

(No Model.)

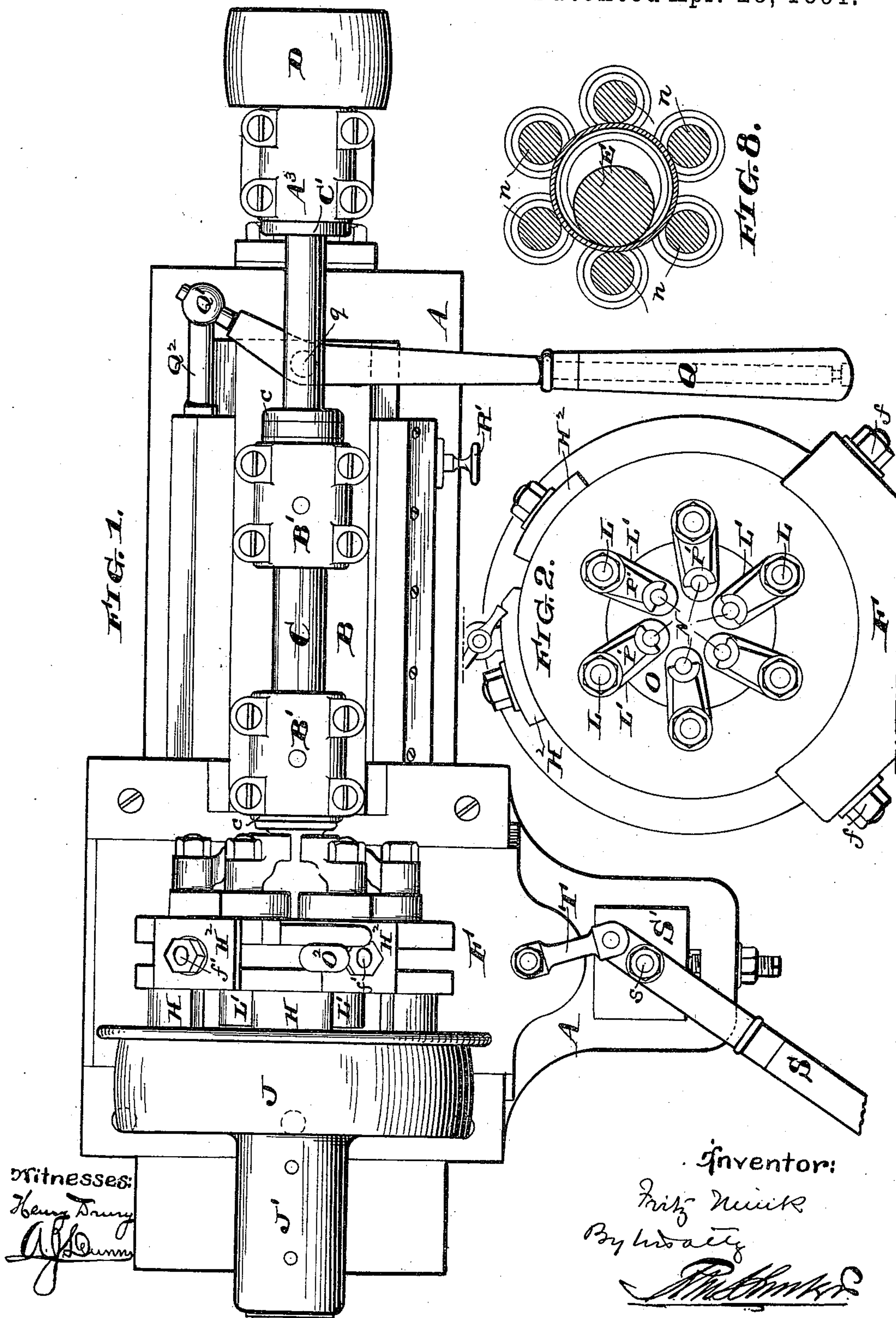
3 Sheets—Sheet 1.

F. MINK.

MACHINE FOR SPINNING CIRCULAR FORMS OF METAL.

No. 451,159.

Patented Apr. 28, 1891.



(No Model.)

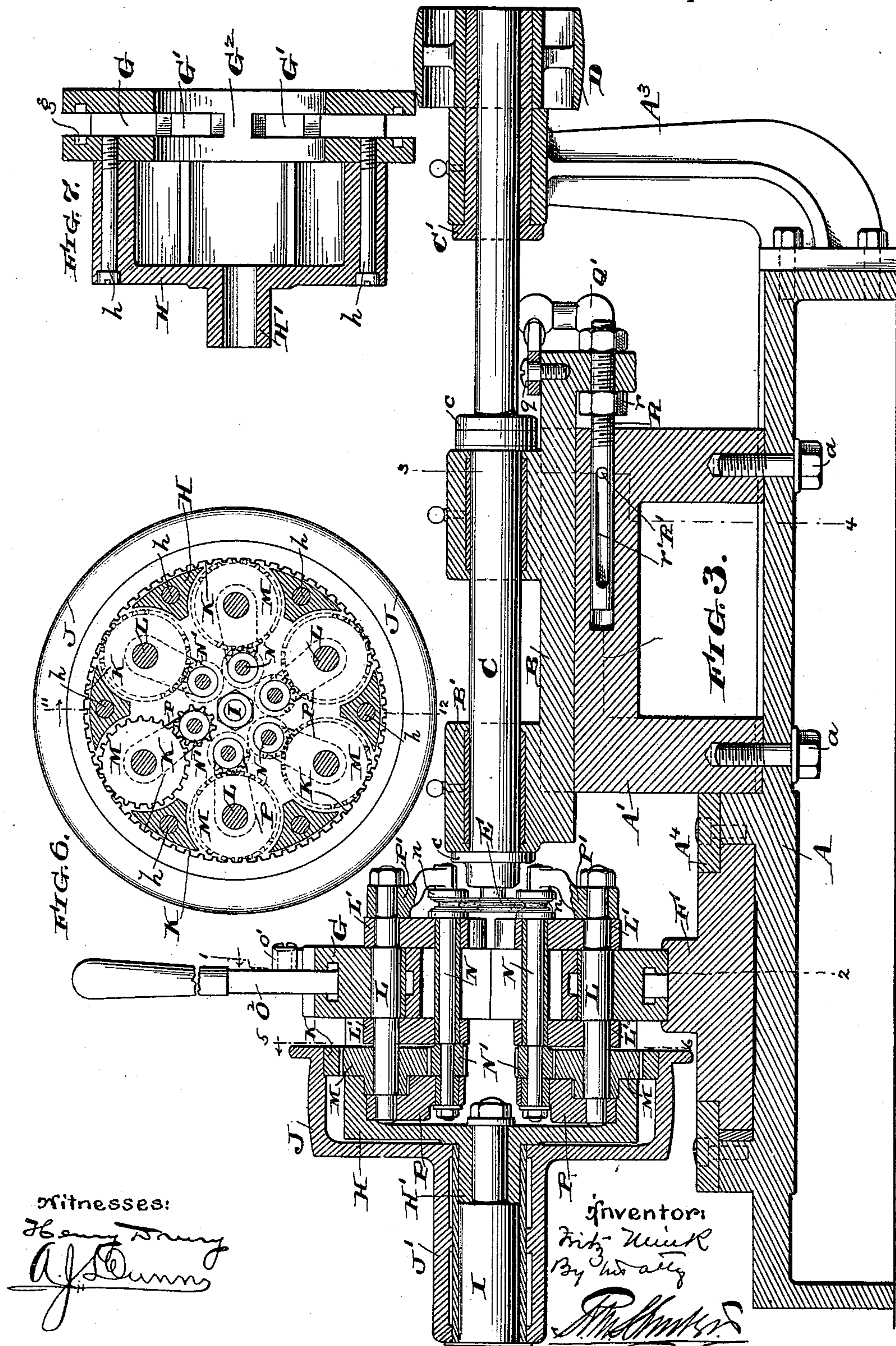
3 Sheets—Sheet 2.

F. MINK.

MACHINE FOR SPINNING CIRCULAR FORMS OF METAL.

No. 451,159.

Patented Apr. 28, 1891.



(No Model.)

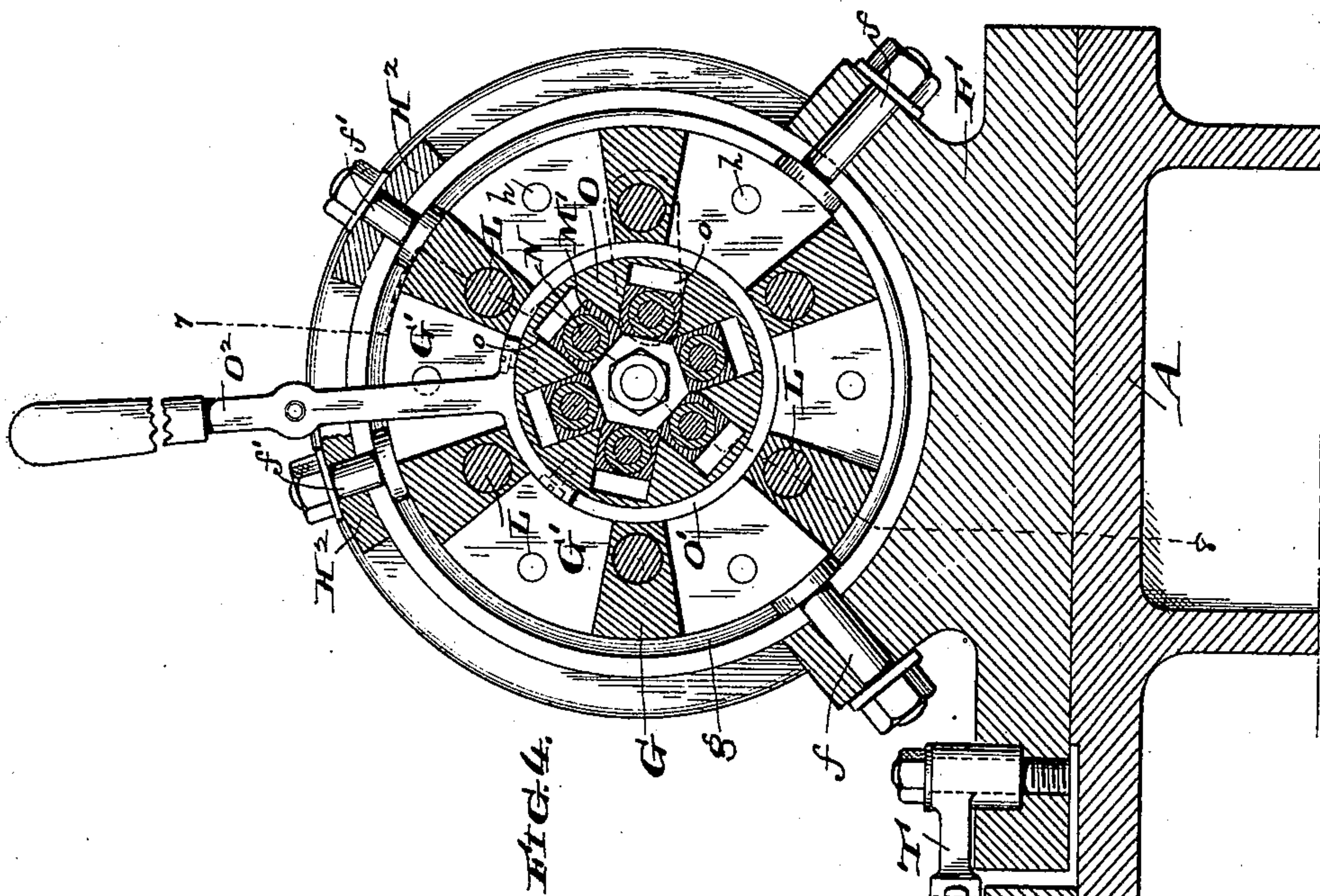
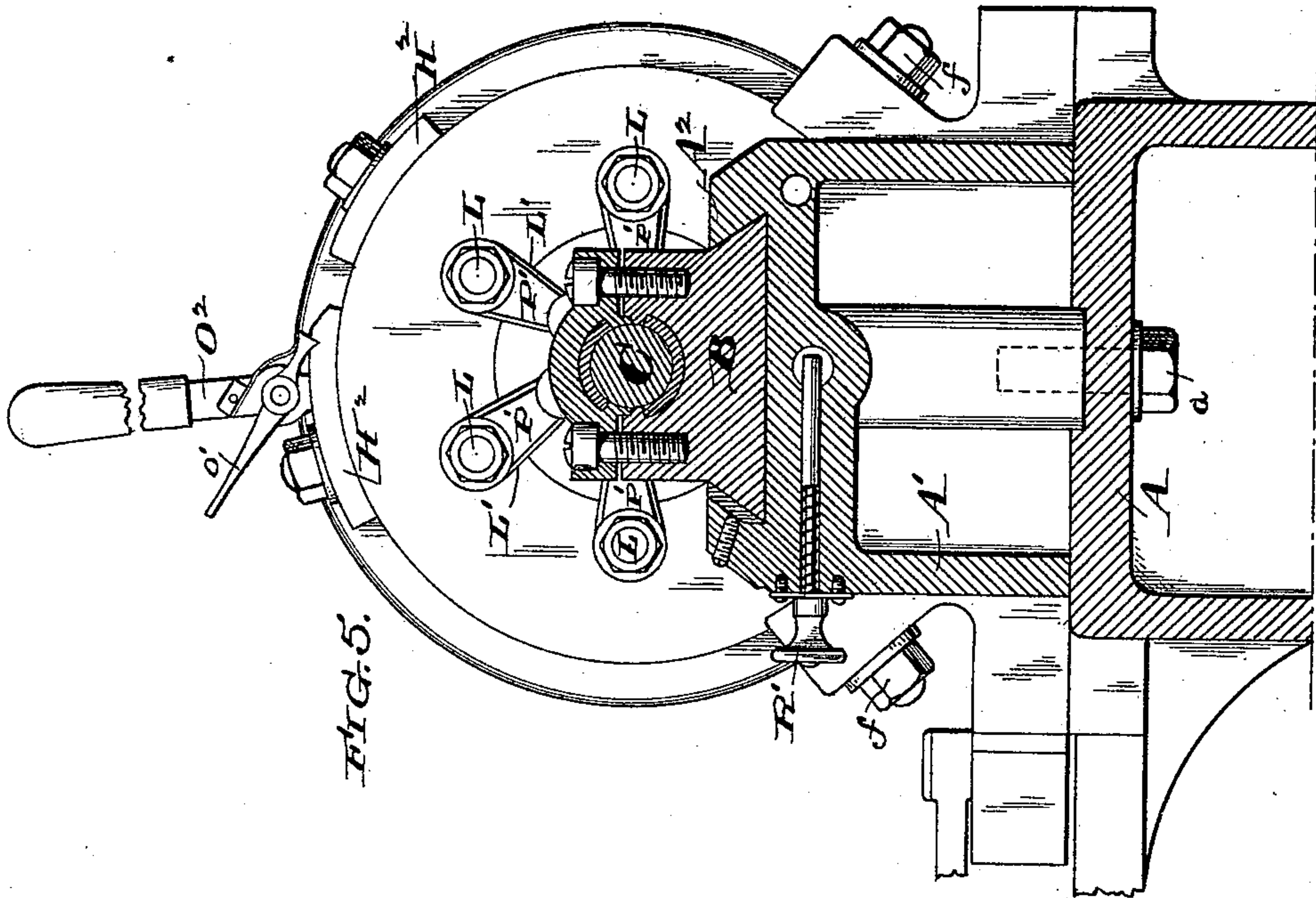
3 Sheets—Sheet 3.

F. MINK.

MACHINE FOR SPINNING CIRCULAR FORMS OF METAL.

No. 451,159.

Patented Apr. 28, 1891.



Witnesses:
Henry Denny
A. J. Dunn

Inventor:
Fritz Mink
By *[Signature]*

UNITED STATES PATENT OFFICE.

FRITZ MINK, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE KEYSTONE WATCH CASE COMPANY, OF SAME PLACE.

MACHINE FOR SPINNING CIRCULAR FORMS OF METAL.

SPECIFICATION forming part of Letters Patent No. 451,159, dated April 28, 1891.

Application filed October 15, 1890. Serial No. 368,206. (No model.)

To all whom it may concern:

Be it known that I, FRITZ MINK, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Machines for Spinning or Shaping Circular Metallic Forms, of which the following is a specification.

My invention relates to machines for spinning or shaping circular metallic forms; and it consists of certain improvements which are fully set forth in the following specification, and are shown in the accompanying drawings, which form a part thereof.

It is the object of my invention to spin up or shape circular metallic forms by means of mechanism in a rapid, efficient, and economical manner.

My invention is, moreover, designed to impart a highly polished or burnished surface to the metal during the spinning or shaping operation and keep it round and to size.

In carrying out my invention I employ a mandrel, upon which the article to be spun up or shaped is loosely supported with its surface in contact with a series of forming or shaping rollers. By means of suitable devices these shaping-rollers may be moved toward or away from the article which is being operated upon to permit it being placed upon and removed from the mandrel. The metal is worked between the mandrel and the shaping-rollers, the peripheries of which are formed to impart the desired shape or form to the article. Motion is imparted to the shaping-rollers by means of suitable gearing, by which the rollers may be moved to or from the article to be worked while still maintaining their proper gearing connections. The action of these shaping-rollers upon the surface of the metal imparts to it a highly polished or burnished effect.

My invention also consists of certain novel constructions and combinations of parts, which are hereinafter fully described and claimed.

While the invention is equally adapted to the spinning or shaping of any circular metallic forms, it is peculiarly adapted to the shaping and polishing of watch-case centers, and in the drawings and description it is shown applied thereto.

In the drawings, Figure 1 is a plan view of my improved apparatus for spinning or shaping circular metallic forms. Fig. 2 is an end elevation of the same, looking toward the left, with the supporting-mandrel and its connections removed. Fig. 3 is a longitudinal sectional elevation taken upon the line 7 8 of Fig. 4. Fig. 4 is a cross-sectional view upon the line 1 2 of Fig. 3. Fig. 5 is a similar view on the line 3 4 of Fig. 3. Fig. 6 is a similar view on the line 5 6 of Fig. 3. Fig. 7 is a longitudinal sectional view on the line 11 12 of Fig. 6, showing the supporting-frames of the shaping-rollers with the rollers, gearing, &c., removed; and Fig. 8 is an illustrative view showing the supporting-mandrel and shaping-rollers in section to illustrate the operation of the machine.

A is the main frame or base of the machine. Connected to the frame A by means of bolts *a* and movable thereon is a chair A', having its upper surface provided with guides A².

B is a frame carried by the chair A' and movable longitudinally in the guides A² thereof. Carried by the frame B in suitable housings B' is the shaft C, which is provided with collars *c c*, adjacent to the housings B', to prevent longitudinal movement of the shaft in the frame B.

A³ is a bracket of the main frame A, in which one end of the shaft C is supported.

C' is a sleeve journaled in the bracket A³. The shaft C is keyed to the sleeve C'.

D is a pulley carried by the sleeve C' to impart motion thereto and to the shaft C.

E is a mandrel carried upon the end of the shaft C, having its periphery formed to correspond with the shape to be imparted to the watch-case center or article to be worked, but being of smaller diameter to receive the center and to permit it to be removed when shaped or spun.

F is a frame supported by the main frame A in the transverse guides A⁴ and movable therein laterally or transversely to the shaft C.

G is an annular disk connected with the frame F by means of bolts *f*. To permit the rotation of this disk G for the purpose hereinafter set forth, I prefer to construct it with an annular L-shaped slot *g* in its periphery

to receive the bolts f , the ends of which bear upon the surface of the disk within the slot. By loosening the bolts the disk may be turned upon its axis, the slot g permitting the movement upon the bolts.

Connected with the disk G by means of bolts h or otherwise is a hollow circular frame H , (see Fig. 7,) provided with a tubular projection H' .

I is a stud carried by the tubular projection H' .

J is a band-wheel having a tubular extension J' , which is journaled upon the stud I . The interior of the band-wheel J is provided with a circular gear K .

Journaled in the disk G are a series of shafts L , each carrying a gear-wheel M , which engages with the circular gear K .

$L' L'$ are links carried by the shafts L , one on each side of the disk G . Carried by these links $L' L'$ are shafts N , journaled therein and carrying upon their outer or free ends the shaping-rollers n . Carried by the shafts N are gear-wheels N' , engaging with the gear-wheels M . The links $L' L'$ support the shafts N with their gear-wheels N' in constant engagement with the gear-wheels M while permitting them to swing from the shafts L .

M' are rectangular boxes carried by the shafts N .

O is a disk provided with a series of rectangular slots or guides o , in which the boxes M' are guided. The disk O is movable in the central opening G^2 of the disk G , and is provided upon its periphery with an annular groove O' , in which is attached a lever or handle O^2 for operating the disk O , the disk G being formed with a slot G' , through which the handle or lever O^2 extends. By moving the lever O^2 and turning the disk O the boxes M' are moved in the guides o , thus moving the shafts N and their rollers n , while the links $L' L'$ maintain the constant engagement between the gear-wheels N' and M .

P are links connecting the free ends of the shafts N with the shafts L , and P' are pivoted arms carried by the shafts L to afford support to the outer ends of the shafts N beyond the rollers n . The shafts N are thus suspended from the shafts L by means of the links $L' L'$ and P .

The disk G is supported at the top by bolts f' , similar to the bolts f , carried by extensions H^2 of the frame H .

The lever O^2 is provided with a spring-catch o' , which holds it in a normally-fixed position.

Q is a lever pivoted at q to the longitudinally-movable frame B , and at Q' to the slide Q^2 , working in the chair A' .

R is an adjustable slide carried by the movable frame B and working in the chair A' . This slide R may be adjusted longitudinally by means of screw-threads and nuts r , as shown, Fig. 3. The slide R is provided with a slot or groove r' , which receives the end of a spring-stop R' , carried by the chair A' . This

stop working in the groove or slot r' limits the movement of the slide R , and consequently of the longitudinal frame. The slide is so adjusted that the movement of the frame B will be arrested when the mandrel E is exactly in position with reference to the shaping-rollers n , as shown in Fig. 3.

S is a lever pivoted at s to an adjustable piece S' upon the main frame A , and connected by a link T with the transversely-movable frame F .

The operation of the machine is as follows: The article to be shaped is placed upon the mandrel E of the shaft C , which, as has been heretofore stated, is of smaller diameter than the article, and has its periphery formed to correspond with the shape to be imparted. By the operation of the lever Q the frame B is moved longitudinally to bring the mandrel E in the same vertical plane with the rollers n . By the previous operation of the handle or lever O^2 the disk O has been turned, causing the boxes M' to move in the guides o and move the rollers n away from the common center, so as to admit the mandrel E . By again shifting the handle or lever O^2 the rollers n are moved toward each other to operate upon the article supported upon the mandrel E . In Fig. 8 the operation of the mandrel and rollers is illustrated. The mandrel E is eccentric with reference to the rollers n , and the metal of the article to be operated upon is pressed between one of the rollers and the mandrel, as shown, and is worked between them. The other rollers n press against the surface of the metal as it is being worked, the working between the one roller n and the mandrel E causing the watch-case center or other article that is being operated upon to rotate. This working of the metal between the mandrel E and roller n causes the article to expand slightly or enlarge in diameter, so that at the commencement of the spinning operation all of the rollers n should not be in contact with the metal, the roller by which the metal is to be worked upon the mandrel being pressed in contact with it, but the others being slightly removed to permit this expansion or enlargement. This is, however, a matter of adjustment to be controlled by the operator. An adjustment to suit the size of the watch-case center or article to be spun may be obtained by means of the lever S , by which the frame F may be moved laterally or transversely to the axis of the shaft C until one of the rollers n has clamped the metal upon the mandrel, as shown in Fig. 8. Power is imparted to the belt-wheel J , which carries the circular gear K , by a belt in the usual manner, and the rollers n are driven by this circular gear through the medium of the gears M and N' in the manner heretofore described. The mandrel E and its shaft C are rotated by the belt wheel or pulley D . As the working of the metal is performed by one of the rollers n and the mandrel E , it is consequently desirable to change the roller n , which per-

forms this office. For this purpose the disk G is formed with the L-shaped grooves, which permit it to be moved upon the bolts $f f'$ to bring a new roller n into operative position.

5 The point at which the handle O^2 is connected with the disk O is changed to correspond with the movement of the disk, and the disk G is provided with a series of slots G' for the handle O^2 in each of its positions.

10 The action of the rollers n upon the metal imparts thereto a highly polished or bur-nished surface. By this invention the cen-ters of cheap watch cases formed of filled metal may be shaped or spun with great
15 rapidity and economy.

If desired, the inner supporting-mandrel E may be withdrawn and the rollers n may be used alone, acting upon the outer surface of the piece of metal operated upon to shape it
20 into the desired circular form. In this case the rollers n are all brought equally in con-tact with the outer surface of the metal.

While I prefer the many minor details of construction which have been shown, they are
25 not necessary to my invention and may be varied without departing from the principles of it.

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

30 1. In a spinning-machine, the combination of a rotating shaft having a circular die upon it with a series of rotary dies arranged about the spinning-die, a frame carrying the said series of rotary dies, and mechanism for mov-
35 ing said frame laterally with respect to the spinning-die.

2. In a spinning-machine, the combination of a rotating shaft having a circular die upon it with a series of rotary dies arranged about
40 the spinning-die, a frame carrying the said series of rotary dies, mechanism for moving said frame laterally with respect to the spin-ning-die, and mechanism for moving the dies making up the series of rotary dies to or
45 from the spinning-die.

3. In a spinning-machine, the combination of a rotating shaft having a circular die upon it with a series of rotary dies arranged about the spinning-die, a frame carrying the said
50 series of rotary dies, mechanism for moving said frame laterally with respect to the spin-ning-die, mechanism for moving the dies mak-ing up the series of rotary dies to or from the spinning-die, and mechanism for rela-
55 tively reciprocating the spinning-die in the plane of its rotation toward or from the se-ries of rotary dies.

4. In a spinning-machine, the combination of a rotating shaft having a circular die upon
60 it with a series of rotary dies arranged about the spinning-die, a frame carrying the said series of rotary dies, mechanism for moving said frame laterally with respect to the spin-ning-die, and mechanism for reciprocating the
65 spinning-die in the plane of its rotation rela-tively toward or from the series of rotary dies.

5. In a spinning-machine, the combination of a rotating shaft having a circular die upon it with a series of rotary dies arranged about
70 the spinning-die, a frame carrying the said series of rotary dies, mechanism for moving said frame laterally with respect to the spin-ning-die, mechanism for moving the dies making up the series of rotary dies to or from
75 the spinning-die, and mechanism for recip-rocating the spinning-die in the plane of its rotation relatively toward or from the series of rotary dies.

6. In a spinning-machine, the combination
80 of a rotary die with a series of rotary guid-ing or supporting dies arranged in a circle about the spinning-die, a frame to hold said rotary guiding or supporting dies against ro-tation about the spinning-die, power mechan-
85 ism to rotate all of the rotary guiding or sup-porting dies with the same surface speed, and mechanism for imparting a relative lateral movement between the said spinning and guiding dies.
90

7. In a spinning-machine, the combination of a rotary die with a series of rotary guiding or supporting dies arranged in a circle about the spinning-die, a frame to hold said rotary supporting or guiding dies against rotation
95 about the spinning-die, power mechanism to rotate all of the rotary guiding or support-ing dies with the same surface speed, and mechanism for imparting a relative lateral movement between the said spinning and
100 guiding dies and also an independent rela-tive movement between the said dies in the direction of their axes of rotation.

8. In a spinning-machine, the combination of a rotary spinning-die, a positively-rotated
105 holding or guiding die arranged exterior to said spinning-die, guides to support the work in position between said dies, and power mechanism to impart a relative lateral recip-rocation between the said dies.
110

9. In a spinning-machine, the combination of a rotary spinning-die, a positively-rotated holding or guiding die arranged exterior to said spinning-die, guides to support the work in position between said dies, and power
115 mechanism to impart a relative reciprocation between the said dies and also a relative lon-gitudinal reciprocation in the direction of their axes.

10. In a spinning-machine, the combination
120 of a rotary spinning-die with a series of ro-tary supporting and guiding dies arranged in a circle about the said spinning-die, power mechanism for rotating the spinning-die, a movable support for the supporting and guid-
125 ing dies, and means to adjust said movable frame to bring either of the several support-ing and guiding dies into position to work in conjunction with the spinning-die.

11. In a spinning-machine, the combination
130 of a rotary spinning-die with a series of ro-tary supporting and guiding dies arranged in a circle about the said spinning-die, power mechanism for rotating the spinning-

die, a movable support for the supporting and guiding dies, means to adjust said movable frame to bring either of the several supporting and guiding dies into position to work
5 in conjunction with the spinning-die, and power mechanism to rotate all of the supporting and guiding dies at the same surface speed.

12. In a spinning-machine, the combination
10 of a rotary spinning-die with a series of rotary supporting and guiding dies arranged in a circle about the said spinning-die, power mechanism for rotating the spinning-die, a movable support for the supporting and guid-
15 ing dies, means to adjust said movable frame to bring either of the several supporting and guiding dies into position to work in conjunction with the spinning-die, and means for imparting a relative lateral movement between
20 the spinning-die and the supporting and guiding die with which it operates.

13. In a machine for spinning circular forms of metal, the combination of a rotary spinning-die, a series of rotary dies arranged in a circle about said spinning-die, and means to
25 move said series of dies to and from the spinning-die.

14. In a machine for spinning circular forms of metal, the combination of a series of rotary dies arranged in a circle about a central point,
30 power devices to rotate said dies, and means to move said dies to and from each other to bring them nearer to or farther from said central point.

In testimony of which invention I have here-
35 unto set my hand.

FRITZ MINK.

Witnesses:

R. M. HUNTER,
F. B. MEYER.