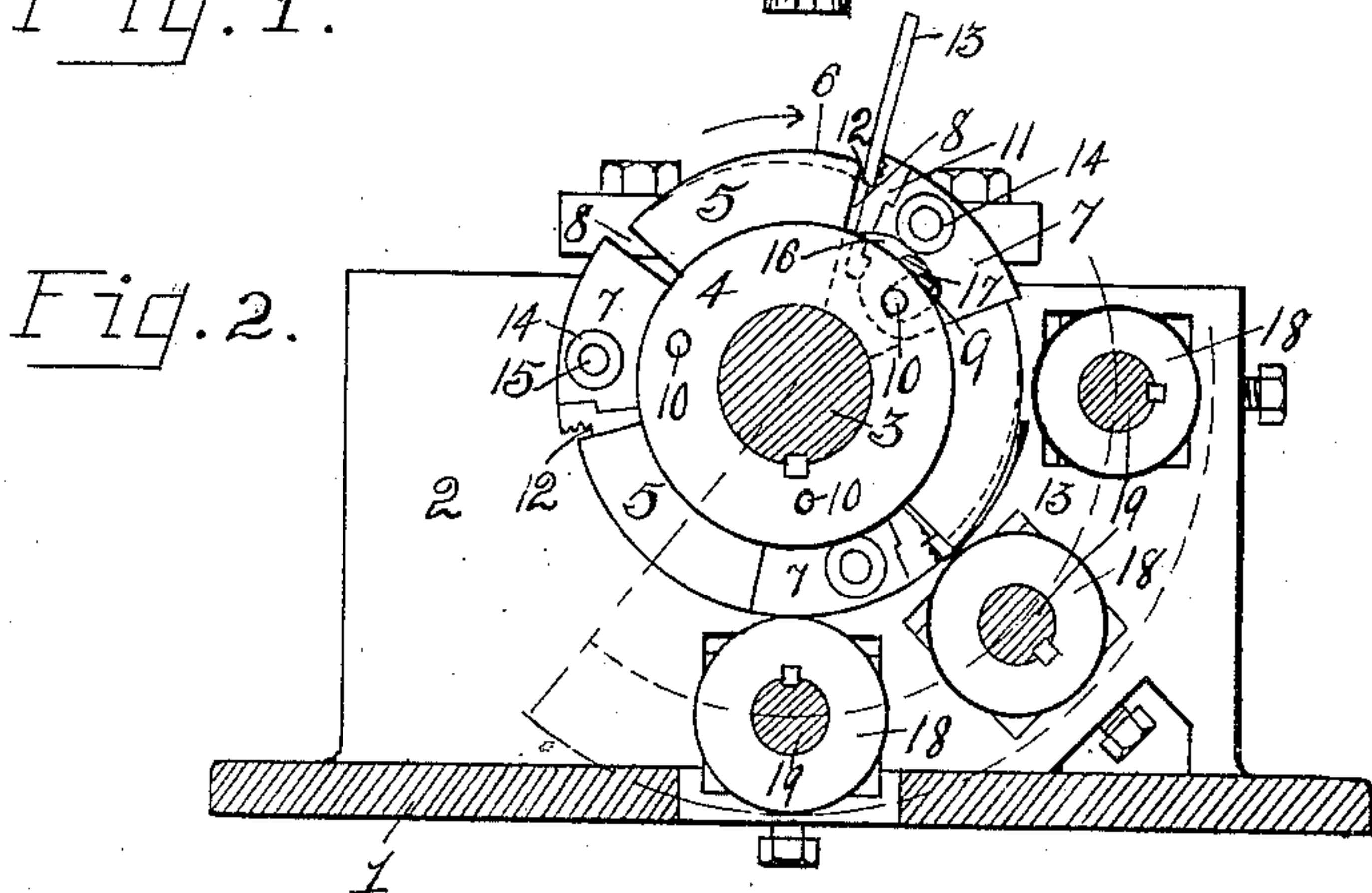


Fig. 2.

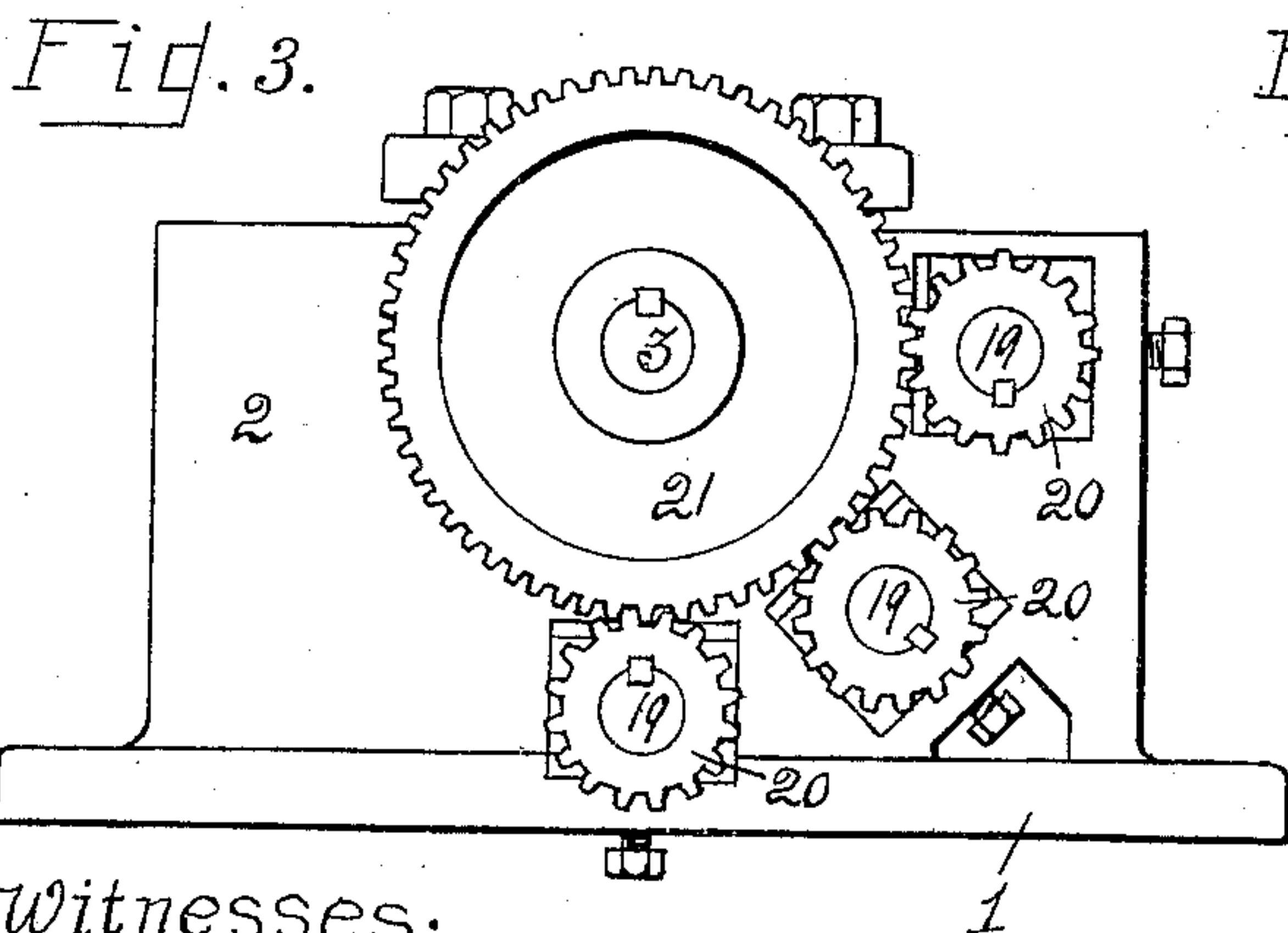


Fig. 3.

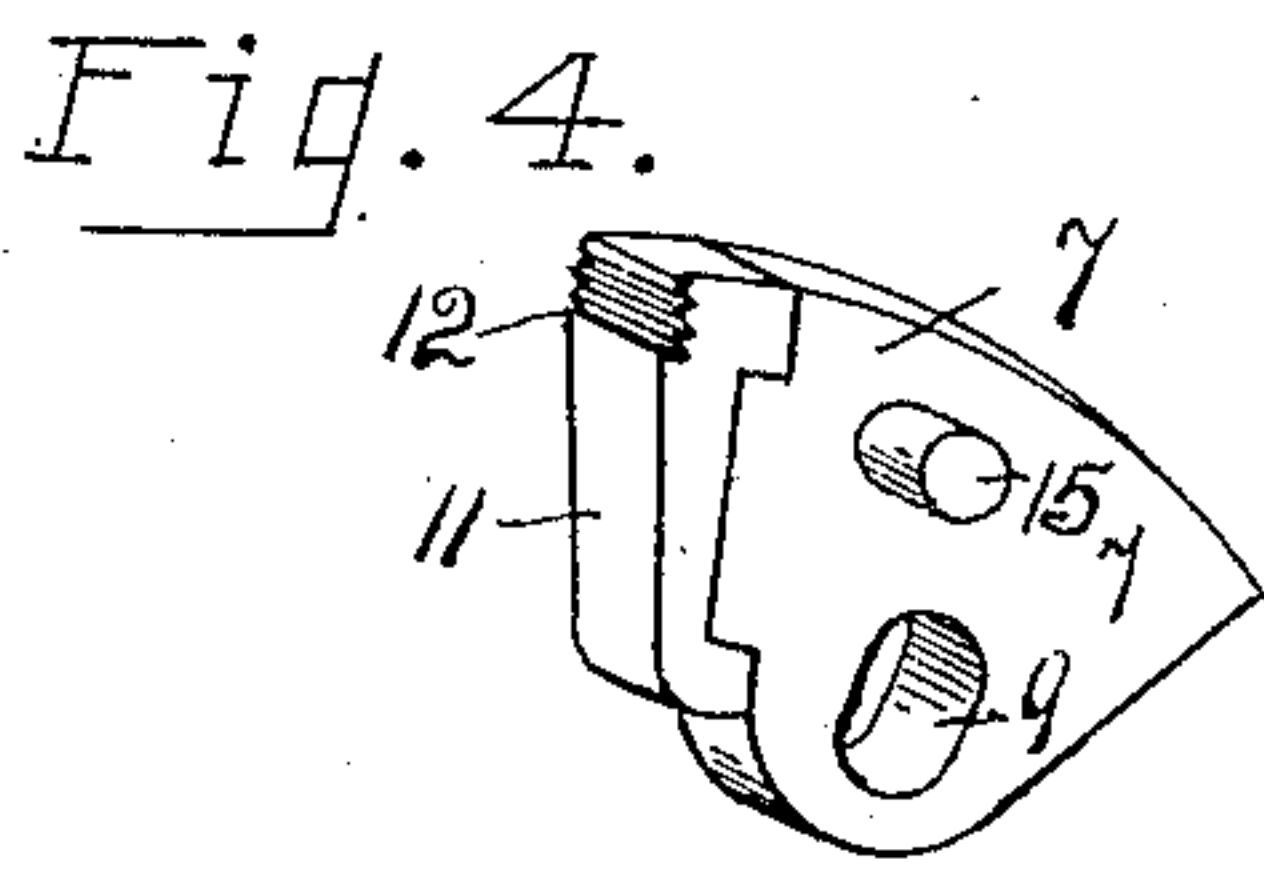


Fig. 4.

Fig. 5.

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# UNITED STATES PATENT OFFICE.

PHILIP W. JONES, OF TOLEDO, OHIO.

## METAL-SHAPING MACHINE.

No. 924,907.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed April 1, 1908. Serial No. 424,850.

*To all whom it may concern:*

Be it known that I, PHILIP W. JONES, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a certain new and useful Metal-Shaping Machine; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-  
10 pertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specifica-  
15 tion.

My invention relates to machines for shaping metal parts by rolls acting on the blank to forge the same to conform to a recess in the work-carrying or die-roll, and has particular reference to a machine adapted for  
20 the forming of tapered brake-shoe keys, but is not restricted to such use, as it may be employed for the shaping of any other articles for which it is appropriate.

The object of my invention is the provision,  
25 in combination with the work-carrying or die-roll in a machine of this class, of simple and efficient means for gripping and holding the blank while being operated on, which means is automatically movable at different  
30 predetermined points in a revolution thereof both to release the work and to place itself in open position to receive another blank to be operated on, and also of means for suc-  
35 cessively operating on the blank as it is carried around with its roll to first bend it to form the headed end thereof and then to act thereon to gradually shape it to form the taper.

The operation, construction and arrange-  
40 ment of the parts of the invention are fully described in the following specification and illustrated in the accompanying drawings, in which,—

Figure 1 is a top plan view of a machine  
45 embodying the features of my invention. Fig. 2 is a vertical longitudinal section on the dotted line *x x* in Fig. 1. Fig. 3 is a side elevation thereof. Fig. 4 is an enlarged  
50 view in perspective of one of the movable clamping jaws of the work-carrying roll, and Fig. 5 is a side view of the key when formed.

Referring to the drawings, 1 designates the base of the machine frame from which  
55 2, 2. Mounted intermediate these pedestals

on the shaft 3, which has its ends suitably journaled therein, is the work-carrying or die-roll 4. This roll has its circumference formed with the annularly elevated portion 5 in the periphery of which are provided one or  
60 more circumferentially-extending tapered-bottom grooves 6, three of which are shown in the drawings. The elevated portion 5 is provided with the radially movable sections  
65 7, one of which is disposed at the deep end of each groove 6 and forms a jaw which coöperates with the contiguous end of one of the fixed parts of the portion 5 of the roll be-  
70 tween which it is disposed. The jaws or sections 7 and the incuts or vacancies 8 in the portion 5 which said sections are intended to fill are preferably V-shape with their end  
75 lines standing substantially radial to the roll axis so that an inward movement of each jaw will effect a converging or gripping ac-  
80 tion of its ends with the ends of the incut 8. The jaws 7 are permitted to have limited radial movements in their recesses due to  
85 their inner ends projecting into the body of the roll and each being provided with a slot 9 through which a pin 10, that is inserted  
90 transversely through the roll and associated recess, extends. Each jaw has its gripping end faced with a hardened block 11, which  
95 is provided with a shoulder, as at 12, to act as a stop against which the inner end of the blank 13 is placed when being positioned in  
100 the roll, and is roughened without such shoulder to provide a better gripping surface.

The jaws 7 are caused to have a positive  
105 outward or opening movement at a predetermined point in a revolution thereof by rollers 14, which are carried by studs 15 projecting from opposite sides thereof, working  
110 over cams 16, which overhang the roll 4 at the sides of its elevated portion 5 and are fixed against movement by tenons 17 projecting therefrom into mortises in the sides of the frame parts or pedestals 2, as shown in Fig. 1.

Coöperating with the die-roll 4 to form the blanks 13 in the desired shape are a plurality of rolls 18 (three being shown in the draw-  
115 ings), which are arranged between the pedestals 2 around a portion of the roll 4 and have their shafts 19 journaled at their ends in bearing-boxes, which are mounted in the pedestals 2 for radial adjustment relative to the roll 4. The rolls 18 have their inner sur-  
120 faces arranged progressively nearer to the



roll 4 to adapt them to successively act on a blank to gradually form the same in the desired shape, but instead of being the same size and having their axes adjusted nearer to the die-roll axis for such purpose, their axes are preferably arranged in the arc of a circle which is concentric to the die-roll axis and the rolls themselves are made progressively larger, as shown. As the rolls 18 are driven at the same speed by the like gears 20 on their shafts meshing with the larger gear 21 on the shaft with the die-roll, the arrangement of the rolls in this manner is quite an important feature in the perfect operation of the machine, as the gradual increasing of the size of the rolls not only disposes their inner surfaces nearer to the die-roll surface, but also prevents a slipping of the rolls 18 when in contact with the blank, which would otherwise be the case due to the lengthening of the blank under the forging stress of the rolls.

In the operation of my invention the rolls are turned in unison by a turning of one of the shafts 19 or in any other suitable manner. As the rollers 14 of a jaw 7 in a revolution thereof with the die-roll 4 pass over the fixed cams 16, the jaw is moved outwardly to open position, as shown in Fig. 2, and an end of a blank 13 is then inserted into the opening 8 against the shoulder 12 of the jaw. After the rollers 14 leave the cams the jaw coacts with the first roll 18 of the set and is forced inwardly thereby to cause it to firmly grip the end of the blank to the end of the contiguous fixed part of the elevated portion 5 of the die-roll. As the movement of the die-roll continues the portion of the blank protruding therefrom is first bent over into the registering groove 6 in said roll and is then progressively acted on by the several rolls 18 to gradually forge or roll it out into taper form, as illustrated by the formed key shown in Fig. 5. Each jaw, on passing the last roll 18 of the set, drops by gravity to open position, thus releasing the formed article held thereby to permit it to drop from the die-roll when it has moved out of contact with the rolls 18. The key after being formed may be straightened by any suitable means.

I wish it understood that I do not desire to be restricted to the exact details of construction and arrangement of the parts of the invention shown and described, as obvious modifications will occur to persons skilled in the art.

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

1. In a shaping-machine, a die-roll, means carried thereby for holding the work, and a plurality of rolls arranged around said die-roll to progressively act in conjunction with the die-roll to gradually shape and lengthen

the blank and means cooperating with the die-roll and said rolls to cause the peripheral speed of such rolls to be gradually increased for successive rolls to prevent a relative slipping of the blank and rolls as the blank lengthens.

2. In a shaping-machine, a die-roll, a movable jaw cooperating therewith to grip the work, a plurality of rolls having their axes arranged in an arc of a circle which is concentric to the die-roll axis, said rolls having their diameters progressively greater to adapt them to act on the work to gradually shape the same, and means cooperating with the die-roll and the rolls to cause the latter to revolve at the same angular velocity.

3. In a shaping-machine, a die-roll having its periphery provided with a circumferentially-extending tapered-bottom groove, a V-shaped radially movable jaw associated with the deep end of said groove to hold the work to the die-roll, and a plurality of rolls cooperating with said groove and disposed to progressively act on the work to gradually taper the same longitudinally thereof.

4. In a shaping-machine, a die-roll, a radially-movable jaw for gripping the work thereto, and a plurality of rolls adapted to act on the jaw to move it to closed or gripping position and to progressively act on the work to gradually shape it as the die-roll is rotated.

5. In a shaping-machine, a frame, a die-roll carried thereby, a work-gripping-jaw carried by the die-roll for limited radial movements, a plurality of rolls arranged around one side of the die-roll and adapted to act both to move the jaw to closed position and to progressively shape the work, said jaw being free to open by gravity to release the work after it has passed the rolls.

6. In a shaping-machine, a frame, a die-roll mounted on said frame and having a radial socket, a work-gripping jaw mounted in said socket for limited radial movements, means fixed to the frame for effecting an opening movement of the jaw at a predetermined point in a revolution of the die-roll, and a plurality of rolls arranged around a portion of the die-roll and adapted to act on the jaw to cause it to grip the work, the last of such rolls being positioned adjacent the under side of the die-roll to enable the jaw to move by gravity to release the work when it moves free from said last roll.

7. In a shaping-machine, a frame, a die-roll mounted on said frame and having a radial opening, a work-gripping jaw mounted for limited radial movements in said opening, means fixed to the frame and adapted to cooperate with said jaw at a predetermined point in a revolution thereof to move it to open position, and means cooperating with the die-roll to shape the work during a revolution of such roll.



8. In a shaping-machine, a die-roll having a radially-disposed wedge-shape opening, a wedge-shape jaw radially movable in said opening and adapted to grip a work blank when forced therein, means for forcing the jaw within its opening when the roll is rotated, said means also acting to cooperate with the die-roll to shape the work.

9. In a shaping-machine, a frame, a die-roll carried by the frame and having its periphery provided with a longitudinally-tapered circumferentially-extending groove and a radially-disposed wedge-shaped opening at the deep end of said groove, a work-gripping jaw mounted for limited radial movements in said opening, and having a laterally-projecting part, means fixed to the frame for cooperating with said part to effect a positive outward opening movement of the jaw at a predetermined point in a revolution thereof to permit an insertion of a work blank, and means adapted to act both to close the jaw to grip the work and to bend the work over into said groove and progress-

ively act in conjunction with the groove to longitudinally taper the work.

10. In a shaping-machine, a die-roll having its circumference formed with an annularly elevated portion, said portion having a radial opening, and its periphery provided with a longitudinally-tapered circumferential groove extending from said opening, cams fixed relative to the die-roll, a work-gripping jaw radially-movable in said opening and having parts adapted to coact with said cams at a predetermined point in its revolution whereby to force the jaw to open position, and means for closing the jaw and cooperating with said groove to shape the work.

In testimony whereof I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

PHILIP W. JONES.

Witnesses:

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