(No Model.) 3 Sheets—Sheet 1.

# J. J. ANDERSON.

## METAL ROLLING MACHINE.

No. 488,048. Patented Dec. 13, 1892.

Fig. 1.

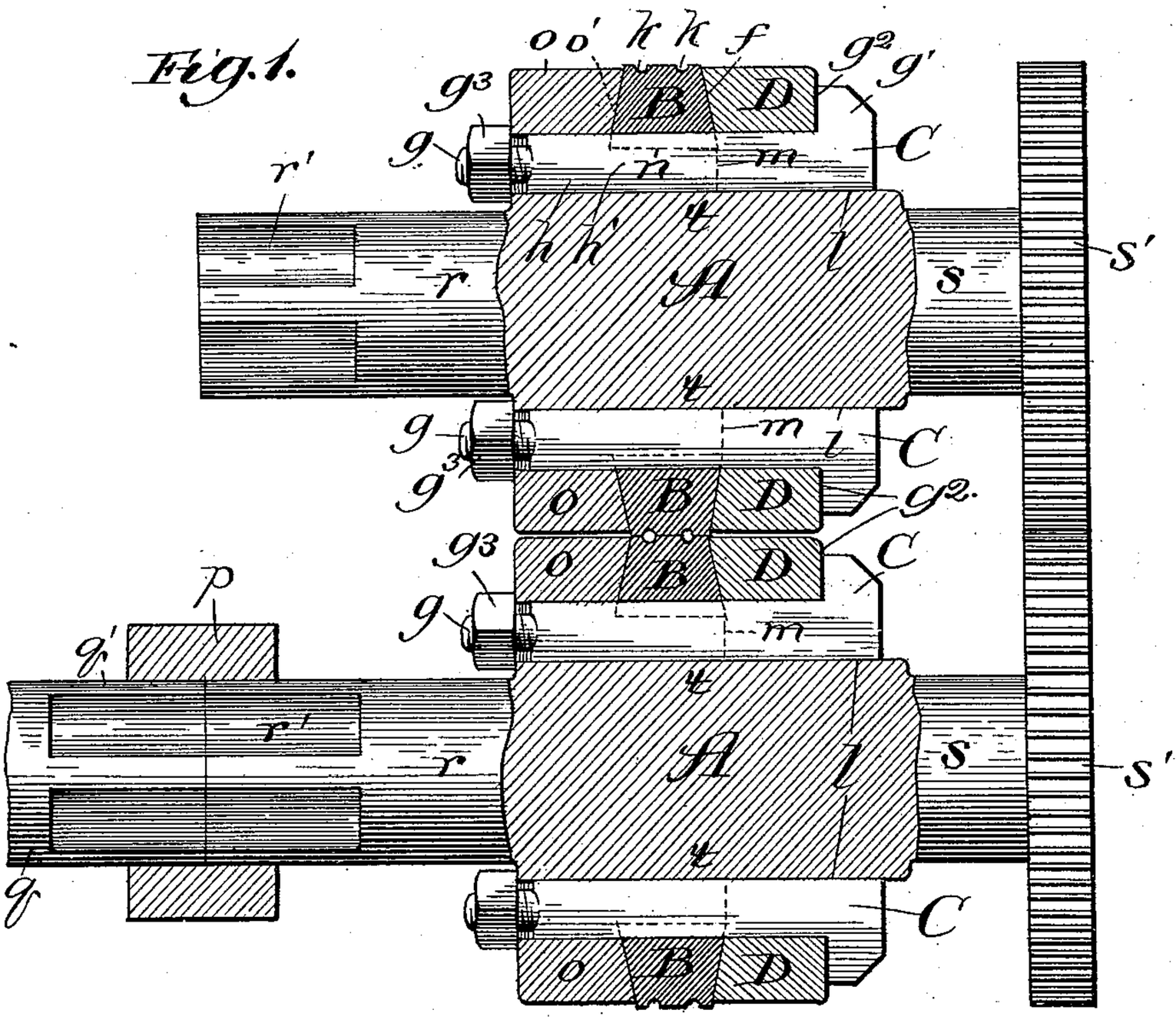
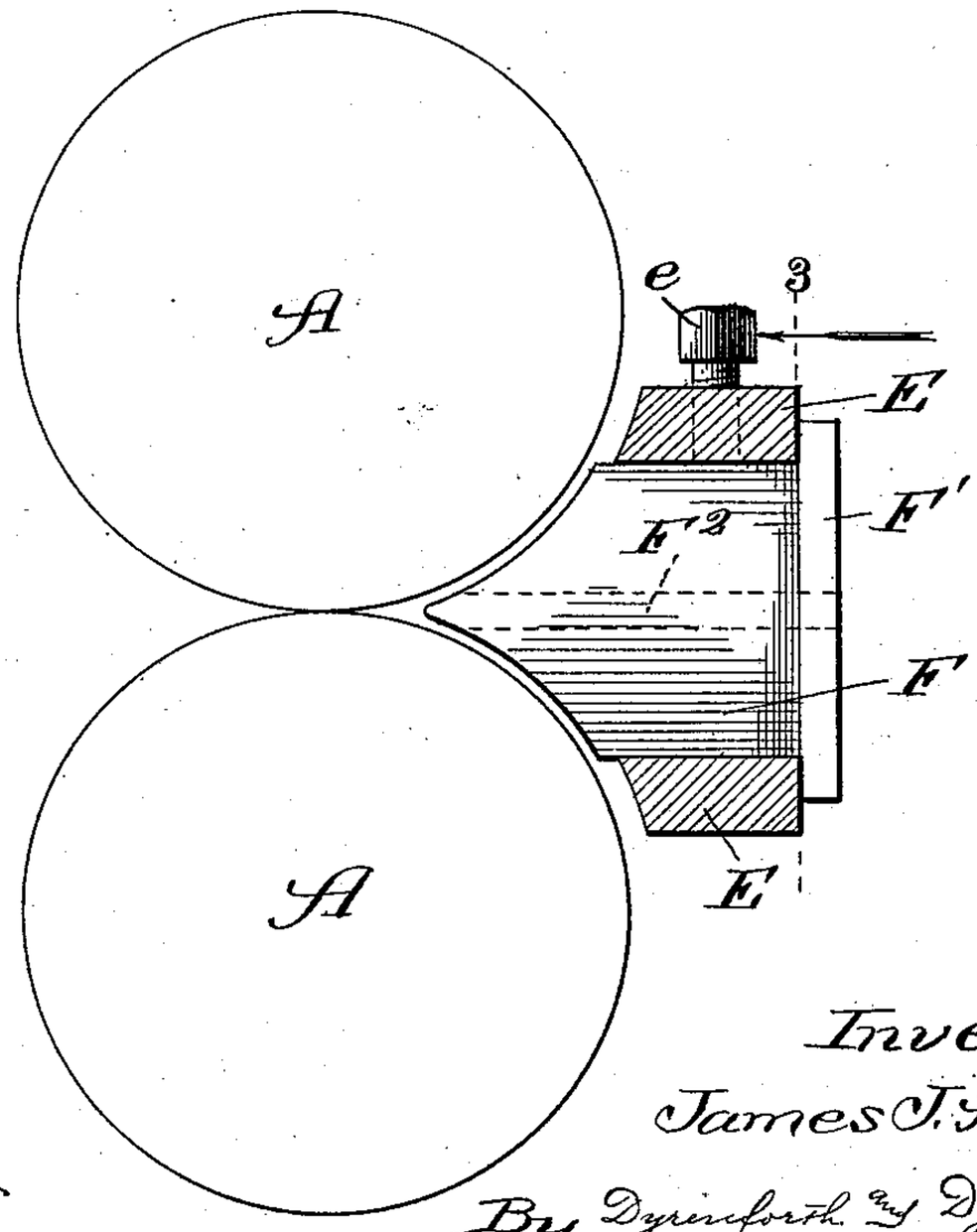



Fig. 2.

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(No Model.) 3 Sheets—Sheet 2.

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## METAL ROLLING MACHINE.

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Fig. 3.

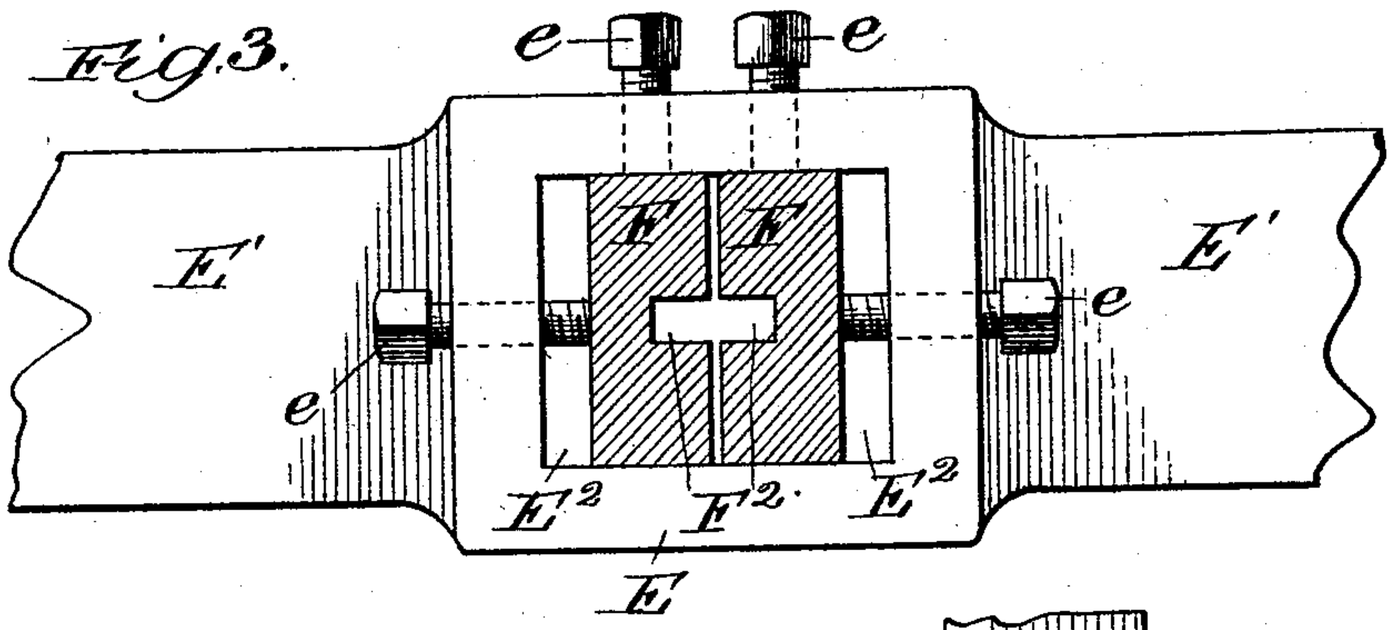



Fig. 4.

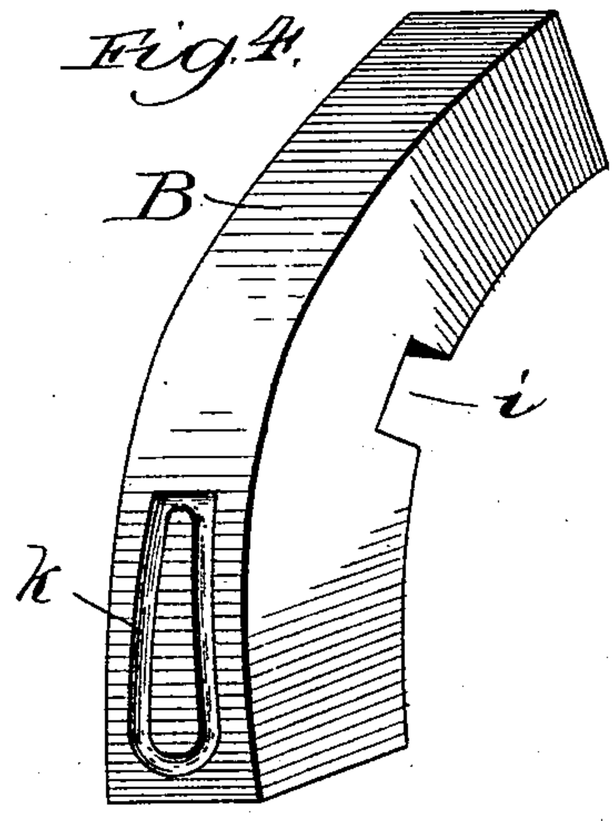



Fig. 5.

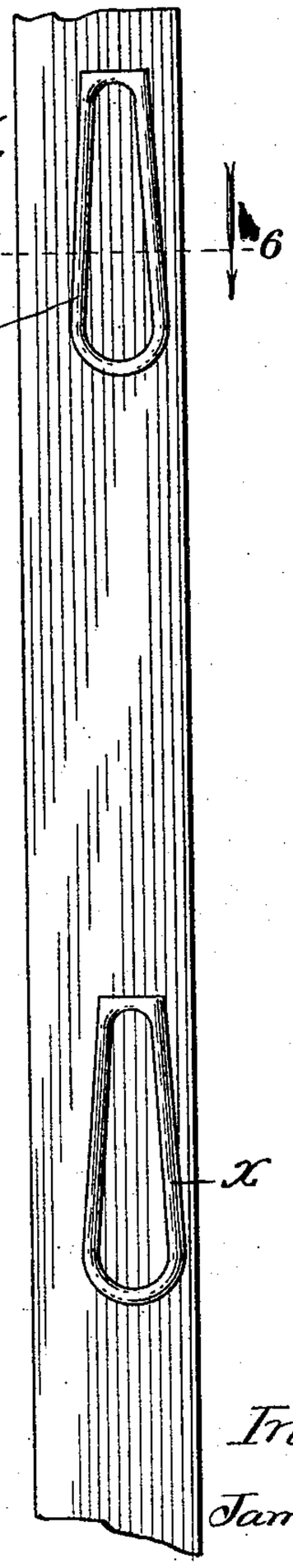



Fig. 6

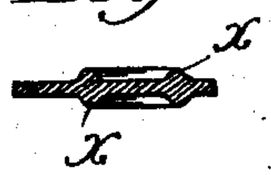
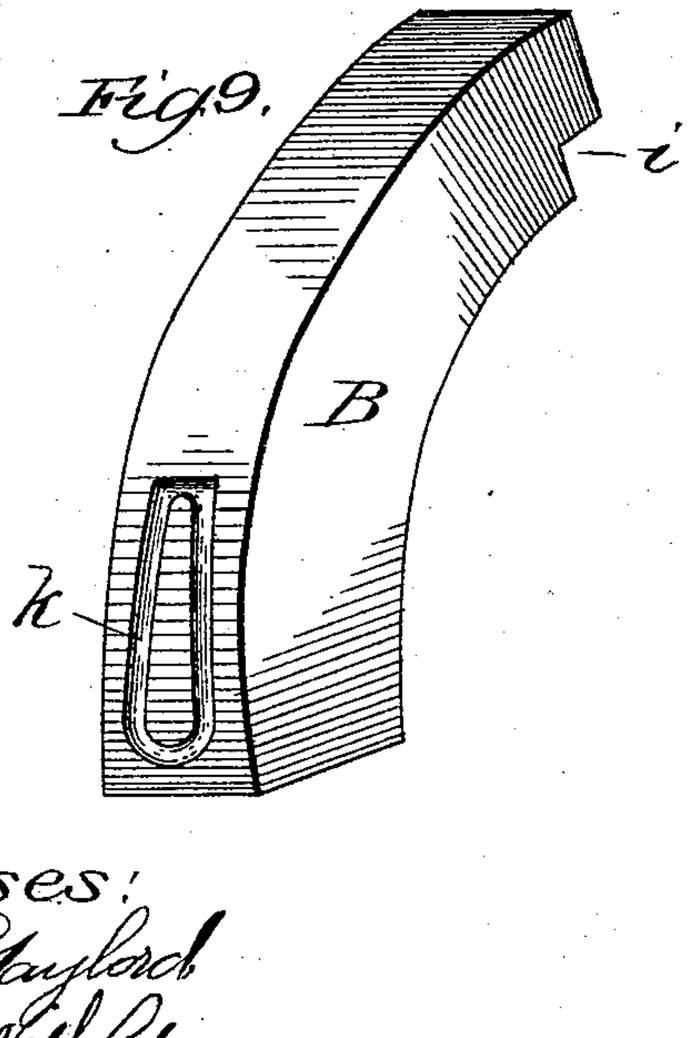



Fig. 9.

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(No Model.) 3 Sheets—Sheet 3.

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## METAL ROLLING MACHINE.

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Fig. 7.

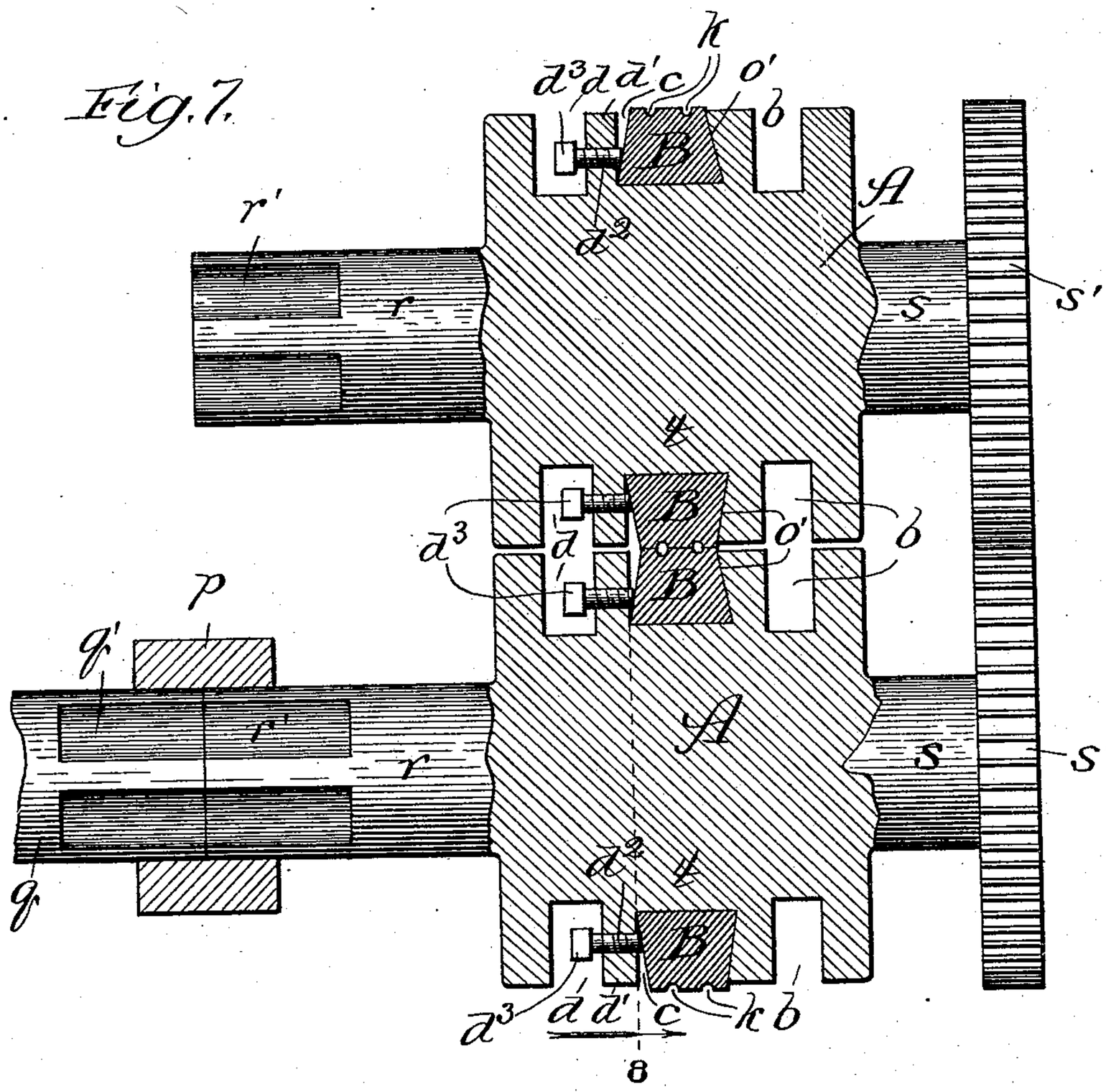
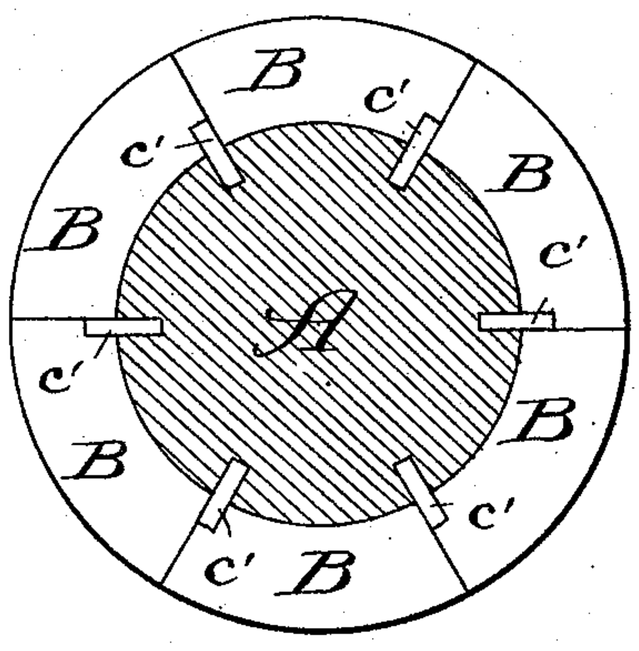



Fig. 8.

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# UNITED STATES PATENT OFFICE.

JAMES J. ANDERSON, OF CHICAGO, ILLINOIS.

## METAL-ROLLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 488,048, dated December 13, 1892.

Application filed March 28, 1892. Serial No. 426,744. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES J. ANDERSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Metal-Rolling Machines, of which the following is a specification.

My invention relates to improvements in machines for rolling metal bars or rods into blanks of desired shape, and more especially into blanks for table cutlery.

My object is to provide a machine of this character which will operate to produce the blanks with great rapidity and in a manner more perfect than has been possible in the machines hitherto employed.

In the drawings, Figure 1 is a broken sectional view of a pair of rolls provided with forming-dies and of my improved construction, the supporting-frame or housing being left out; Fig. 2, a transverse section of the rolls, showing an improved construction of guide for the rod or bar from which the blanks are to be drawn; Fig. 3, a broken section taken on line 3 of Fig. 2 and viewed in the direction of the arrow; Fig. 4, a perspective view of a segmental die for use in forming table-cutlery blanks; Fig. 5, a broken view in elevation showing a strip or series of knife-blanks after they have been formed in the machine; Fig. 6, a section taken on line 6 of Fig. 5; Fig. 7, a view, partly in broken section, of a pair of rolls of modified form; Fig. 8, a section taken on line 8 of Fig. 7 and viewed in the direction of the arrow, and Fig. 9 a perspective view of a segmental die for use upon the rolls shown in Figs. 7 and 8.

A A are the rolls formed in the usual way with roll-bodies *t* and necks *s r*. At their necks the rolls are journaled in a suitable frame or housing. The rolls are placed tangentially with their peripheries close to but out of contact with each other, and upon the necks *s* are gear-wheels *s'* of equal size and in mesh, whereby one roll is driven from the other. The necks *r* are provided with longitudinally-grooved sections or "wobblers" *r'*, and adjacent to one wobbler in longitudinal line with the neck *r* is a drive-shaft *q*, also formed at its end with a wobbler *q'*. On the drive-shaft *q* is a sliding coupling-box *p*, of a common construction and adapted to be slid upon the wobbler *q'* and into engagement with the wobbler *r'*, as shown, to couple the drive-shaft to the roll.

In the construction shown in Fig. 1 each roll A is formed at its circumference with an annular shoulder *o*, an annular surface or die-receiving face *n*, radial face *m*, and annular surface *l*. The shoulder *o* is provided on its inner side with a recessed annular face *o'*, the recess being produced, preferably, by inclining the face, as shown.

B B are segmental dies, provided on their faces with matrices *k*. The sides of the dies are formed with projecting portions to correspond with the recesses in the faces *o'*, and I prefer to form them with inclined sides, as shown, giving them a flaring or dovetailed shape in cross-section, widest at the under side. The dies are placed upon the surface *n*, and their sides conform to the inclined faces *o'* of the shoulders *o*, against which they fit, as shown. The segmental dies B at their under sides describe the same arc as that of the surface *n*, and are of equal fractional length of the circle, so that a certain number will entirely fill out the circle and leave no space between their abutting ends.

In a machine which I have constructed to carry out my invention six dies B are provided for knife-blanks, and seven dies B for fork-blanks, the knife-dies being each one-sixth of the circumference of the surface *n* and the fork-dies being each one-seventh of the circumference of the surface *n*. In the under surface of each die is a transverse groove *i*. At equal intervals around each roll in the plane of the surface *l* are transverse openings *h*, extending through the shoulder portion *o* and forming grooves *h'* in the surface *n*. The openings *h* and grooves *h'* are of squared or angular shape to receive squared or angular bolts or drivers C. Each driver C is formed with a round threaded end portion *g*, and at its opposite end with a laterally-extending lug or shoulder *g'*, having a face $g^2$ which extends at a right angle to the driver and surface *l*.

D is a continuous flat-sided ring having a recessed or inclined side *f*, adapted to coincide with the sides of the dies B. The outer surface of the ring D is of the same circumference as the outer face of the shoulder *o*. To

adjust the dies in position upon a roll, they are placed around the surface $n$ with their grooves $i$ registering with the grooves $h'$ in the surface $n$. The ring D is then placed against the dies and the drivers C are slipped between the ring D and surface $l$ and through the grooves $h'$ $i$ and openings $h$. Nuts $g^3$ are then placed upon the ends $g$ of the drivers and tightened against the side of the roll. Tightening of the nuts draws upon the drivers and causes their surfaces $g^2$ to bear against the rings D and clamp them against the dies. The dies are thus held in position with great security. The engagement of the drivers C with the grooves $i$ prevents "creeping" or longitudinal movement of the dies.

In front of the rolls A is guide mechanism for the rod or bar from which the blanks are to be drawn for directing it into the bite of the dies. The mechanism comprises a guide-box E, having laterally-extending arms E', at which it is secured to the frame or housing of the machine and having a central opening $E^2$. Extending through the guide-box are adjustable guide-plates F. The guide-plates are formed, as shown in Fig. 2, with wedge-shaped ends, which permit the plates to be advanced almost to the nearest point of approach of the rolls, the outer ends of the guide-plates having flanges F', which engage the outer surface of the guide-box and prevent the plates from being drawn into the rolls. At the centers of their inner faces the guide-plates F are provided with coincident longitudinal grooves $F^2$. Extending through the sides of the guide-box into the opening $E^2$ are threaded openings for set-screws $e$. In setting the adjustable guide-plates they are so placed that the opening formed by the coincident grooves $F^2$ will be of a width to permit the ready passage through it of the bars or rods from which the blanks are to be drawn, the opening being no larger than is necessary for the purpose. The guide-plates are fastened in adjusted position by means of the set-screws, as shown in Fig. 3.

The dies B project slightly beyond the faces of the shoulders $o$ and outer circumferences of the rings D, and the dies on one roll are thus brought normally into contact with the dies on the companion roll.

In operation the rod or bar from which the blanks are to be drawn heated to the desired temperature is passed into the opening $F^2$ and is guided thereby to the revolving dies. The yielding between the rolls A, caused by the natural springy nature of the latter, will cause the dies to spread apart slightly—say one-sixteenth of an inch—as the bar passes between them, so that the bar is drawn to that thickness. While passing through the dies the matrices $k$, where they act upon the metal, give proper form thereto. In the manufacture of knife-blanks the matrices will form the handle portion $x$, as shown in Figs. 5 and 6. To complete the knives, the handle portions $x$ and integral blades are stamped out of the blanks by suitable means, the blades being afterward ground to complete the knives.

In the modified construction shown in Fig. 7 the roll-body of each roll is provided with three circumferential grooves $d$, $c$, and $b$. The groove $c$ is provided with one recessed or inclined side $o'$, as shown, for the sides of the dies to fit against. The grooves $d$ and $c$ are separated by annular ribs $d'$, and at intervals around the roll threaded openings $d^2$ are provided through the ribs $d'$ for set-screws $d^3$. In the base of each groove $c$, at the ends of the dies, are transverse keys or feathers $c'$, and the dies B employed are cut away at their ends in the manner indicated at $i$ in Fig. 9 to fit over the feather. The feather thus acts as a stop or driver to prevent creeping of the dies upon the roll. When the dies are placed in position, they are held securely in place by tightening the set-screws $d^3$ against them. The faces $o'$ and sides of the rings D are inclined, as shown, to produce recesses adapted to receive the wide portions of the dovetail dies, the object of the construction being to hold the dies firmly in place. It is obvious that the recesses described may be formed by grooving instead of inclining the faces, the sides of the dies where they engage the recesses being caused to conform to the recesses provided.

I prefer to provide a driver for each die, as described, though if the dies are formed of material sufficiently thick drivers may be provided only at every second or third die. The drivers should be sufficiently near together to prevent any longitudinal play or "buckling" of the dies, which would cause appreciable relative displacement between the companion matrices.

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

1. In a machine for rolling metal blanks, the combination of two companion rolls formed with coincident annular transversely-recessed die-receiving faces, drivers in the said recesses, a series of abutting, removable, and replaceable segmental dies around the die-receiving face of each roll, the series of dies being provided at their inner circumference with transverse recesses into which the said drivers extend, and fastening means upon the rolls engaging the opposite sides of the dies, substantially as and for the purpose set forth.

2. In a machine for rolling metal blanks, the combination of two companion rolls formed with coincident annular transversely-recessed die-receiving faces and annular shoulders $o$ at one side of the said die-receiving faces, drivers in the recesses of the die-receiving faces, a series of abutting, removable, and replaceable segmental dies around the die-receiving face of each roll, the series of dies being provided at their inner circumferences with transverse recesses into which the said drivers extend, adjustable clamping-rings upon the rolls, and means for tightening the rings in place to

clamp the dies against the shoulders *o*, substantially as described.

3. In a machine for rolling metal blanks, the combination of two companion rolls formed with coincident annular transversely-recessed die-receiving faces and annular shoulders *o*, having recessed faces *o'* at one side of the said die-receiving faces, drivers in the recesses of the die-receiving faces, a series of abutting, removable, and replaceable segmental dies around the die-receiving face of each roll, each die being shaped at its side adjacent to a face *o'* to conform to and engage the same, and the series of dies being provided at their inner circumferences with transverse recesses into which the said drivers extend, adjustable clamping-rings upon the rolls, and means for tightening the rings in place to clamp the dies against the shoulders *o*, substantially as described.

4. In a machine for rolling metal blanks, the combination of two companion rolls formed with coincident annular die-receiving faces having transverse recesses *h'* and annular shoulders *o* at one side of the die-receiving faces, openings *h* in the rolls below the shoulders *o* at the recess *h'*, a series of abutting, removable, and replaceable segmental dies extending around the die-receiving faces against the shoulders *o* and having transverse recesses *i* in their under sides which register with the recesses *h'*, adjustable clamping-rings at the sides of the dies opposite the shoulders *o*, drivers C, engaging at one end portion the outer surfaces of the rings and extending thence through openings formed by coincident recesses *h' i* and through the respectively-adjacent openings *h*, and tightening means upon the drivers for forcing the same against the rings to clamp the dies against the shoulders *o*, substantially as and for the purpose set forth.

5. In a machine for rolling metal blanks, the combination of two companion rolls formed with coincident annular transversely-recessed die-receiving faces and annular shoulders *o*, having inclined faces *o'* at one side of the said die-receiving faces, adjustable clamping-rings D upon the rolls at the opposite side of said die-receiving faces, having inclined faces *f*, drivers in the recesses of the die-receiving faces, a series of abutting, removable, and replaceable dies around the said die-receiving faces of dovetail shape in cross-section to conform at opposite sides, respectively, to the faces *o' f*, the series of dies being provided with transverse recesses into which the said drivers extend, and means for tightening the rings D to clamp the dies in place, substantially as described.

JAMES J. ANDERSON.

In presence of—
W. N. WILLIAMS,
M. J. FROST.