

H. HENRICH.
MACHINE FOR ROLLING FINGER RINGS.
APPLICATION FILED JUNE 2, 1910.

1,026,983.

Patented May 21, 1912.

6 SHEETS-SHEET 1.

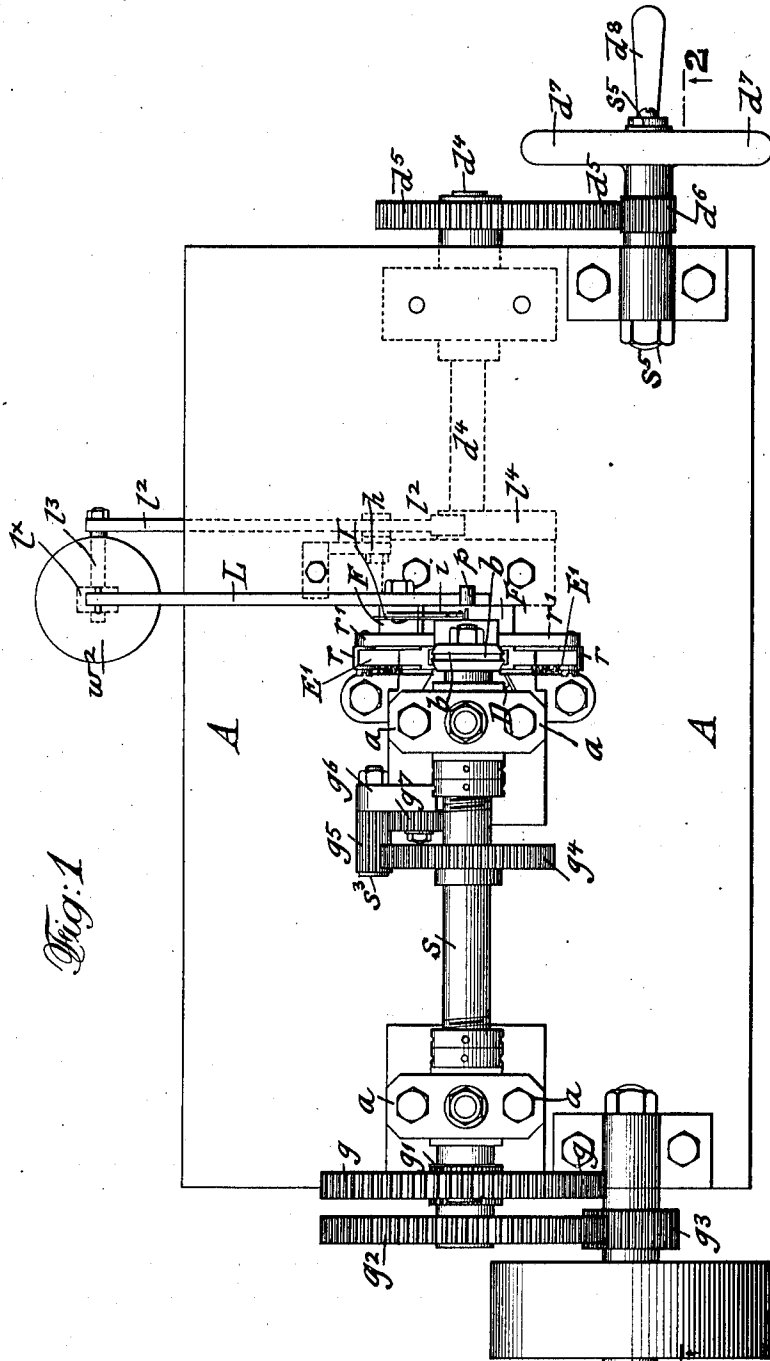


Fig. 1

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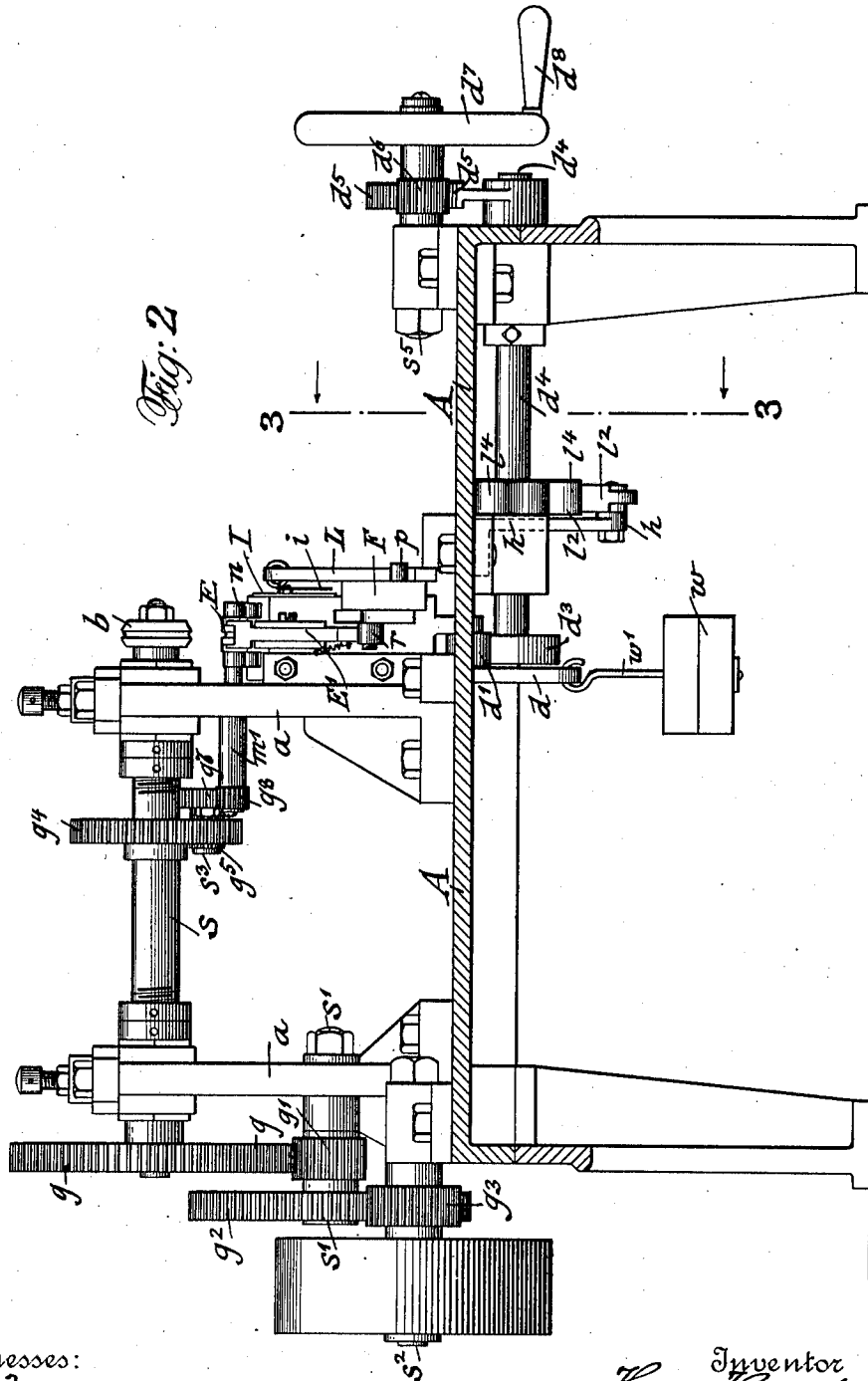
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By his Attorneys
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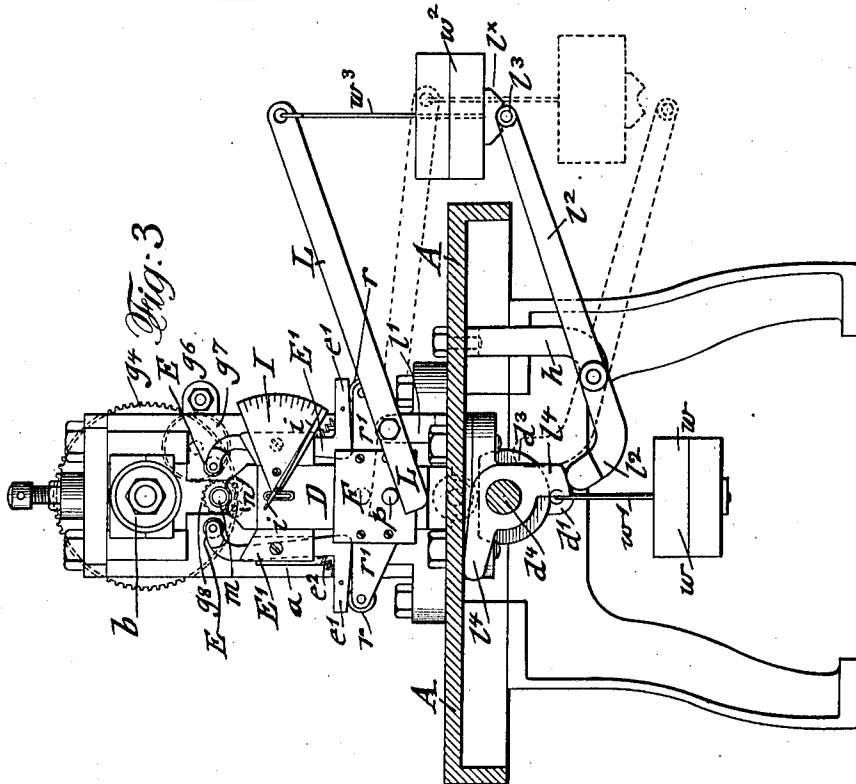
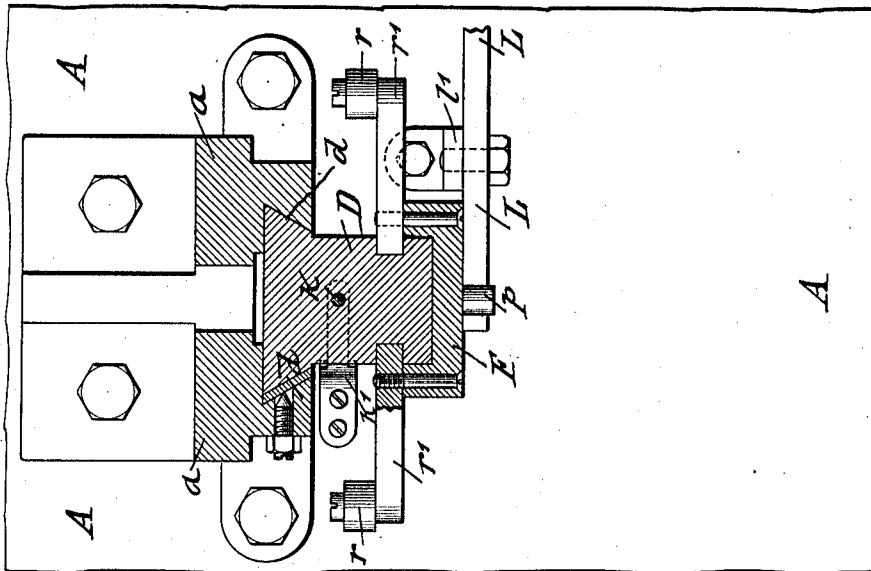
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6 SHEETS—SHEET 3.

Fig. 4



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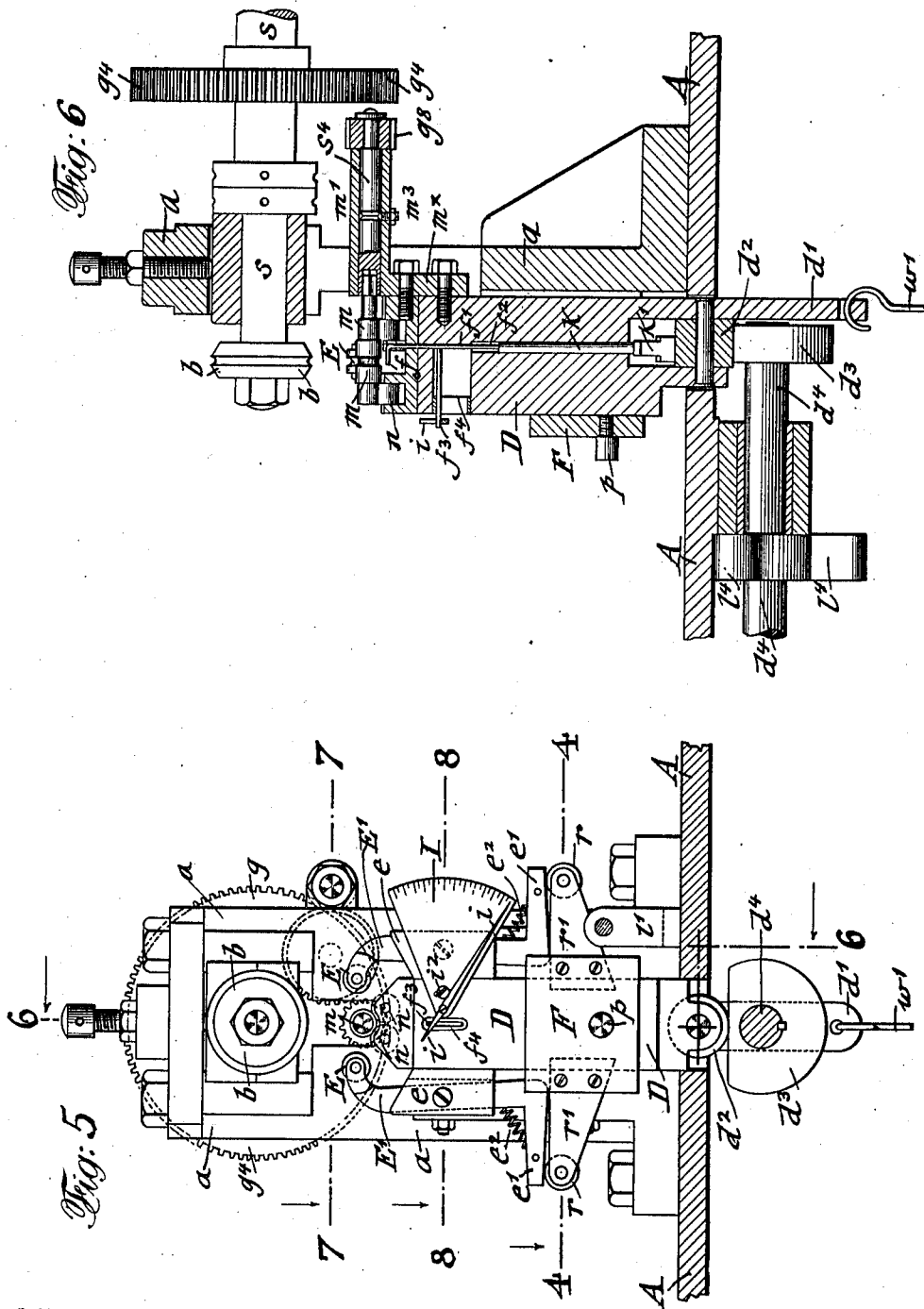
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6 SHEETS—SHEET 4.



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6 SHEETS—SHEET 5.

Fig. 8

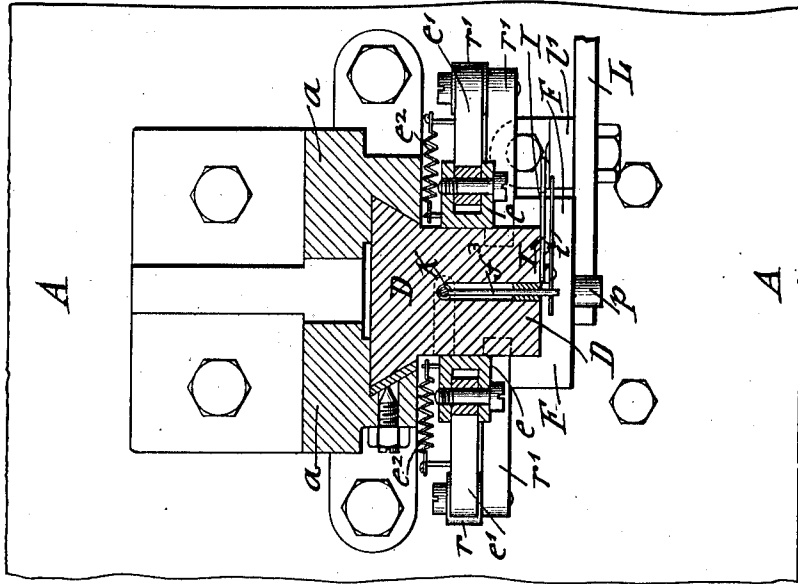
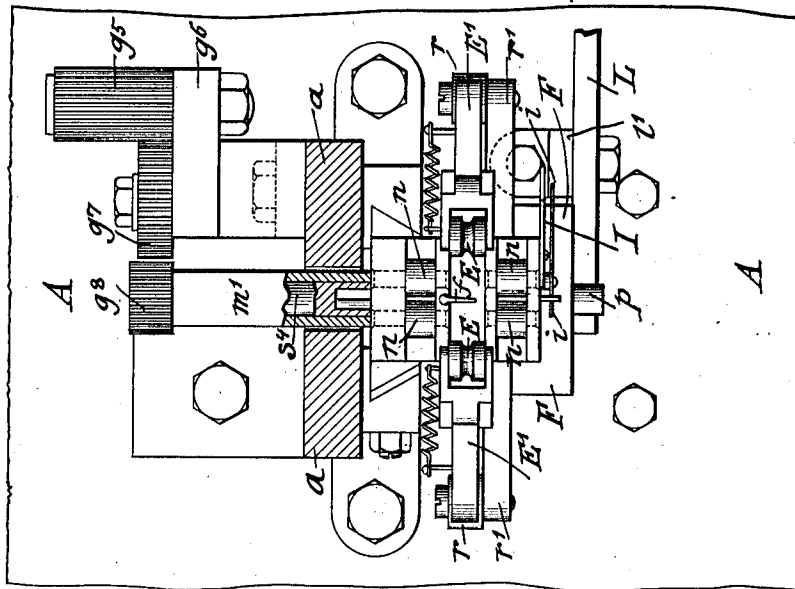


Fig. 7



Witnesses:
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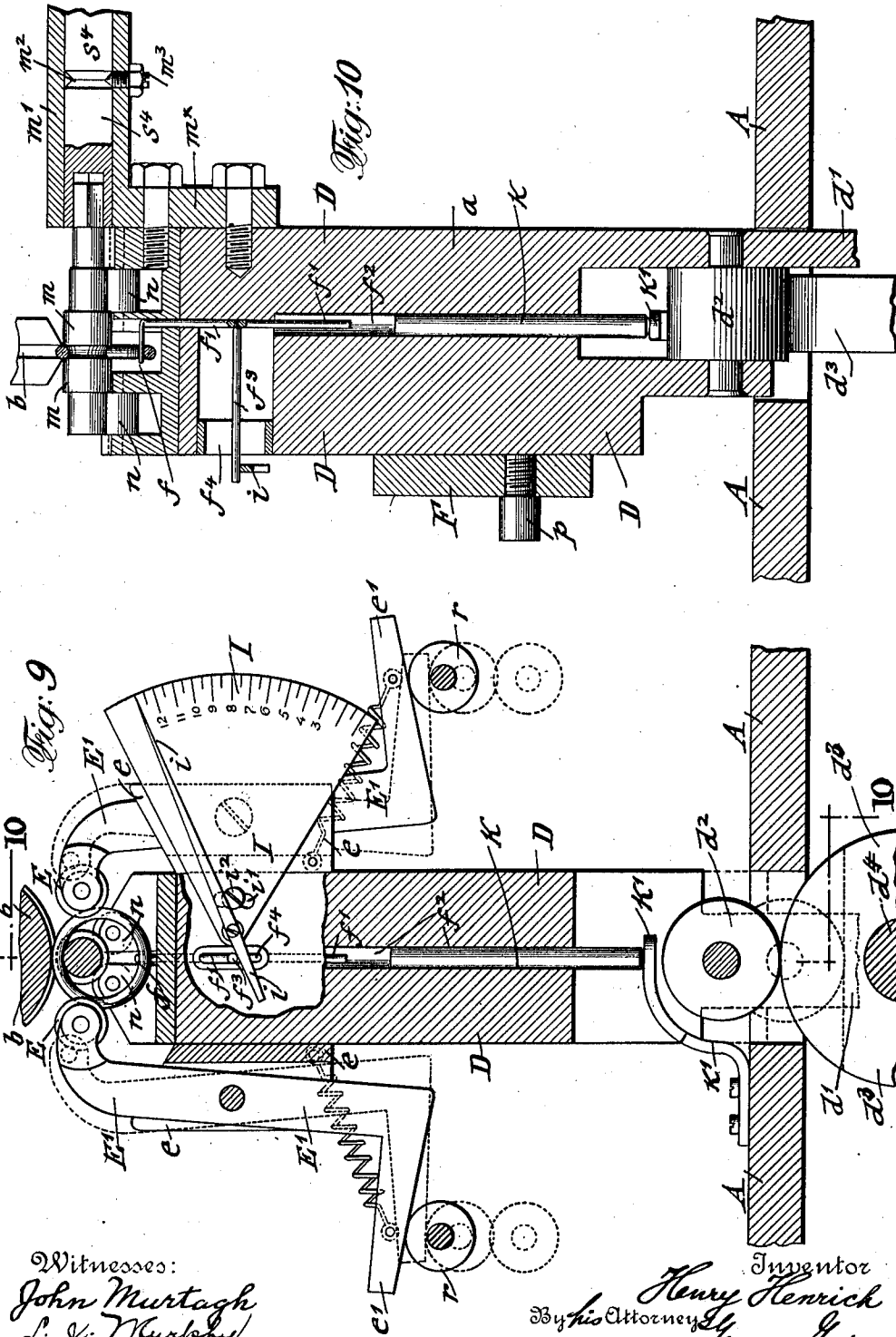
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6 SHEETS—SHEET 6.



Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY HENRICH, OF NEW YORK, N. Y.

MACHINE FOR ROLLING FINGER-RINGS.

1,026,983.

Specification of Letters Patent.

Patented May 21, 1912.

Application filed June 2, 1910. Serial No. 564,635.

To all whom it may concern:

Be it known that I, HENRY HENRICH, a citizen of the United States of America, residing in New York, in the borough of Manhattan, county and State of New York, have invented certain new and useful Improvements in Machines for Rolling Finger-Rings, of which the following is a specification.

10 This invention relates to an improved machine for rolling seamless finger-rings in which the blanks, which are formed by means of dies, are transformed into a completely finished ring of the required size and cross-section, the size to be produced being accurately controlled by a visual index so as to permit the removal of the finished ring at the proper time.

20 The invention consists of a machine for rolling finger-rings which will be fully described in detail hereinafter, and of which the novel features will be pointed out in the claims, in connection with the accompanying drawings, forming a part of this specification, in which,

Figure 1 is a plan-view of my improved machine for rolling finger-rings, Fig. 2 is a side-elevation of the same, partly in vertical longitudinal section on line 2, 2, Fig. 1, Fig. 3 is a front-elevation, partly in vertical transverse section on line 3, 3, Fig. 2, Fig. 4 is a horizontal section on line 4, 4, Fig. 5, drawn on a larger scale, Fig. 5 is a front-elevation of the operating parts of the machine for rolling finger-rings, drawn on a larger scale and partly in section through the supporting table, Fig. 6 is a vertical transverse section on line 6, 6, Fig. 5, Figs. 7 and 8 are horizontal sections respectively on lines 7, 7 and 8, 8, Fig. 5, Fig. 9 is a detail vertical section showing the mandrel and operating rollers in operation for rolling a finger-ring, and Fig. 10 is a vertical transverse section on line 10, 10, Fig. 9.

45 Similar letters of reference indicate corresponding parts throughout the different figures of the drawings.

Referring to the drawings, A represents the table of my improved machine for rolling finger-rings. On the table are supported two upright standards *a*, which are provided with journal-bearings for a horizontal main-shaft *s* that is provided at the front-end with a grooved ring-forming roller *b*, while to the other end is keyed a gear-wheel *g* that meshes with a pinion *g*¹

on a short intermediate shaft *s*¹, said shaft carrying a gear-wheel *g*² which meshes with a pinion *g*³ on the driving shaft *s*² to which motion is imparted by a suitable belt and pulley transmission from an overhead shaft. The gear-wheel transmission imparts continuous rotary motion to the main-shaft *s*. The shaft *s* can be adjusted longitudinally in its bearings by means of nuts and jam-nuts located adjacent to the journal-bearings and engaging exterior screw-threads on the shaft, said nuts and jam-nuts being provided with socket-holes for inserting a lever for turning the nuts when the longitudinal adjustment of the main-shaft and of the grooved ring-forming roller *b* is to be accomplished. On the main-shaft *s* is mounted at a point intermediately between the standards *a* a gear-wheel *g*⁴ which meshes with a pinion *g*⁵ on a short shaft *s*³ that is supported in a bracket-bearing *g*⁶ which is attached to the front upright standard *a*. The pinion *g*⁵ meshes with a gear-wheel *g*⁷, the shaft of which turns also in a bearing of the bracket *g*⁶. Adjacent to the gear-wheel *g*⁷ is arranged a pinion *g*⁸ which is keyed to the rear-end of a mandrel-spindle *s*⁴, the front end of which is provided with a square socket for inserting the mandrel *m* on which the ring-blank is placed. The mandrel-spindle *s*⁴ is supported in a sleeve-shaped bearing *m*¹ which is provided with a rectangular arm *m*^x that is bolted to a vertical slide-piece D, as shown in Fig. 6, the dove-tailed rear-portion of which is guided in corresponding ways *d* on the front-standard *a*, said slide-piece being provided with an extension *d*¹ at its lower end that extends through an opening in the table A and is provided with a counterweight *w* which is suspended by means of a rod *w*¹ having a hook-shaped upper end from the lower end of the extension *d*¹, as shown in Fig. 3. When the slide-piece D is in its lowermost position of rest, the pinion *g*⁸ at the rear-end of the mandrel-spindle is out of mesh with the gear-wheel *g*⁷, but when the slide-piece is raised, the pinion *g*⁸ intermeshes with the gear-wheel *g*⁷ so that rotary motion is imparted to the mandrel-spindle and the mandrel *m* in the front-end of the same by the gear-wheel transmission *g*³, *g*², *g*¹, *g*, *g*⁴, *g*⁵, *g*⁷ and *g*⁸. The mandrel-spindle *s*⁴ intermediately of its length is provided with a circumferential groove *m*² that is engaged by a set-screw *m*³ for holding the mandrel-

spindle in proper position in its sleeve-shaped bearing. The mandrel m is provided with a groove corresponding in size and shape with the ring to be rolled from the blank; different sizes and shapes requiring correspondingly-grooved mandrels. Below the mandrel are arranged at the upper end of the slide-piece D two pairs of supporting rollers n for the cylindrical ends of the mandrel. The mandrel is provided with shouldered portions between the supporting rollers for increasing the thickness of and preventing the bending of the mandrel and the shifting of the same in longitudinal direction.

The inner end of the mandrel m is made of square shape so as to fit into the corresponding socket of the mandrel-spindle, the construction of the parts being such as to permit of its being removed past the rollers n . The mandrel is easily detachable or removable and therefore interchangeable. Thus the machine is readily adapted to the rolling of rings of different sizes corresponding to the size of the mandrel employed. At both sides of the mandrel are arranged guide-rollers E which are provided with grooves for holding the ring-blank, said guide-rollers being pivoted to the upper ends of elbow-levers E^1 that are fulcrumed to wing-shaped brackets e at opposite sides of the slide-piece D, the lower arms e^1 of the elbow-levers extending in outward direction and resting on antifriction-rollers r which are supported on bracket-arms r^1 attached to an auxiliary slide-plate F and moving with the same so as to turn the elbow-levers E^1 with the guide-rollers E in inward direction for holding the ring-blank, as shown in full lines in Fig. 9, or in outward direction, as shown in dotted lines in Fig. 9, when the auxiliary slide-plate and slide-piece are lowered for removing the finished ring. The outwardly-extending arms e^1 of the elbow-levers E^1 are connected by helical springs e^2 with stationary points on the slide-piece D, so that the guide-rollers are moved away from the ring-blank when the slide-plate F is lowered. The lower end of the slide-piece D is provided with an antifriction-roller d^2 which is engaged by a cam d^3 that is keyed to a shaft d^4 which extends in forward direction toward the front-end of the table A and which turns in suitable journal-bearings at the under-side of the table. At the front-end of the shaft d^4 is arranged a toothed segment d^5 which meshes with a pinion d^6 on a short shaft s^5 that turns in a journal-bearing on the table A, said shaft being provided with a hand-wheel d^7 having a crank-handle d^8 for turning the pinion d^6 , and by the toothed segment d^5 the cam-shaft d^4 . The cam d^3 engages the antifriction-roller d^2 of the slide-piece D and lifts thereby all the parts supported by the same until

the mandrel, its supporting rollers and the guide-rollers arrive in the operating position shown in Fig. 9. During the upward motion of the slide-piece D, the fulcrumed elbow-levers E^1 are pressed inwardly by the rollers r so that the parts required for rolling the finger-ring are then in their operating position. Power is then applied to the driving shaft s^2 and the main-shaft and the ring-forming roller b on the latter rotated, while simultaneously the mandrel receives positive rotary motion by the intermediate gearing g^4, g^5, g^7, g^8 , so that the blank is turned and the required shape given to the ring.

The auxiliary slide-plate F is arranged at the front of the slide-piece D and guided thereon. In its center-line is arranged a projecting pin p which is engaged by the lower end of a weighted lever L which is fulcrumed to a stud l^1 sidewise of the slide-plate F and which extends laterally over the table, its balance-weight w^2 being suspended by a hooked rod w^3 from the outer end of the lever L, as shown in Fig. 3. The weight w^2 of the slide-plate serves for counterbalancing the weight w of the slide-plate F and of the parts attached thereto and facilitates the lifting of the slide-plate so as to bring it from its lowermost position of rest into the working position. A second lever l^2 is placed by a cross-pin l^3 at its outer end in contact with the lower end of the holder l^4 of the counterbalancing weight w^2 , said lever being approximately parallel with the lever l^1 and fulcrumed to a curved hanger h below the table A and extending inwardly toward the cam-shaft d^4 , the inner end of the lever l^2 being rounded off and placed in contact with an elbow-shaped cam l^4 that is mounted on the shaft d^4 . One end of the elbow-shaped cam l^4 serves to return the lever l^2 and the weight w^2 into the raised position, while the other end serves as a stop for holding the lever l^2 in this position, as shown in Fig. 3. In this position of the levers L and l^2 , the slide-piece D and the slide-plate F are in their lowermost position of rest. As soon as the cam-shaft d^4 is turned by the hand-crank at the front-end of the machine, the lower end of the cam l^4 releases the inner end of the lever l^2 and permits to move by its middle portion the lever l^2 into its lowermost position, as shown in dotted lines in Fig. 3, so that the weighted lever L can lift the slide-plate F simultaneously with the lifting of the slide-piece D by its cam d^3 . When the slide-piece D is returned into its lower position by turning the cam-shaft d^4 in opposite direction, the cam l^4 reengages the end of the lever l^2 and returns it in upward direction for lifting the weight w^2 and holding it in this position until the slide-piece is again to be lifted by the actuation of the hand-crank and intermediate gearing

for rolling the next blank. The lever l^2 and cam l^4 form thereby an auxiliary device for producing the lowering and raising of the auxiliary weight w^2 and of the auxiliary slide-plate F and the moving inwardly and outwardly of the guide-rollers E by the rollers r of the slide-plate F and elbow-levers of the slide-piece D.

For the purpose of indicating the required size of the ring, a horizontal finger f , is located below the mandrel and extended over the lower part of the ring-blank, said finger being arranged at the upper end of a vertical rod f^1 that is guided in a vertical bore f^2 of the slide-piece D, said vertical rod being provided with a forwardly-extending rod f^3 which passes through an elongated slot f^4 in the slide-piece D to the outside of the same and engages the lower end of an index or pointer i , which is fulcrumed to a sector-shaped scale-plate I that is attached to the upper front-part of the slide-piece D and provided with graduations at its outer arc-shaped end so as to indicate the different sizes of finger-rings to be rolled. As soon as the pointer i arrives at the number corresponding to the size of the ring, the motion of the mandrel-spindle is interrupted, the slide-piece returned to its lower position by means of the hand-crank, by which motion the guide-rollers are moved sidewise of the mandrel, owing to the return of the slide-plate by its counterweight, so that the completed ring can be removed with the mandrel by removing the latter from its socket. A new blank is then placed on the mandrel and the same returned to its position in its spindle. During the downward motion of the slide-piece into its lowermost position of rest the vertical shank f^1 of the finger f forms contact with a slide rod k which is located in the bore f^2 below the shank f^1 and supported on a stationary arm k^1 that is attached to the table A sidewise of the slide-piece D, so that the finger is lifted, together with its horizontal arm f^3 , and placed into a position close to the mandrel, while the pointer is returned to the starting point on the scale, as shown in Figs. 5 and 6. The scale-plate I is provided with an arc-shaped slot i^1 , concentric with the fulcrum of the pointer i , by which the scale-plate may be adjusted on its clamping screw i^2 slightly higher or lower so as to permit the adjustment of the scale-plate to different sizes of ring-blanks. After the scale is adjusted and the pointer set to the proper graduation on the scale, the latter is clamped in position by the clamping screw and the special size of rings rolled until the desired quantity of the rings of a certain size is obtained.

The rolling of the blank into a finger-ring of the proper size is accomplished in the same manner as in finger-ring rolling ma-

chines heretofore in use, and requires no special description in addition to the operation hereinbefore described in connection with the rolling parts of the machine. The new and important feature resides in the arrangement of the slide-plate and its counterweighted lever, cam and return-lever, by which the motion of the slide-plate and of the guide-roller carrying elbow-levers is reliably performed and the slide-plate held in its lower position of rest by supporting the counterweight in normal position by the lower counter-lever and its weight-actuating and locking cam. Both weights, the weight of the slide-piece and the weight of the slide-plate operating lever, balance each other, the weight of the slide-piece rising when the actuating weight of the slide-plate descends, and vice versa, so that the up and down motion of both slide-piece and slide-plate are performed without jar or shocks and in strict response to the motion of the hand-operated cam-shaft when turned in one direction or the other.

The advantages of the improved construction of the machine for rolling finger-rings are, first, that the operating parts are accessible from the front-end of the machine so as to permit the convenient insertion of the blanks and removal of the finished rings; second, that the mandrel can be readily removed from and replaced in the spindle so as to facilitate and expedite the insertion of the blanks and removal of the finger-rings; third, that the operating parts are readily raised toward the grooved ring-forming roller and lowered again after the finger-ring has been rolled into proper shape, which is due to the counterbalancing of the weights of the slide-piece and slide-plate; fourth, that the mandrel being supported at both ends by two pairs of rollers, gives a solid support to the blank and performs the rolling operation in connection with the ring-forming roller and the guide-rollers in a positive and reliable manner; and, lastly, that by the size-indicating scale and finger the rolling of the blank into the required size of ring can be readily observed and the motion of the rolling parts immediately interrupted as soon as the index or pointer arrives at the number corresponding with the desired size of ring to be rolled.

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

1. The combination of a ring forming roller, two pairs of mandrel supporting rollers, and a mandrel having an annular working face and supported at opposite ends and opposite sides by said rollers between the same and said ring forming roller and having said working face between said working rollers.

2. In a machine for rolling finger-rings, the combination of a main-shaft, gearing for rotating the same, a grooved ring-forming roller on said shaft, a mandrel-spindle, a mandrel inserted in said spindle, two pairs of supporting rollers for said mandrel, means for raising or lowering said supporting rollers and the mandrel-spindle, and gearing between the main-shaft and the mandrel-spindle for rotating the mandrel-spindle when raised.
3. In a machine for rolling finger-rings, the combination of a grooved ring-forming roller, means for rotating the same, a mandrel-spindle, a detachable mandrel below said roller, two pairs of rollers for supporting the ends of the mandrel, a vertically-guided slide-piece supporting the mandrel-spindle and mandrel-supporting rollers, grooved guide-rollers, one at each side of the mandrel, and means for actuating the same for moving them toward or away from the mandrel.
4. In a machine for rolling finger-rings, the combination of a main-shaft, means for rotating said shaft, a grooved ring-forming roller attached to the front-end of said shaft, a mandrel-spindle, a vertically movable slide-piece provided with a bearing for said mandrel-spindle, a mandrel inserted in said spindle, gearing between the shaft of the grooved roller and the mandrel-spindle for rotating the latter when the slide-piece is raised, two pairs of rollers for supporting the mandrel, grooved guide-rollers, one at each side of the mandrel, and means for moving them in and out of contact with the ring-blank.
5. In a machine for rolling finger-rings, the combination of a main-shaft, gearing for imparting rotary motion to the same, a grooved ring-forming roller at the front-end of said shaft, a vertically reciprocating slide-piece, a mandrel-spindle supported in a journal-bearing of said slide-piece, a mandrel inserted in the front-end of said mandrel-spindle, two pairs of supporting rollers for said mandrel, laterally movable guide-rollers, and means for moving the guide-rollers in contact with the ring-blank or away from the same.
6. In a machine for rolling finger-rings, the combination of a main-shaft, gearing for imparting rotary motion to the same, a grooved ring-forming roller at the front-end of said shaft, a vertically reciprocating slide-piece, a mandrel-spindle supported in a journal-bearing of said slide-piece, a mandrel inserted in the front-end of said mandrel-spindle, two pairs of supporting rollers for the mandrel, grooved guide-rollers, one at each side of the mandrel, fulcrumed and spring-actuated elbow-levers for supporting said guide-rollers, an auxiliary slide-plate provided with bracket-arms having anti-friction-rollers contacting with the lower arms of said elbow-levers, and means for raising the auxiliary slide-plate independently of the slide-piece for placing the guide-rollers in operative position relatively to the mandrel.
7. In a machine for rolling finger-rings, the combination of a mandrel-spindle, a vertically reciprocating slide-piece provided with a bearing for supporting the mandrel-spindle, a mandrel inserted in said mandrel-spindle, two pairs of rollers for supporting the ends of the mandrel, an auxiliary slide-plate guided on the slide-piece and provided with brackets having antifriction-rollers, fulcrumed and spring-actuated elbow-levers actuated by said rollers, guide-rollers at the upper ends of said elbow-levers, means for imparting vertically reciprocating motion to said slide-piece, and means for imparting motion to the auxiliary slide-plate for actuating the elbow-levers and placing the guide-rollers into proper relative position to the mandrel.
8. In a machine for rolling finger-rings, the combination of a mandrel, a ring-forming roller above the same, two pairs of rollers for supporting the ends of the mandrel, fulcrumed and spring-actuated elbow-levers, guide-rollers supporting by said elbow-levers a slide-piece, means for actuating the slide-piece, an auxiliary slide-plate guided on said slide-piece and provided with means for oscillating the elbow-levers, and means for operating the auxiliary slide-plate independently of the slide-piece.
9. In a machine for rolling finger-rings, the combination of a mandrel, a mandrel-spindle, a ring-forming roller above said mandrel, supporting rollers for said mandrel, guide-rollers arranged at both sides of the mandrel, a vertically-guided and weighted slide-piece, means for raising or lowering the slide-piece, an auxiliary slide-plate guided on said slide-piece, a lever mechanism engaging said slide-plate, and means for actuating said lever mechanism independently of the means for raising or lowering the slide-piece.
10. In a machine for rolling finger-rings, the combination of a mandrel-spindle, a vertically reciprocating slide-piece provided with a counterweight, means for raising or lowering said slide-piece, an auxiliary slide-plate guided on the main slide-piece and provided with laterally-extending brackets having antifriction-rollers, a weighted lever engaging said auxiliary slide-plate, spring-actuated elbow-levers fulcrumed to the slide-piece above said brackets, grooved guide-rollers at the upper ends of the elbow-levers, a weighted lever mechanism engaging the auxiliary slide-plate, and means for re-

leasing said lever mechanism for raising the auxiliary slide-plate independently of the slide-piece.

11. In a machine for rolling finger-rings,
5 the combination of a mandrel, a ring-forming roller above the same, two pairs of rollers for supporting the ends of the mandrel, guide-rollers, fulcrumed and spring-actuated elbow-levers supporting said guide-
10 rollers, a slide-piece, a counterweight for the same, means for actuating the slide-piece, an auxiliary slide-plate guided on said slide-piece and provided with means for moving the elbow-levers, a weighted lever engaging
15 the auxiliary slide-plate, an auxiliary lever

fulcrumed below the weighted lever and co-operating with said weighted lever, a cam-shaft, cams for actuating the slide-piece and the weighted lever, and means for turning the cam-shaft for actuating the slide-piece 20 and slide-plate and placing the ring-forming parts in operative position.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

HENRY HENRICH.

Witnesses:

PAUL GOEPEL,
FANNIE FISK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."