

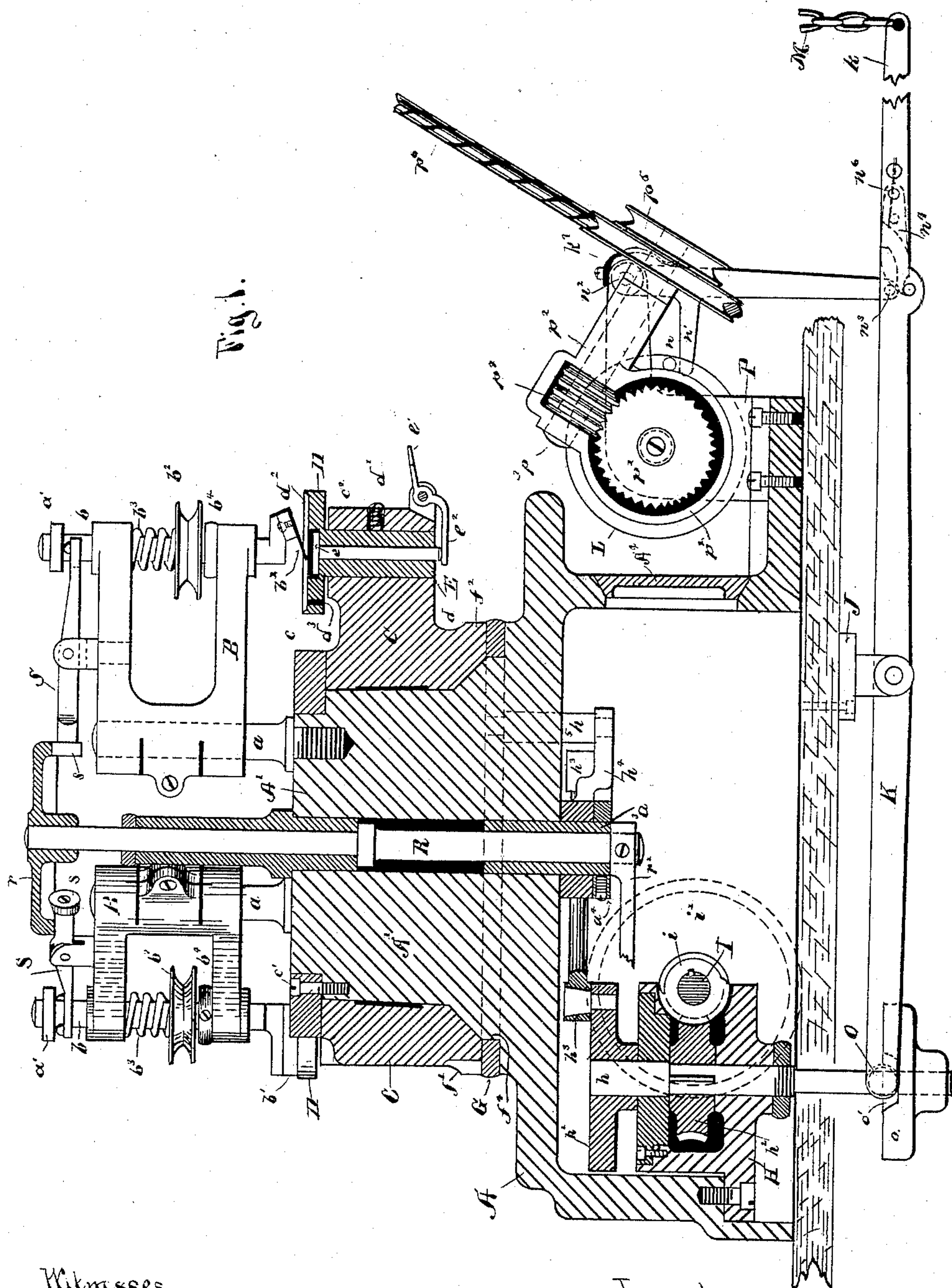
(No Model.)

4 Sheets—Sheet 1.

T. F. SHERIDAN.
MACHINE FOR ENAMELING SMALL DIALS.

No. 448,734.

Patented Mar. 24, 1891.



Witnesses

O.A. Artsman

Fred I. Getty.

Inventor.

Thos. D. Hendon

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Fig. 3.

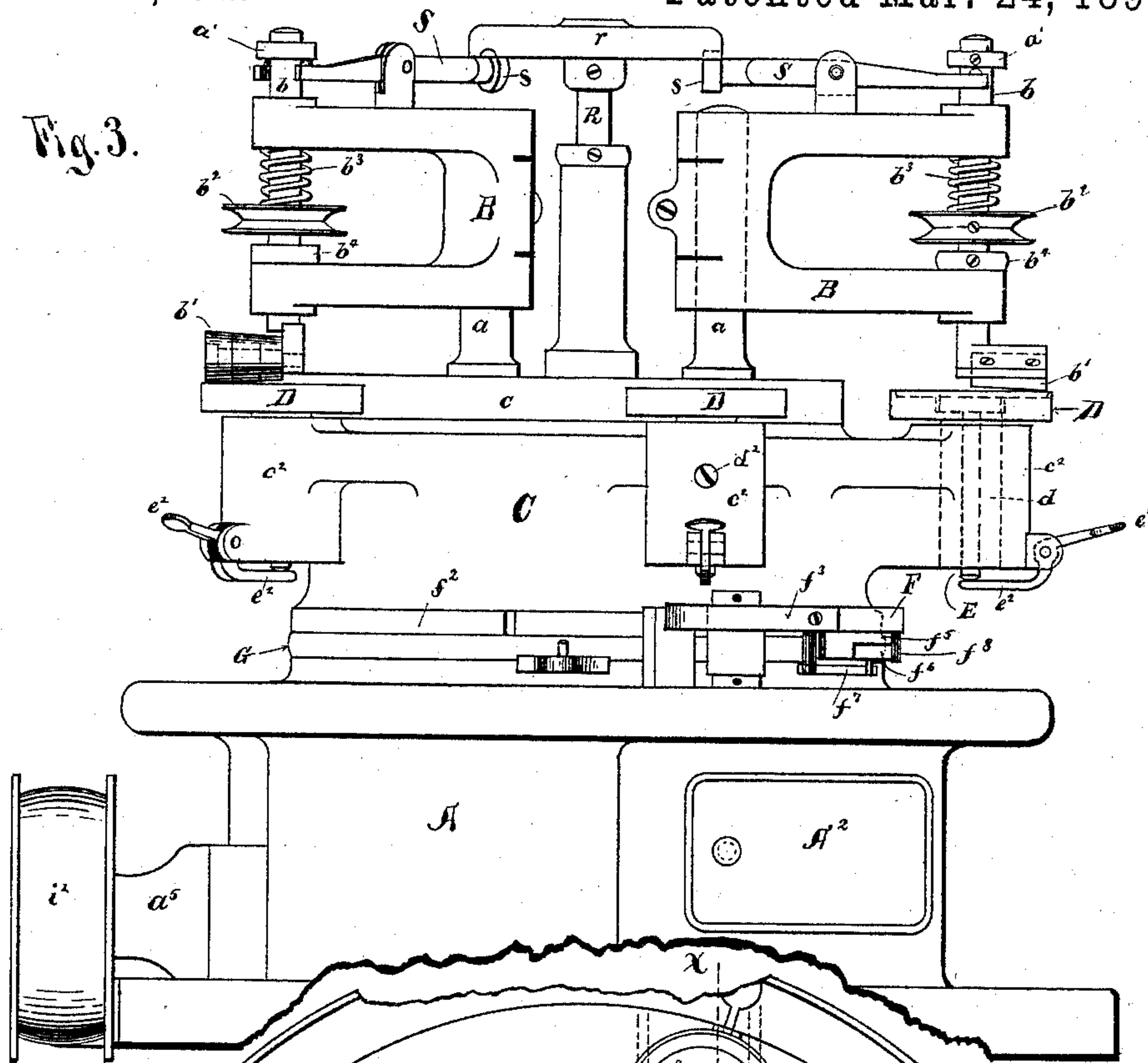
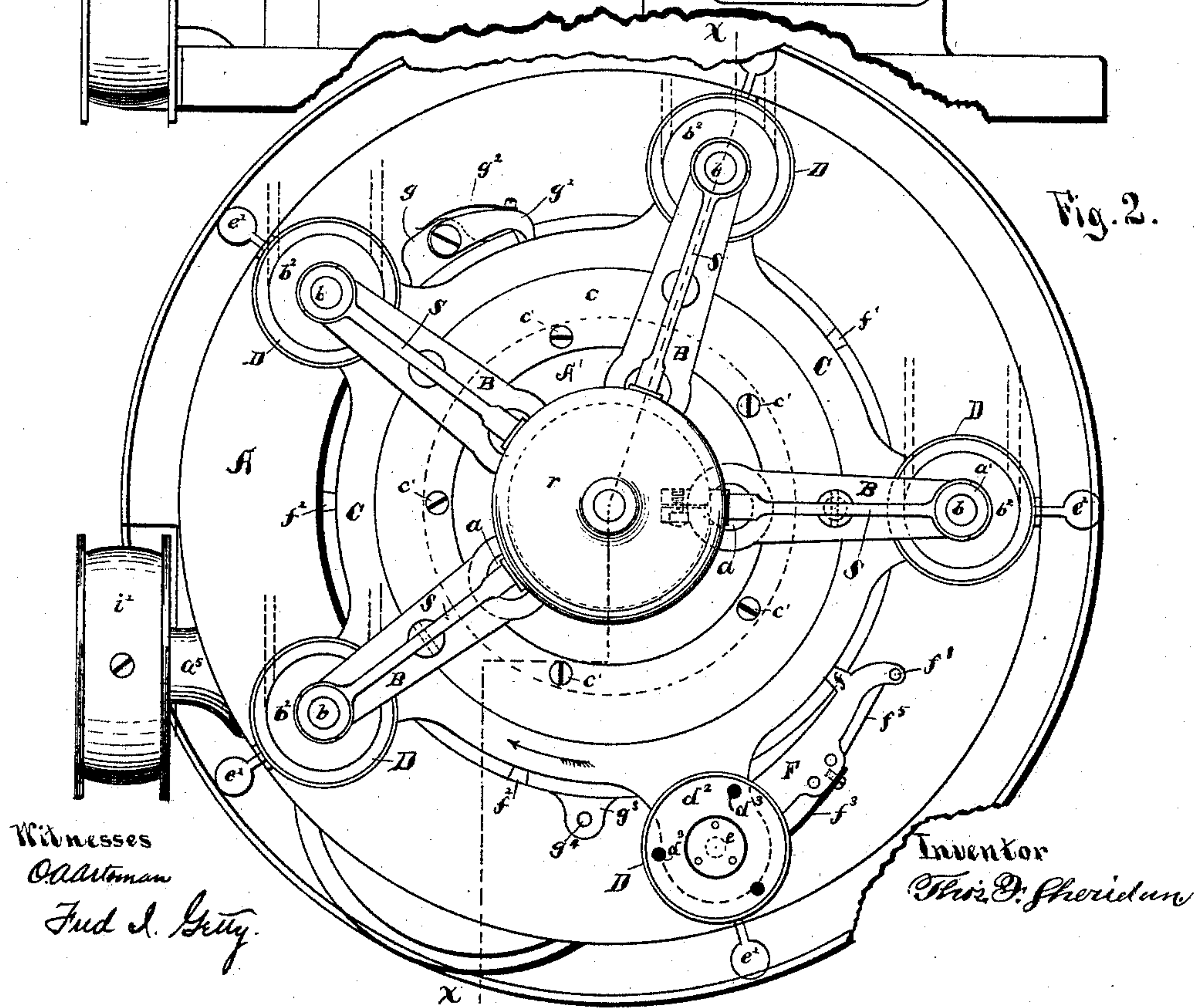


Fig. 2.



Witnesses
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(No Model.)

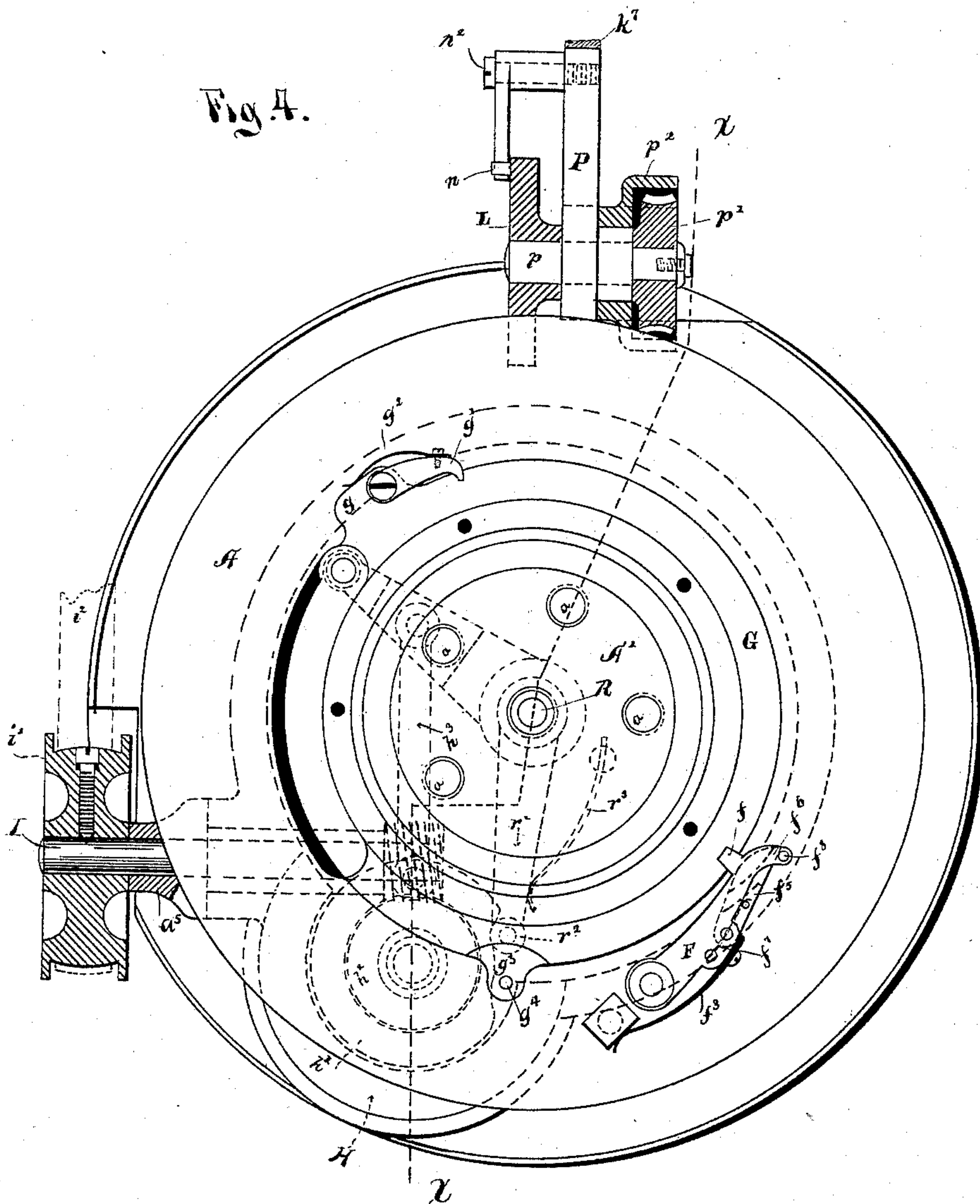
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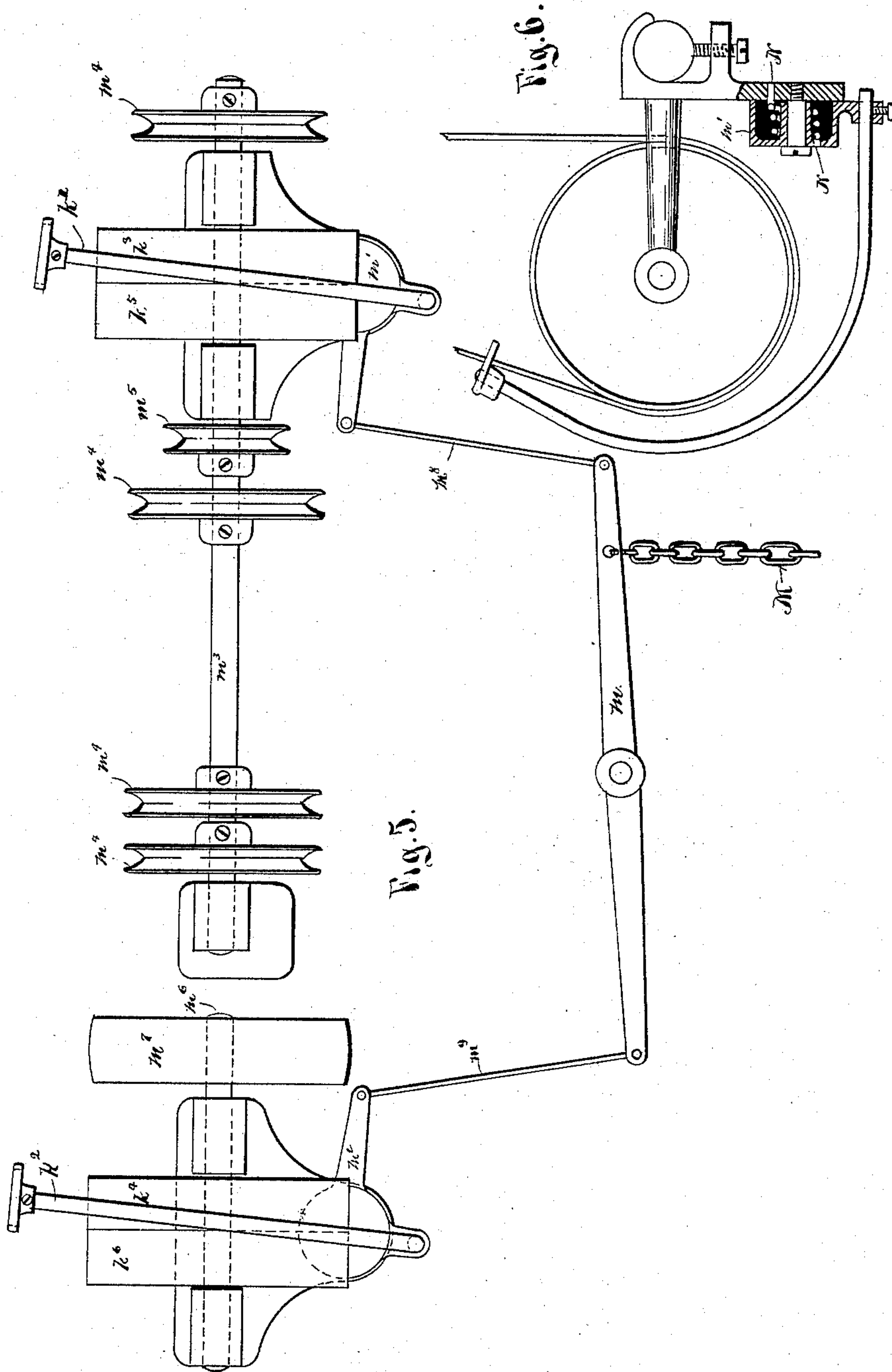
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4 Sheets—Sheet 4.

T. F. SHERIDAN.
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Patented Mar. 24, 1891.



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UNITED STATES PATENT OFFICE.

THOMAS F. SHERIDAN, OF SPRINGFIELD, ILLINOIS.

MACHINE FOR ENAMELING SMALL DIALS.

SPECIFICATION forming part of Letters Patent No. 448,734, dated March 24, 1891.

Application filed March 3, 1890. Serial No. 342,498. (No model.)

To all whom it may concern:

Be it known that I, THOMAS F. SHERIDAN, a citizen of the United States, and a resident of Springfield, in the county of Sangamon and State of Illinois, have invented certain new and useful Improvements in Automatic Machines for Enameling Small Dials; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a representation of the entire machine in vertical section on line $x x$. Fig. 2 is a plan view of top of the machine. Fig. 3 is an elevation of the front part of the machine. Fig. 4 is a plan of base, showing rotating mechanism. Figs. 5 and 6 are a front and side view of the counter-shaft for driving the machine.

In the annexed drawings letters of like name and kind refer to like parts in each of the figures.

The design of my invention is to lessen the time and expense required for enameling small dials and to improve the quality of the work, which at present is entirely performed by hand; and to this end said invention consists, principally, as an improvement in mechanism for enameling dials, in the combination of a series of rolls and spatulas, which are adapted by successive action to lay and smooth the moistened enamel, a holder or series of holders for a dial-copper, mechanism for automatically rotating said holder or holders from roll to roll, and spatulas, substantially as and for the purpose hereinafter set forth.

It consists, further, in an organized machine for enameling dials, in which are combined the following elements, to wit: a series of rolls and spatulas having a rotary motion and arranged in circular order, a series of dial-holders which exceed the number of rolls and spatulas and are arranged at equidistant points around a circle, automatic mechanism for stopping the rolls and spatulas during the rotation of the said holders, and automatic mechanism for operating the step-by-step rotation of the dial-holders, sub-

stantially as and for the purpose hereinafter set forth.

In the annexed drawings, A represents the frame or base, having a general cylindrical contour and provided interiorly with the bell-shaped recess shown in Fig. 1 for holding the rotating mechanism. At suitable points on top of the base center A' are secured the four vertical posts a for holding the roll and spatula mechanism. Each post a is provided with frame B, in which is fitted a spindle b . The said spindles revolve in their several frames by means of the pulleys b^2 , and are held to their downward limit by means of the spring b^3 and the cheek-nuts b^4 . At the lower end of each of the said spindles is fitted a roll or a spatula b' .

A' is a vertical tapered hub projecting up from the base A, upon which is fitted the table C, which is held easily upon the hub by means of the annular ring c and screws c' . At suitable points on the outer circumference of the table C are the outstanding circular lugs c^2 . Each of these lugs have a cylindrical opening extending longitudinally through the same, into which are fitted the small end d of the dial-holders D, the same being held firmly in place by the screw d' , which can be loosened and the said holders adjusted as to height. The dial-holders D have a cupped recess d^2 of a suitable diameter for the dial and a little deeper than the dial, so that the enamel will not be entirely thrown out of contact with the rolls or spatulas.

Extending through the flanged head of the dial-holder D are the three holes d^3 , designed for receiving the dial-feet easily, and thus allowing the body of the dial to rest flat on the bottom of the recess d^2 . Each of the dial-holders D are provided with an axial opening extending through the same, in which is fitted loosely a cylindrical pusher E, provided at its upper end with a flanged head e . This arrangement of parts is such that a downward pressure of the lever e' causes its opposite end e^2 to raise the pusher E and throw the enameled dial out of the holder. Upon releasing the said lever, the weight of the pusher carries it back to its normal position, as in Fig. 1.

The table C being rotated until the dial-holders D are in a proper position directly under the rolls and spatulas, said table is locked

in such position by means of the pawl F, which is pivoted on the upper flanged table of the base A and has its toothed end f engaged with one of the notched indices f' of the flange f^2 on the table C. Said pawl is held in engagement with the said notch by means of the flat spring f^3 . The pawl F is released from engagement with the table C, and said table is caused to bring the dial-holders into their positions under the rolls and spatulas in their regular order by the following means: Fitted on the upper central portion of the base A and concentric with the annular groove f^4 , formed by the base A and the lower flange of the table C, is the ring G. (See Figs. 1 and 3.)

The ring G is provided with projection g , that carries the ratchet-pawl g' on its upper side. (See Figs. 1 and 2.) The said pawl is kept with a yielding pressure against the flange f^2 of the table C by means of the flat spring g^2 . On the opposite side of the circumference of the said ring is a projection g^3 , carrying a pin g^4 . On the lower side of the pawl F is pivoted a lever f^5 , the arrangement of parts of the ring G and the pawl F being such that by the forward motion of the said ring the pin g^4 impinges upon the curved face of the lever f^5 , pressing it outward, thereby carrying with it the said pawl out of engagement with the index-notch f' in table C just before the ratchet-pawl g' , moving forward, is carried into engagement with a notch on the same flange, thereby causing the pawl F to be released before the ring G has completed its motion in a forward direction, the pin g^4 has passed by and off the curved surface of the lever f^5 , and the pawl F is permitted to drop into contact with the flange f^2 . When said motion is completed, the pawl F drops into the next notch and firmly locks the table C in that position until the next forward motion of the ring G. When the said ring is moved rearward, the ratchet-pawl rides out of the notch and does not move the table C. Continuing its rearward motion, it is necessary it should not disturb the position of the pawl F, therefore the lever f^5 has a lateral motion on its pivot, and is provided on its lower surface with a curved groove f^6 . The pin g^4 strikes the inner wall of said groove, and, continuing its motion, presses the lever f^5 inwardly until its motion is almost completed, when the said lever is released, and the action of the flat spring f^7 carries it back to its normal position against the pin f^8 .

The vibratory motion of the ring G is secured by the following means: Secured to the interior lower side of the base A is the frame II, and journaled in said frame is the shaft h , which at its upper end is provided with a crank-plate h' and between its bearings has secured to it a worm-wheel h^2 . The crank-plate is connected to the ring G by means of a rod h^3 , pivoted at its opposite end to a lever h^4 , said lever being connected by a stud

h^5 to ring G, and for better support has a bearing on the bushing a^3 in the center of base A. The collar a^4 prevents said lever from springing down and off said bushing during its vibratory motion. Journaled at right angles to the shaft h in the base A by means of the bushing a^5 is the shaft I, which at its inner end is provided with a worm i , that engages the teeth in the worm-wheel h^2 , and at its outer end has a flanged pulley i' for the driving-belt i^2 .

The alternate driving of the mechanism for rotating the table C and driving-roll and spatula-spindles is secured by the following means: Pivoted on the hangers J on the lower side of the bench to which the machine is fastened is the lever K, which at one end k is connected with the shipping-rods k' and k^2 for shifting the belts from the pulleys k^3 and k^4 to k^5 and k^6 by means of the chain M, the vibrating lever m , and spring-levers m' and m^2 .

N is a coiled spring surrounding an internal hub in the spring-levers m' and m^2 , having one end secured to the hanger and its other fixed to the lever, as shown in Fig. 6. The tension of the said spring in the lever m' serves to keep the belt normally on pulley k^3 for driving the rolls and spatula mechanism and a downward movement of the lever k by means of the chain and levers described causes the belts to be shifted from pulleys k^3 and k^4 to pulleys k^5 and k^6 , thus stopping the spatula-driving counter-shaft and causing the table rotating mechanism C to operate. The normal position of the lever K is shown in Fig. 1. The revolution of the disk L brings the pin n into contact with the lever n' , thereby causing the said lever n' to swing outward on its pivot n^2 , and the pin n^3 at the opposite end of the said lever impinges against the curved face of the lever n^4 , thereby causing the depression of the lever K at k . This action, as hereinbefore stated, causes the spatula and roll mechanism to cease and operate the table-rotating mechanism. As the lever K is depressed the opposite end is raised, carrying with it the roll O out of engagement with the face-cam o . The said cam makes one revolution, when its recess comes opposite the roller O again. The action of the coiled spring N in the lever m' causes the said roll to drop into the said recess, thereby causing the table-rotating mechanism to cease and again operate the roll and spatula mechanism. When the said roll has dropped into the said recess the lever n' , through the action of the spring k^7 , passes back to its normal position, as in Fig. 1, its pin n^3 passing through the curve-slot in lever n^4 , said lever n^4 having a lateral motion on its pivot n^6 .

The revolution of the disk L is caused by the following means: Fastened to the lower flange of the base A is the bracket P, and journaled in said bracket is the shaft p , which at one end is provided with the disk L and at its opposite end has the worm-wheel

p' . Journaled at right angles to the shaft p by means of the jacket p^2 , is the shaft p^3 , which near one end is provided with the worm p^4 and at its outer end has the grooved pulley p^5 . The worm p^4 engages with the teeth of worm-wheel p' . The pulley p^5 is connected with pulley m^5 on counter-shaft m^3 by means of a belt p^6 .

The object of the above-described mechanism is to limit the time of operating the roll and spatula mechanism necessary to the performing one operation in the enameling of a dial.

When the table-rotating mechanism is about to operate, it is necessary that the spatulas and rolls should be raised out of contact with the dials, and it is secured by the following means: Extending upward through bushings in the center of the base A is the vibrating spindle R. Attached to the upper end is the cam r , and secured to the lower end is the lever r' , said lever being furnished at its opposite free end with a roll r^2 , which extends upward, coming into contact with the periphery of the crank-plate h' , said plate having an irregular periphery, thereby forming also a cam. The lever r' is held with a yielding pressure against the surface of said cam by means of the flat spring r^3 . On the upper end of the frames B are pivoted the levers S, which have their inner ends provided with a roll s and their opposite forked end in contact with the collar a' on the spindle b . The cam r is provided with notches in which the rolls s rest when the said cam is in its normal position, (see Fig. 1;) but when the said cam is vibrated the rolls s are depressed, and the opposite forked end is correspondingly raised, thereby raising the spindle b by means of the collar a' and rolls and spatulas from contact with the dials, the arrangement of parts, as described, being such that during each revolution of the crank-plate h' and during the rotation of the table C the cam r is vibrated, and by the mechanism hereinbefore described the rolls and spatulas are raised from contact with the dials. When said rotation ceases and the dial-holders are again brought into their proper position under the rolls and spatulas, the cam r is allowed to resume its normal position through the action of the lever r' and the flat spring r^3 , thereby causing the rolls and spatulas to come again in contact with the next series of dials through the action of the spiral spring b^3 .

The operation of the machine is as follows: Rolls and spatulas are provided for but four of the dial-holders, so that one holder, preferably the one nearest the operator, is in condition for the ready insertion of a dial-copper or the removal of an enameled dial. In starting, the main driving mechanism is started and the table is automatically rotated one step, as hereinbefore described. At the completion of the double motion of the ring G which rotates the table C the rotating mechanism is

arrested and the mechanism for driving the rolls and spatulas is caused to operate. When they have operated long enough for the disk L to complete one revolution, the spatula and roll mechanism is arrested and the table rotated one more step, bringing the aforesaid dial-holders under the next roll or spatula. While the enamel on the first dial is being rolled out and partially smoothed by the first roll a second copper is placed in the next holder that has been rotated to the front, and when the said table has been rotated so that the first dial is now under the second roll the second dial is under the first roll. Each of the said rolls completes its work, and the first dial is now rotated under the third spindle, which carries a spatula which performs its operation, when said dial is now brought under the last spindle, which also carries a spatula and completes the smoothing of the enamel on the dial. The first dial is now rotated to the front, removed from the holder, and a new dial-copper inserted. By the mechanism shown and the arrangement of parts while four coppers are being acted upon simultaneously by the different rolls and spatulas one holder is in front ready for the removal of an enameled dial and the insertion of a dial-copper. If at any time it is necessary to use a less number of rolls and spatulas, the frames B can be swung aside on their posts a and be kept out of contact with the dials.

The method of journaling the table C, its rotating mechanism, and alternating mechanism hereinbefore described and shown are not claimed in this application, but is included in my application filed May 31, 1888, Serial No. 275,573, in which the aforesaid mechanism is shown, described and claimed.

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

1. As an improvement in mechanism for enameling dials, the combination of a series of rolls and spatulas which are adapted by successive action to roll and smooth the enamel, a holder or series of holders for dials, and mechanism for rotating said holder or holders from roll to roll and spatula to spatula, substantially as and for the purpose shown and described.

2. As an improvement in mechanism for enameling dials, the combination of a series of rolls and spatulas and operating mechanism thereof, substantially as described, a series of dial-holders which are adapted to present a series of dials simultaneously to said rolls and spatulas, and mechanism for moving the series of holders simultaneously to bring each into position under the next roll or spatula of the series, substantially as and for the purpose shown and described.

3. As an improvement in mechanism for enameling dials, the combination of a series of rolls and spatulas and operating mechanism, substantially as described, a rotary car-

riage or table having secured thereon a series of dial-holders, and mechanism alternating in its action with said roll and spatula mechanism to partially rotate said table and bring
5 each holder into position under the next roll or spatula of the series, substantially as and for the purpose set forth and described.

4. As an improvement in mechanism for enameling dials, an organized machine in
10 which are combined the following elements: one or more spindles, each provided with a roll, one or more spindles, each provided with a spatula, three or more holders, each adapted to hold a dial-blank, mechanism whereby said
15 holders may be successively moved into position under each roll or spatula, and mechanism whereby said holders may be securely locked in said position, substantially as and for the purpose shown and described.

20 5. As an improvement in dial-enameling machines, a machine in which are combined several revolving rolls and spatulas arranged around a part of a circle, an annular table adapted to rotate under said rolls and spatulas,
25 dial-holder exceeding in number the said rolls and spatulas and rotating with said table, a reciprocable ring that is journaled under said table, means whereby said ring automatically unlocks said table and rotates it forward one
30 step, means whereby said table is automatically locked in said position, and mechanism, substantially as described, whereby said rolls and spatulas are operated a limited time only when said table is at rest and are automati-
35 cally stopped and raised from contact with dials during the rotation of said table, substantially as and for the purpose shown and described.

6. As an improvement in the enameling of
40 dials, an automatic organization in which are combined a series of rolls and spatulas that are adapted by their successive action to roll down and smooth-finish the moistened enamel on a dial-copper, a series of dial-holders
45 which exceed said rolls and spatulas in number and secured within a table adapted to have a step-by-step rotation around its axis, mechanism whereby said rolls are lowered into contact with the dials when the said

table is at rest and automatically raised from
50 such contact when said table is about to rotate, mechanism whereby the operation of said rolls and spatulas is limited and their revolution stopped, and mechanism, substan-
55 tially as shown, whereby when said rolls and spatulas are raised and at rest the table C is being rotated, substantially as and for the purpose shown and described.

7. The combination of the base A, the ver-
60 tical studs *a*, the frames B, holding the rolls and spatulas *b'*, with their spindles *b*, the table C, supported by and capable of being rotated on said base, the holders D, each adapted to hold a dial-copper and rotate with
65 said table, and the ring G, fitted around said base and adapted to automatically disengage the pawl F from said table and rotate said table one step, substantially as and for the purpose specified.

8. As a means for holding the dial to be
70 enameled, the combination of the holder D, with its cupped recess *d'* a little deeper than the dial, the plunger E, with the flanged head *e*, and the lever *e'* and *e''*, substantially as and for the purpose shown and described. 75

9. As a means for raising and lowering the rolls and spatulas, the combination of the
cam-plate *h'*, the levers *r'*, roll *r''*, and flat spring *r'''*, the spindle R, the multiple cam-plate *r*, the levers S, with their rolls *s*, the
80 spindles *b*, with their collars *a'*, and springs *b'''*, substantially as and for the purpose shown and described.

10. As a means for limiting the time of op-
erating the roll and spatula spindles *b*, the
85 combination of the disk L, the pin *n*, the lever *n'*, the compound lever K, the chain M, the double lever *m*, the rod *m''*, and the spring-lever *m'*, with its shipping-rod *k'*, and the counter-shaft *m'''*, with its tight and loose pul-
90 leys, substantially as and for the purpose set forth.

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

THOS. F. SHERIDAN.

Witnesses:

C. W. BLODGETT,

GEORGE A. BATES.