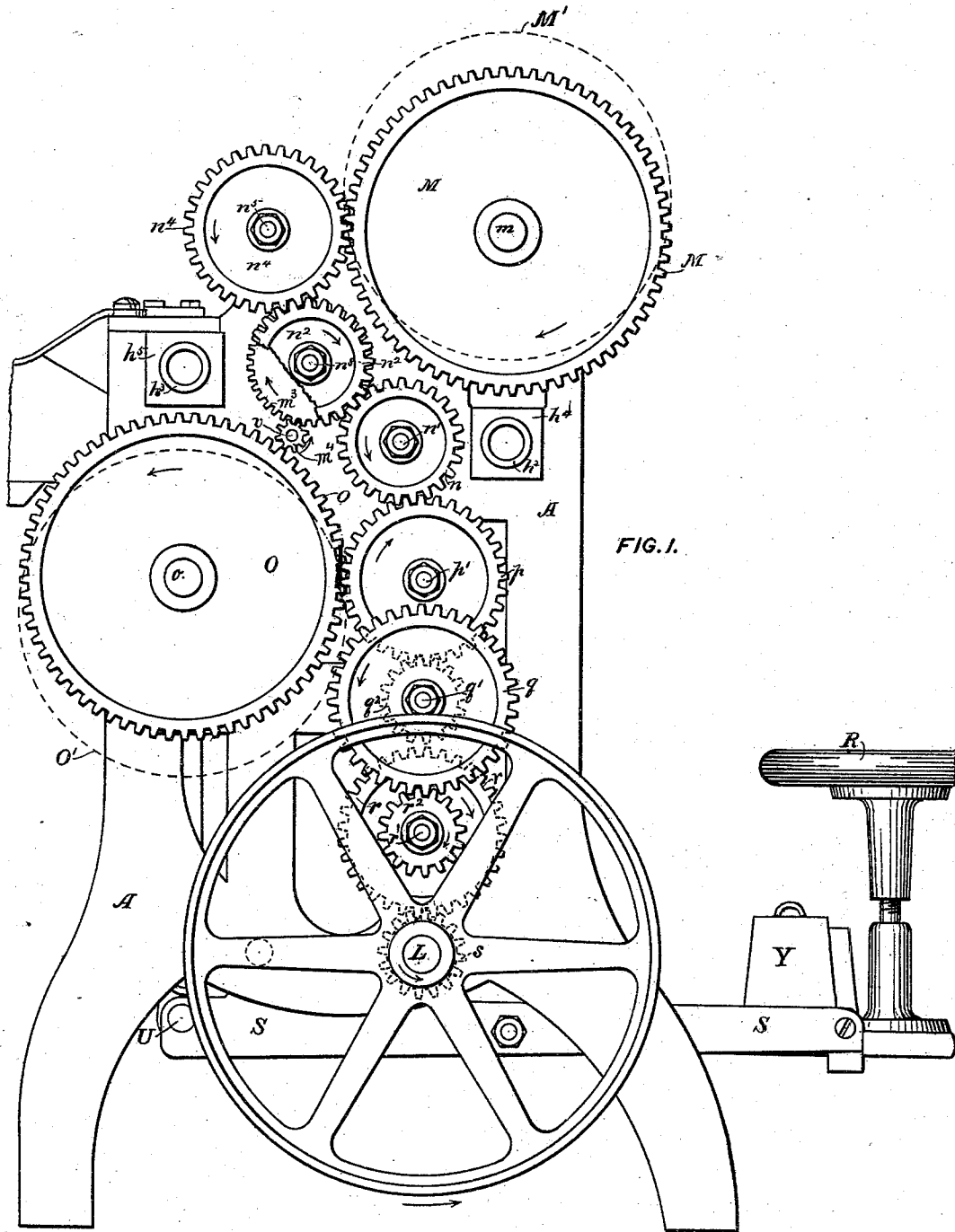


T. S. WILES.  
IRONING APPARATUS.

No. 177,908.

Patented May 23, 1876.



**WITNESSES:**

William A. Rousseau  
James Thorn Goodfellow.

***INVENTOR:***

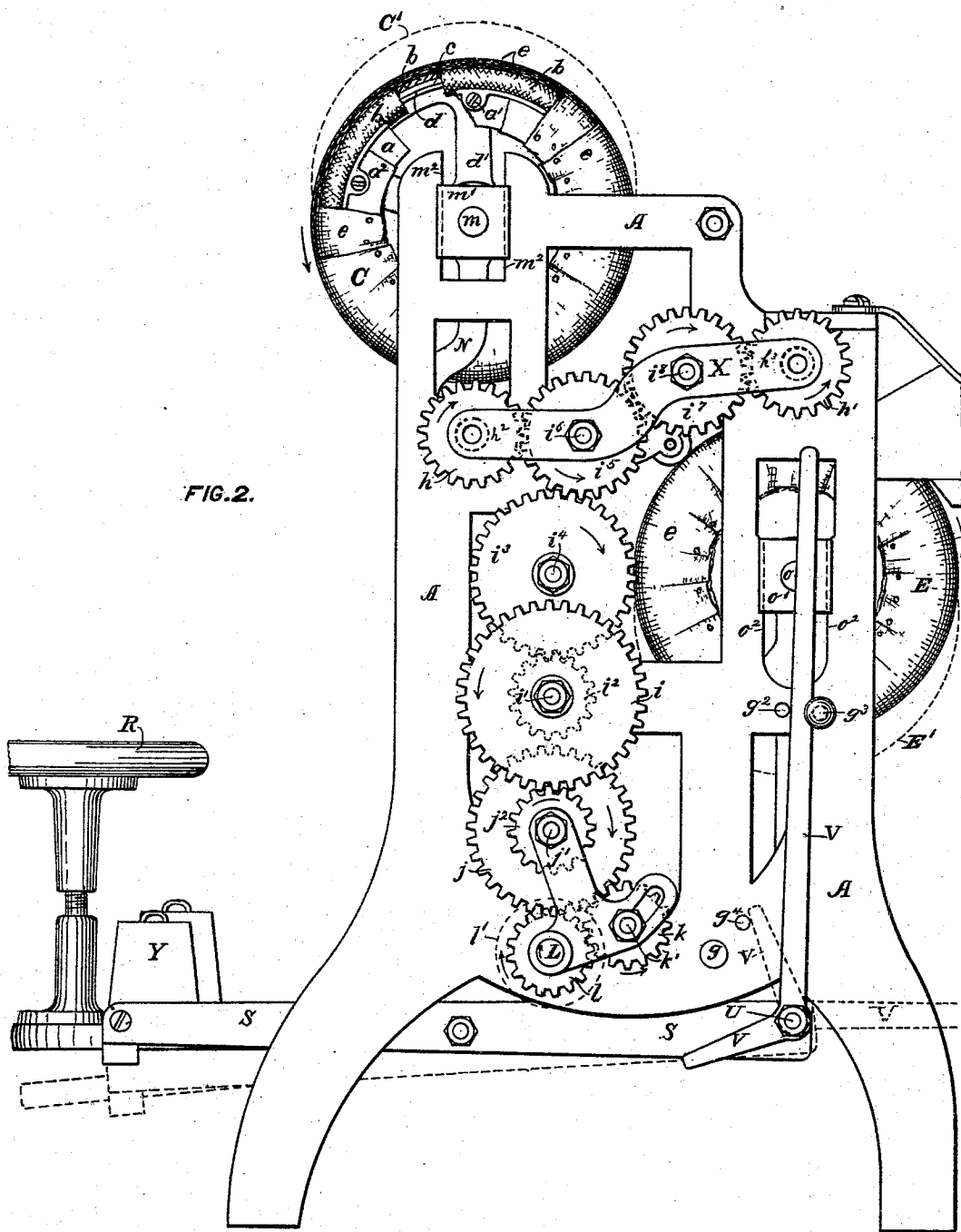
Thomas Shires Wiles  
by Austin F. Park.  
attorney.

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FIG. 2.



WITNESSES:

William A. Rousseau  
James Thorn Woodfellow

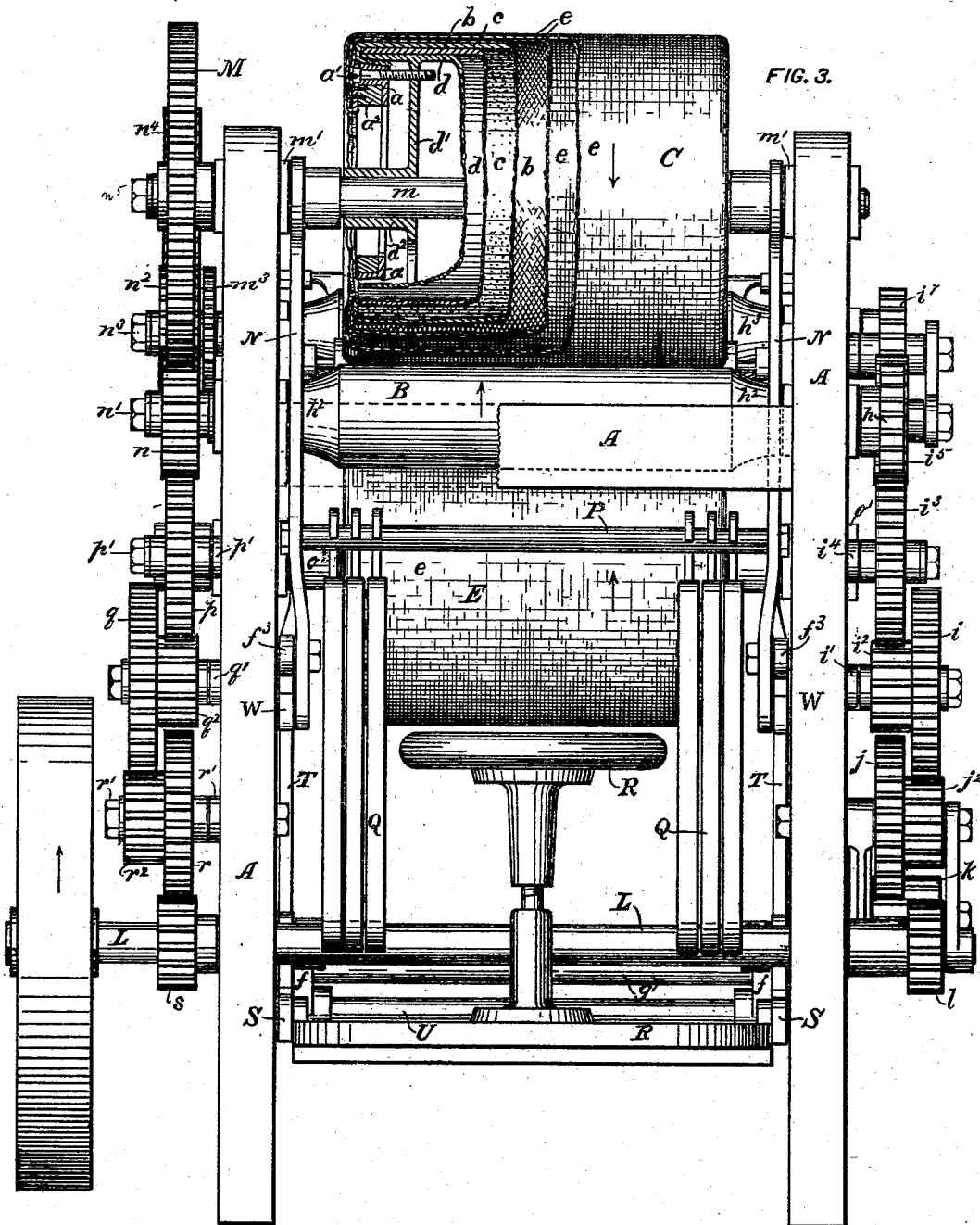
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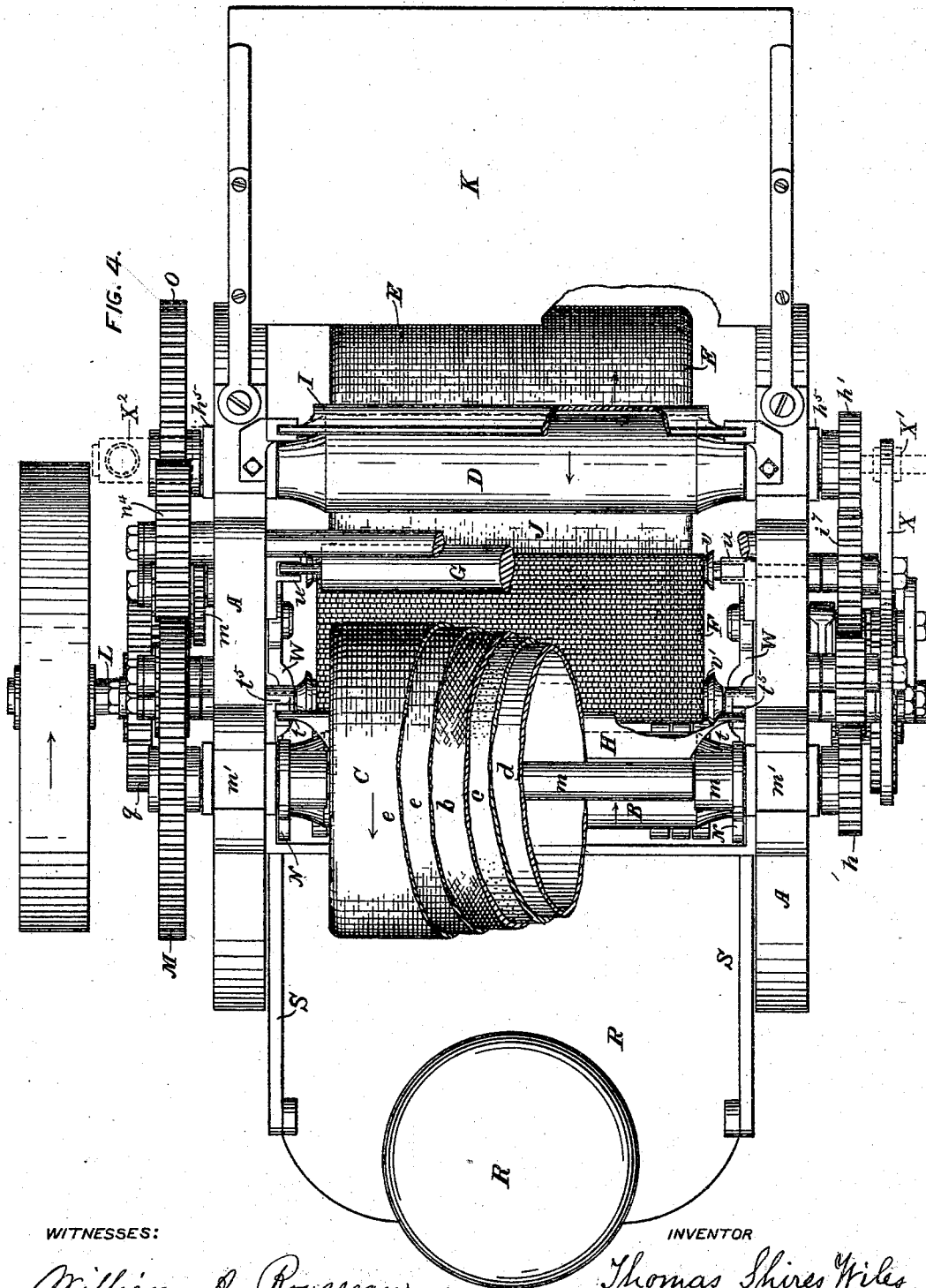
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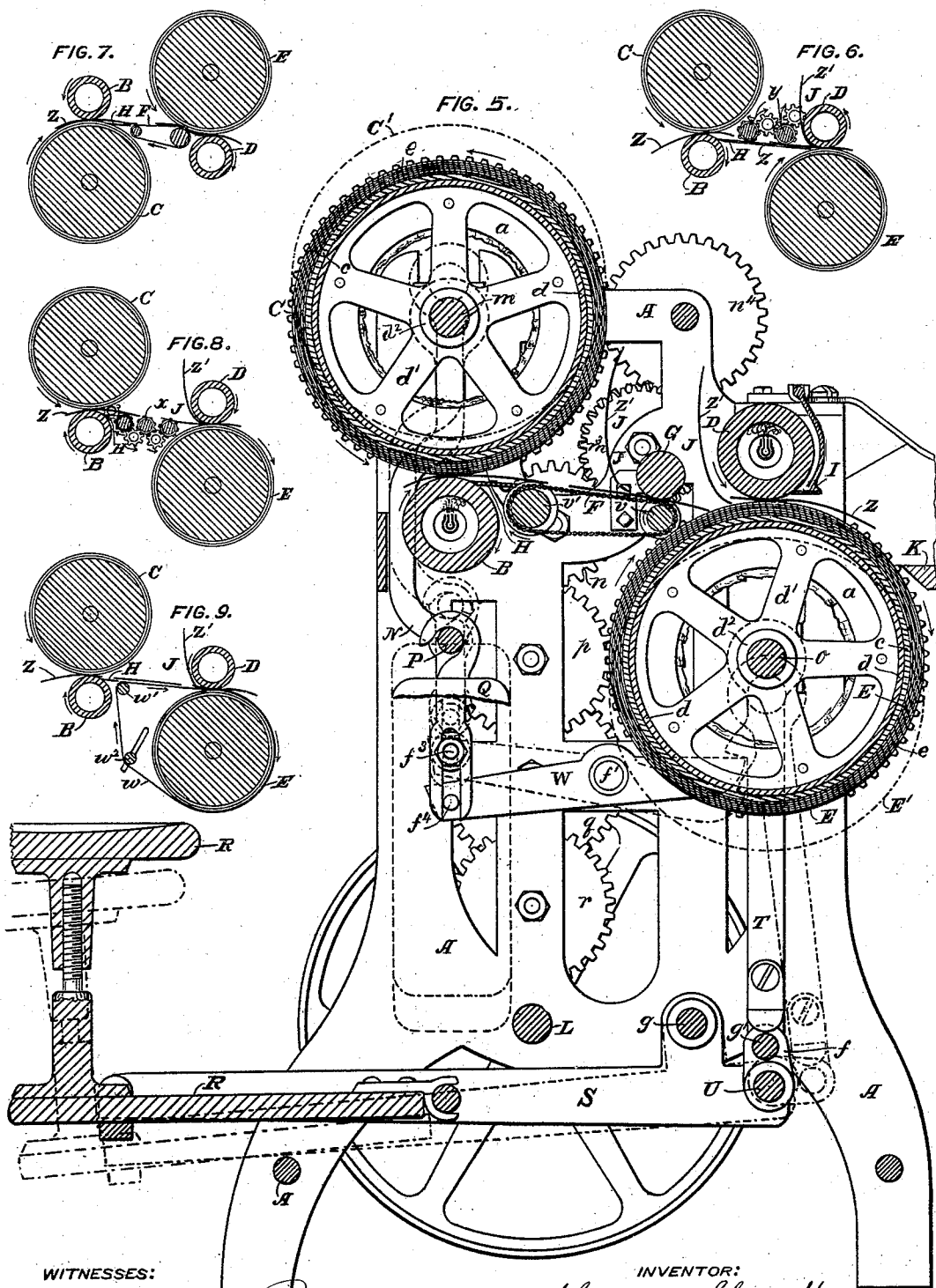
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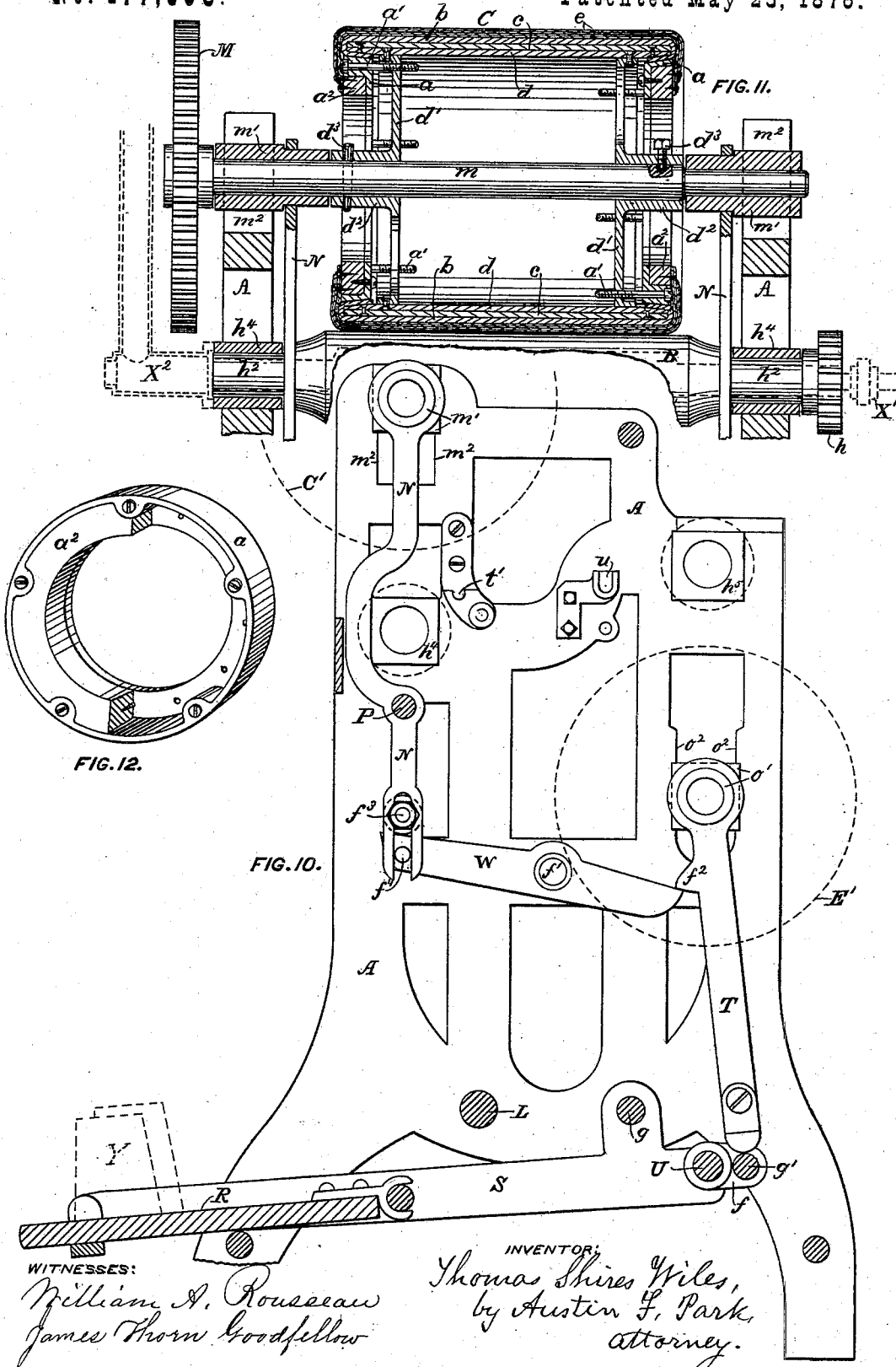
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by Austin L. Park,  
attorney.

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William A. Rousseau  
James Thorn Goodfellow

INVENTOR:

Thomas Shires Wiles,  
by Austin F. Park,  
attorney.

# UNITED STATES PATENT OFFICE.

THOMAS S. WILES, OF ALBANY, NEW YORK, ASSIGNOR OF ONE-HALF HIS  
RIGHT TO ALONZO PELTON ADAMS, OF SAME PLACE.

## IMPROVEMENT IN IRONING APPARATUS.

Specification forming part of Letters Patent No. **177,908**, dated May 23, 1876; application filed  
April 27, 1876.

### *To all whom it may concern:*

Be it known that I, THOMAS SHIRES WILES, of the city of Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Ironing-Machines, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to ironing-machines in which the ironing of articles of cloth is accomplished by a metallic roller or metallic rollers, hereinafter called an "ironing-roller" or "ironing-rollers," adapted to be heated internally, and having a hard, smooth surface, turning with and against a roller or rollers, hereinafter called a "clothed roller" or "clothed rollers," having an elastic covering, with a surface of muslin, or other suitable cloth or fabric which will absorb and discharge moisture, and against which the articles will not slip so easily as against the ironing roller or rollers in passing between the rollers in being ironed thereby, and which elastic covering will temporarily yield to hems, seams, and other thick parts of the articles, so as to materially prevent undue and injurious strain and compression thereof, and tend to equalize the ironing action of the rollers upon the thin and thick parts of the articles. One such ironing-roller and such a clothed roller, arranged to turn together in surface-contact, are generally hereinafter called a "set" of ironing and clothed rollers.

An ironing-machine was heretofore devised with separate sets of ironing and clothed rollers, arranged reversely to each other, and operated substantially as described in United States Letters Patent No. 145,034, dated November 25, 1873, so that articles of sufficient length to reach from one set of the ironing and clothed rollers into the next adjacent set, and of sufficient stiffness, would be passed between the sets of rollers, and ironed first on one side only by one set of the rollers, and then on the other side by the next set, all at one progressive automatic operation; but such a machine could not automatically iron, first on one side only and next only on the other side, articles of less length than the distance between the adjacent sets of rollers. To overcome that defect is the principal object of one part of this invention, which con-

sists in the combination, with two reversely-arranged separate sets of ironing and clothed rollers, of an intermediate active feeding device, so that when articles of less length than the distance between the two sets of rollers shall be inserted between the first set, such articles will be thereby ironed on one side only, and will be thence conducted and carried by the said feeding device directly to and introduced between the next set of the rollers, and will be thereby ironed only on the other side.

Another part of this invention consists in the combination, with two separate reversely-arranged sets of ironing and clothed rollers, of an intermediate endless apron, separate from the sets of ironing and clothed rollers, and arranged and operated so as to actively assist in conducting and carrying short or limpsy articles from one set of the rollers to, and introducing them between, the other set of rollers.

Another part consists in the combination, with two separate reversely-arranged sets of ironing and clothed rollers, of an intermediate moving endless apron, for carrying the articles from one set of the rollers to the other set, and a roller incumbent on the apron, and arranged so as to assist in introducing the articles between the second set of rollers.

Another part consists in the combination, with two separate sets of ironing and clothed rollers, arranged reversely to each other, of an intermediate active feeding device, substantially such as hereinafter described, and a clearing-guide applied to the lower roller of the first set, and arranged so as to prevent adhesion of the articles to the latter roller, and direct the articles therefrom into or upon the said feeding device.

Another part consists of two separate sets only of ironing and clothed rollers, of which the ironing-roller is under the clothed roller in the first set, and the ironing-roller is over the clothed roller in the second set, and an active feeding device between the two sets of rollers, all combined, arranged, and operating together, and having an open feeding-in space between the upper rollers of the two sets, so that while articles of less length than the distance between the two sets of rollers, as well as articles of greater length, will be passed

through between and ironed by the two sets of rollers, first on one side and next on the other side, and will be discharged by the second set of rollers, with the last-ironed side uppermost, for convenient inspection, any such articles which shall be imperfectly ironed by one passage between the two sets of rollers can then be conveniently introduced by hand to, and passed through between, the second set of rollers, and thereby re-ironed on the proper side, so as to finish the articles, and avoid the liability of scorching such articles that would occur if they should be passed a second time between both sets of rollers.

Another part consists of two separate reversely-arranged sets of ironing and clothed rollers, having all the ironing-rollers mounted to turn in constant positions, and connected with a driving-shaft by one set of gearing, and all the clothed rollers movable and adjustable toward and from the ironing-rollers, and connected with the same driving-shaft by another and separate set of gearing, all combined and arranged together so that all the rollers will constantly remain in gear with, and be revolved by, the said driving-shaft, whatever shall be the positions of the clothed rollers in respect to the ironing-rollers.

Another part consists of two separate sets of reversely-arranged ironing and clothed rollers, in which all the clothed rollers are connected with a rotary driving-shaft by one set of gearing, and all the ironing-rollers are connected with the same driving-shaft by another separate set of changeable gearing, whereby the ironing-rollers and the clothed rollers are positively revolved together, but independently of each other, by one and the same driving-shaft, and the surface-speed of the ironing-rollers can be altered, so as to produce either a lusterless or a glossy finish on both sides of the articles passed between the rollers, without either changing the speed of the said driving-shaft, or altering that of the clothed rollers.

Another part consists of two separate sets of reversely-arranged ironing and clothed rollers, having all the clothed rollers connected with a rotary driving-shaft by a set of changeable gearing, and all the ironing-rollers connected with the same driving-shaft by another and separate set of changeable gearing, substantially as hereinafter described, whereby the ironing-rollers of both sets are positively turned together independently of the clothed rollers, and the surface-speeds of the clothed rollers and of the ironing-rollers can be separately altered, so as to properly iron articles of greatly different thicknesses, and produce thereon either a glossy finish or a lusterless surface, as shall be required, without changing the speed of the said driving-shaft.

Another part consists in the combination, with a set of ironing and clothed rollers, (one mounted in movable journal-boxes over the other,) of hangers secured to the said journal-boxes, and connected together by a horizontal bar having thereon weights adjustable along

the bar, so as to thereby alter the pressure of different parts of the length of the upper roller against the lower roller, as shall be desirable in ironing articles of various shapes.

Another part consists in the combination, with ironing and clothed rollers in which one of the rollers is movable and under and against an upper one, of a seat or platform arranged in proper position to be occupied by a person feeding articles to the rollers, and mounted on a pressing lever or levers connected by any suitable means with the said movable roller, so that the weight of a person on the seat or platform shall cause, or materially assist, the pressing of the said movable roller against the upper one with the proper yielding force required in ironing the articles, and so that the person, by merely getting off the seat or platform, will relieve the said movable roller from much or all of the pressure which is unnecessary, and desirable to have removed, when articles are not being passed between the rollers.

Another part consists in the combination, with an ironing-roller and a clothed roller, (one movable and under the other,) of a weighted lever or levers connected with the movable roller and with an operating-lever, by means of devices hereinafter described, whereby the pressure of the weighted lever or levers can be readily applied to, and released from, the movable roller, and the latter moved away from, and toward, and against the other roller.

Another part consists in the combination, with two separate, reversely-arranged, adjacent sets of ironing and clothed rollers, having the clothed rollers mounted in movable bearings, of independent pressing devices loosely connected together, so as to independently press the clothed roller of each set against the ironing-roller thereof, and yet so that the movement of the clothed roller of one set away from, and toward, and against the ironing-roller of that set shall cause corresponding movements of the clothed roller of the other set in respect to the ironing-roller of the latter set.

As regards the aforesaid parts of this invention, the clothed rollers may be formed of any suitable materials; but another part thereof consists in the combination, with an ironing-roller, of a clothed roller arranged to turn in surface-contact with the ironing-roller, and having a covering of elastic, heat-resisting, vulcanized india-rubber, impervious to moisture, arranged between the body of the roller and the outer covering of cloth or equivalent yielding and moisture-absorbing fabric.

Another part consists in the combination, with an ironing-roller, of a clothed roller arranged to turn in surface-contact with the ironing-roller, and having an inner covering of elastic vulcanized india-rubber, surrounded by a covering of elastic heat-repelling woolen fabric, whereby the roller is made eminently suitable for use, in connection with the ironing-roller, in ironing various articles.

Another part consists in the combination, with an ironing-roller, of a clothed roller having a closely-fitting elastic or yielding covering of tubular fabric extended over the edges and into the recessed ends of the body of the roller, and durably secured therein against the action of the ironing-roller by removable clamping-rings, constructed either with or without an outer end facing of wood, to which may be fastened or tacked the temporary outer covering of cloth surrounding the fabric.

In the aforesaid drawings, Figure 1 is an elevation of one side, and Fig. 2 an elevation of the other side, of an ironing-machine which embodies all the aforesaid parts of this invention. Fig. 3 is an elevation of the front or feeding-in end of the same machine, a part of one of the clothed rollers being shown in section. Fig. 4 is a plan of the same machine, some portions being partly broken away. Fig. 5 is a central longitudinal vertical section of the same machine; and Figs. 6, 7, 8, and 9 are like sections of modifications of some parts. Fig. 10 shows, in sectional elevation, one-half of the parts by which the two clothed rollers are adjusted against and away from the ironing-rollers. Fig. 11 shows a longitudinal section of one of the clothed rollers, and Fig. 12 represents one of the clamping-rings by which the tubular felted covering is secured in the clothed roller.

Like parts are marked by like letters in the different figures, and the arrows therein indicate the directions in which the adjacent parts move when in use.

A is the stationary frame-work, which supports all the other parts of the machine. B, Fig. 5, is the ironing-roller, and C is the clothed roller, of one set of ironing and clothed rollers, and D is the ironing-roller, and E is the clothed roller, of another set of ironing and clothed rollers. The rollers B and C of one set are shown arranged parallel and reversely to the rollers D and E of the other set, and so that articles of cloth can be passed first through between the rollers B C, and thence directly through between the rollers D E. I arrange between the two sets of ironing and clothed rollers a feeding device having a movement corresponding with that of the clothed rollers, so that when articles of less length than the distance between the two sets of rollers, as well as those of greater length, shall be passed between and ironed on one side by the first set of rollers B C, the feeding device will thence carry forward the articles and introduce them between the second set of rollers, by which the articles will be ironed on the other side.

This feeding device may have any suitable construction. In Fig. 6 it consists of a smooth bed, *z*, upon which lightly bear cloth-covered or other suitable friction-rollers *y*, turned, by gearing, with the same surface-speed as the clothed rollers C E, and acting by frictional contact with the upper surface of the articles, to move them along on the bed *z*, which latter

may consist of a plate, as shown, or of several rollers mounted to turn freely in constant positions under the rollers *y*.

In Fig. 8 the feeding device consists, mainly, of a bed of cloth-covered or other suitable friction-rollers, *x*, turned by gearing with the same surface-speed as the clothed rollers C E.

In Fig. 9 the feeding device consists of an endless apron, *w*, of muslin or other suitable fabric, passing around and turned by the clothed roller E, and extended around an idle-pulley roller, *w*<sup>1</sup>, and a gravitating-roller, *w*<sup>2</sup>. I, however, generally prefer to have the feeding device consist, mainly, of an endless apron, F, Figs. 5 and 7, which is separate from the clothed rollers, and extends around and is supported by separate rollers *v* *v*<sup>1</sup>, and is turned with the same surface-speed as the clothed roller E, either by being held in yielding contact with the latter when in working position, as shown in Fig. 7, or, preferably, by having the roller *v* or *v*<sup>1</sup> turned by gearing, as hereinafter described; and in the latter case I prefer to have the apron F formed of a woven fabric having a weft of stiff threads, or of a fabric very flexible lengthwise of the apron, but rather stiff in the transverse direction thereof.

G is a roller, bearing, by its gravity, gently upon the apron F, and thereby revolved, and free to rise over articles passing between it and the apron, and arranged as shown in Fig. 5, so as to very materially assist the apron in directing and properly introducing the articles between the second set of ironing and clothed rollers. Slotted guides for the journals of the roller G are shown at *u*, Figs. 4 and 10. H, Figs. 4, 5, 6, 7, 8, 9, is a clearing-guide having a thin edge, bearing against the lower roller of the first set B C, and arranged so as to support and direct the articles Z from that set of rollers upon or into the feeding device, which carries or actively conducts the articles to the second set of rollers. This clearing-guide H is shown in Fig. 4, with pivot-like ends *t* in bearings *t*<sup>1</sup>, Fig. 5. I, Figs. 5 and 4, is a suspended clearing-blade, bearing against the ironing-roller D of the second set. A similar clearing-blade applied to the clothed roller C, Fig. 5, of the first set is contemplated.

Collars, cuffs, and other articles of cloth, generally have one side which must have a nicely-finished ironed surface, while the other side need not be so nicely ironed. In practice, the best-finished surface is produced by the last ironing-roller to which the articles are subjected. The articles are first introduced by hand, and in a damp condition, between the first set of rollers B C, and are thereby considerably dried, and generally smoothed out and ironed sufficiently on one side, and are thence directed by the guide H, and conducted by the feeding device into the second set of rollers D E, which generally finish the drying of the articles and iron the other side thereof completely, and discharge

the articles onto an apron or table, K, Fig. 4. Better results are generally obtained by only two sets of ironing and clothed rollers, revolving at the proper slow rate of speed, than by three or more such sets. In some cases, however, the articles are occasionally accidentally introduced into the first set of rollers with the wrong side uppermost, or in a too damp condition, so that they will not be sufficiently dried and ironed and freed from wrinkles when discharged from the second set of rollers; and such imperfectly-ironed articles require to be again passed between an ironing and clothed roller to properly finish them. To pass such imperfectly-ironed articles again through the two sets of rollers would be very inconvenient, and would generally scorch and materially injure the articles. It is, therefore, important that the two sets of rollers should be arranged so that the articles shall be discharged from the second set of rollers with the most highly-finished side uppermost, so that a person at the delivery end of the machine can most readily see any defect in the ironing of any of the articles, and that such a person shall then be able to immediately and conveniently pass such defective articles through between the last set of ironing and clothed rollers only.

To secure that result I arrange the first set of rollers with the clothed roller C over the ironing-roller B, and the second and last set of rollers with the ironing-roller D over the clothed roller E, and with an open feeding-in space, J, between the roller D and the roller C, substantially as shown in Figs. 4, 5, 6, 8, 9, wherein Z' indicates an article being introduced through the space J to the rollers D E.

The two clothed rollers C and E are connected together and to the driving-shaft L by a set of gearing, so as to be positively turned with substantially equal surface-speed by that shaft; and the two ironing-rollers B and D are geared with the same driving-shaft L by another and separate train of wheels, which communicate substantially equal surface-speed to the ironing-rollers. The gearing which connects the two clothed rollers C E with the shaft L is shown by Figs. 1 and 3, and consists of a pinion,  $s$ , fast on that shaft, and engaged with a spur-wheel,  $r$ , which is mounted on a stud,  $r^1$ , and is secured to a pinion,  $r^2$ , which gears with a spur-wheel,  $q$ , which is mounted on a stud,  $q^1$ , and is secured to a pinion,  $q^2$ , that gears with a spur-wheel,  $p$ , which is on a stud,  $p^1$ , and engages with a spur-wheel, O, fastened on the shaft  $o$  of the clothed roller E, and a spur-wheel,  $n$ , which turns on a stud,  $n^1$ , and gears with the wheel  $p$ , and also with a spur-wheel,  $n^2$ , which turns on stud  $n^3$ , and gears with spur-wheel  $n^4$ , which is on stud  $n^5$ , and gears with a spur-wheel, M, fast on the shaft  $m$ , to which the clothed roller is secured.

The apron F is turned with substantially the same surface-speed as the clothed rollers, by means of a spur-wheel,  $m^3$ , Figs. 1 and 3,

gearing into a pinion,  $m^4$ , fast on the shaft  $v$ , Fig. 5, of the endless apron. The gearing which connects the shaft L with the two ironing-rollers B D is shown by Figs. 2 and 3, and consists of a pinion,  $l$ , fast on the shaft L, and in gear with a broad or double spur wheel or pinion,  $k$ , on a stud,  $k^1$ , and in gear with wheel  $j$ , which is mounted on a stud,  $j^1$ , and is secured to a pinion,  $j^2$ , which gears with a wheel,  $i$ , that turns on a stud,  $i^1$ , and is secured to a pinion,  $i^2$ , which gears with a wheel,  $i^3$ , that turns on a stud,  $i^4$ , and gears with a wheel,  $i^5$ , that turns on a stud,  $i^6$ , and gears with a wheel,  $h$ , fast on the shaft  $h^2$  of the ironing-roller B, and a wheel,  $i^7$ , that turns on a stud,  $i^8$ , and gears with the wheel  $i^5$ , and also with a wheel,  $h^1$ , fast on the shaft  $h^3$  of the ironing-roller D. The ironing-rollers B D are mounted to turn in the stationary journal-boxes  $h^4$   $h^5$ . The clothed rollers C E are mounted to turn in journal-boxes  $m^1$   $o^1$ , Figs. 2, 4, 10, and 11, which are fitted to slide up and down in fixed ways  $m^2$   $o^2$ , respectively, so that the clothed rollers can be moved and adjusted toward and in surface-contact with the ironing-rollers for use in ironing articles, and can be moved and adjusted away from the ironing-rollers, as indicated by dotted lines at C' E' in Fig. 5, to prevent burning the covering of the clothed rollers when the ironing-rollers are heated and articles are not being passed between the rollers.

By inspecting Fig. 1 it will be seen that the spur-wheels  $n^4$  and  $p$  are arranged so as to be constantly in gear with the wheels M and O, which are fast on the shafts  $m$  and  $o$  of the clothed rollers C and E, when those rollers are in contact with the ironing-rollers B and D, and the wheels M and O are in the positions shown in full lines in Fig. 1, and also when the clothed rollers are removed from the ironing-rollers, and the wheels M and O are in the positions indicated by dotted lines at M' and O' in Fig. 1.

In the drawings the two separate sets of gearing above specified, by which the shaft L gives independent rotary motion to the two ironing-rollers, and to the two clothed rollers, are shown formed so as to give substantially equal surface-speeds to the ironing-rollers and clothed rollers, so that the ironing-rollers will give a lusterless or "domestic" finish to the articles ironed by the rollers.

In order that the machine may be readily altered, so that the ironing-rollers B D shall be turned with a faster surface-speed than the clothed rollers C E, so as to give a polish or glossy finish to the articles passed between the rollers, the pinion  $l$ , Fig. 2, is pinned or otherwise suitably secured to the shaft L, so that it can be readily removed from that shaft, and a larger pinion, having like teeth, fastened in its place on the shaft, as indicated by dotted lines at  $l'$ , and the stud  $h^1$  is adjustable in an arc about the wheel  $j$ , so as to make the pinion  $k$  gear with the wheel  $j$ , and with the said larger pinion on the shaft L; or the

stud  $k'$  may be permanently stationary, and the double pinion  $k$  changed for another having the part which gears with the pinion on the shaft L of suitable smaller diameter, for engaging with the larger pinion on that shaft; or the surface-speed of the ironing-rollers B D can be increased without changing the speed of the driving-shaft, by means of the pinion  $j^2$ , Figs. 2 and 3, and the wheel  $i$ , both of which are changeable—the pinion  $j^2$  for a larger one, and the wheel  $i$  for a corresponding smaller one.

The speed of the clothed rollers C E can also be altered, independently of the ironing-rollers, by means of the pinion  $r^2$ , Figs. 1 and 3, and wheel  $q$ , which are both changeable on their supporting-studs for others of different corresponding sizes.

By thus connecting the two clothed rollers C E with the driving-shaft L by one set of gearing made changeable, substantially as above described, and also connecting the two ironing-rollers B D with the same driving-shaft by another and separate set of gearing, also made changeable, as above specified, the surface-speed of the clothed rollers can be readily altered, so that they will be turned either at a slow rate of speed suitable for ironing very thick articles, or at different faster rates, as is desirable or necessary in ironing various thinner articles, all without altering the speed of the said driving-shaft; and at the same time the surface-speed of the ironing-rollers can be changed, so that they will be turned either with the same surface-speed as the clothed rollers, to give a lusterless or domestic finish, or at a faster surface-speed than the clothed rollers, to produce a glossy ironed surface on both sides of the articles, whatever shall be the surface-speed of the clothed rollers.

NN are two hangers, secured to the sliding journal-boxes  $m^1$  of the clothed roller C, and connected together by a horizontal bar, P, on which are removable weights Q, which are adjustable along the bar, so that the weights by their gravity press the clothed roller C against the roller B with a yielding force, which can be varied and increased and lessened at different parts of the length of the rollers, as may be desirable in ironing various articles.

It is very important that the second set of rollers D E should be pressed together with greater force than the first set B C, and independently of the latter.

R is a seat or platform, arranged so that a person on it can conveniently introduce the articles by hand between the rollers. This seat or platform is mounted on a lever or levers, S, pivoted to the frame A by a rod,  $g$ , and connected with thrust-rods T, Figs. 3, 5, and 10, which are loosely secured to the sliding journal-boxes  $o^1$  of the clothed roller E, in such manner that the weight of a person on the seat or platform R, and feeding articles to the rollers, shall cause or assist in the pressing of the clothed roller E against the iron-

ing-roller D with the yielding force that is necessary in ironing the articles, and so that when the person stops feeding the articles into the rollers and gets off the platform or seat, the roller E is thereby released from much or all pressure against the roller D that is important to have removed when articles are not passing between the rollers. Removable weights Y are to be placed on the connected pressing-levers S, to alter and regulate the upward pressure that those levers shall exert upon the roller E; and in case there shall be no seat or platform on those levers, the upward pressure against the roller E will be wholly caused or adjusted by means of the weights.

The short arms of the levers S, Figs. 5 and 10, support and are connected together by a rock-shaft, U, on which are fastened short arms  $f$ , which are pivoted by a cross-rod,  $g^1$ , to the lower parts of the rods T, and fast on that rock-shaft is a hand-lever, V, Fig. 2. When the lever V is in the position shown by dotted lines in Fig. 2, the pressing-levers S, arms  $f$ , and rods T are in the positions shown by full lines in Fig. 10 and by dotted lines in Fig. 5, and the clothed roller E is then away from the roller D, as indicated by dotted lines at E' in Figs. 2, 5, 10. By then turning the lever V into the position shown by full lines in Fig. 2, the rock-shaft U and its arms  $f$ , Figs. 5 and 10, are turned so as to first raise the rods T, and thereby lift the roller E to and against the roller D, as shown in full lines in Fig. 5, and then, as the arms  $f$  are turned farther, until they are in line with the rods T, as shown in full lines in Fig. 5, they force down the short arms of the levers S and raise the long weighted or platform arms thereof, as shown in full lines in Fig. 5, so that those levers will then press the roller E against the roller D with great force. The roller E and levers S are easily retained in such active positions by means of any suitable fastening applied to the lever V—as, for example, by a stop,  $g^2$ , Fig. 2, and a removable pin,  $g^3$ , projecting from a hole in the frame. When the lever V shall be released, as by withdrawing the pin  $g^3$ , that lever can be turned down into its dotted position in Fig. 2, so as to thereby release the pressing lever or levers S, and lower the rods T, with the roller E, as indicated in Fig. 10, and the lever V can be retained in such depressed position by any suitable fastening, as by a projecting removable pin in a hole,  $g^4$ , in the frame. The two rods T, Figs. 3, 5, and 10, are connected with the hangers N by two levers, W, which are pivoted at  $f^1$  to the frame A, so that the downward movement of the rods T, in lowering the roller E away from the roller D, shall cause the simultaneous upward movement of the hangers N into the positions shown in Fig. 10, and thereby elevate the roller C away from the roller B, and so that the raising of the rods T, in lifting the roller E to and against the roller D, shall cause or be attended by the downward movement of the hangers N, so as to

lower the roller C against the roller B, as in Fig. 5. The levers W are loosely connected to the rods T and hangers N by any suitable means, as, for example, by having one end of each lever extended under a lug,  $f^2$ , Fig. 10, on the corresponding rod T, and the other end under a roller-stud,  $f^3$ , Figs. 3 and 10, on the hanger N, and with a guide-pin,  $f^4$ , in a slot in the hanger, so that when the roller E is against the roller D, and the roller C is against the roller B, the force then applied to the rods T to press the roller E against the roller D does not act to press the roller C against the roller B, and the power which then presses the roller C against the roller B does not tend to press the roller E against the roller D.

The ironing-rollers B D are to be constructed of cast-iron or other suitable metal, and made hollow, and heated internally by the combustion of gas, or mixed gas and air, therein, or by any suitable means. I generally prefer to heat those rollers by means of burners of the kind described in United States Letters Patent No. 165,775, dated July 20, 1875. Such burners can be supported within, and independently of, the ironing-rollers by a fixed perforated bar or bracket, X, Figs. 2 and 4, to which the pipes for supporting the burner and conducting gas and air thereto can be conveniently secured at one end of the rollers, as indicated by dotted lines at X<sup>1</sup> in Fig. 4, and pipes for conducting away the gaseous products of the combustion can be secured to the boxes around the other end parts of the rollers, as indicated by dotted lines at X<sup>2</sup>, Figs. 4 and 11.

In ironing-machines made with an ironing-roller turning against a clothed roller having a covering of cloth or fabric of fibrous material, the water or moisture that is driven out hot from the wet or damp articles in being ironed by the rollers is forced into and absorbed by the fibrous covering, so that the latter becomes quite wet in its inner portion. Such clothed rollers have heretofore generally had an inner body immediately surrounded by the moisture-absorbing covering. In such cases the water absorbed by the fibrous covering will wet, soak, swell, and warp the body of the roller if of wood, and rusts or oxidizes it when of metal, and dissolves therefrom coloring matter, which is gradually absorbed by the fibrous covering, so as to color the latter through to the outside, and spot, stain, and injure white goods in being passed between and ironed by the rollers.

To overcome that defect I arrange between the wood or metal body of the roller and the surrounding moisture-absorbing covering a sheet, layer, or covering,  $c$ , of elastic vulcanized india-rubber, of the kind commonly used for steam-packing, or any suitable kind which is impervious to the water, steam, or moisture in the surrounding fibrous covering, and which will not be dissolved, injured, or oxidized thereby, and will not give off soluble coloring

matter that will be absorbed by and through the fibrous covering, and which covering of vulcanized india-rubber will prevent the water, steam, and moisture in the fibrous covering from coming in contact with the body of the roller, and, while being firmly elastic, will long resist the softening and disintegrating tendency and action of the heat and pressure from the ironing-roller.

In order to lessen the heating of the elastic vulcanized india-rubber covering, or facilitate the cooling and prevent the overheating of that covering, I make the body of the clothed roller in the form of a thin metallic shell,  $d$ , Figs. 3, 4, 5, 11, more or less open at the ends, and have the india-rubber covering  $c$  immediately surround the shell or drum  $d$ , so that external air will enter and circulate within the drum  $d$  and cool the latter, which is a good conductor of heat, and, consequently, lessen the heat in the india-rubber covering. The latter can be secured upon the drum  $d$  by suitable cement and rivets, as indicated in Fig. 11, and the drum  $d$  can be secured to the shaft  $m$  or  $o$  by any suitable means—as, for example, by arms  $d^1$ , Figs. 3, 5, 11, having hubs  $d^2$  detachably fastened to the shaft by pins or set-screws  $d^3$ , Fig. 11, so that the shaft can be readily released and withdrawn from the roller, to permit the removal of the latter for convenience in renewing its coverings.

In order to advantageously modify the elastic action of the india-rubber covering  $c$ , and protect the latter from the heat of the ironing-roller, and increase the yielding and moisture absorbing and discharging quality of the clothed roller, I surround the india-rubber covering  $c$  with a closely-fitting elastic yielding covering,  $b$ , of woollen fabric, which is a good non-conductor of heat. This fabric is best made in the form of a tube, of suitable size, and moistened and drawn closely over the india-rubber covering  $c$ , and then dried, so as to shrink tightly thereon.

It has been heretofore proposed to have a layer of felt form the whole or a part of the covering of a clothed roller in an ironing-machine, but not around an inner covering of elastic india-rubber, so as to protect the latter from heat, and modify its elastic action.

To durably secure the covering  $b$  tightly in place around and upon the roller, I generally make the metallic body  $d$  with thin recessed ends, Figs. 3 and 11, and extend the fabric  $b$  over the ends and into the recesses, and secure it therein by removable clamping-rings  $a$ , Figs. 11 and 12, fastened to the roller by screws  $a^1$ , or other suitable means, and with or without an outer wooden filling,  $a^2$ , to which the outer covering  $e$  may be fastened by tacks.

What I claim as my invention is—

1. The combination of two separate sets of ironing and clothed rollers, arranged apart and reversely to each other, and an intermediate active feeding device, whereby articles of less length than the distance between the two sets of rollers will be ironed, first on one

side only by the first set of rollers, and thence carried directly to the second set of rollers, and thereby ironed only on the other side, substantially as set forth.

2. The combination of two separate sets of ironing and clothed rollers, B C and D E, arranged reversely to each other, and a separate endless apron, F, between the two sets of ironing and clothed rollers, substantially as described.

3. The combination of two separate sets of ironing and clothed rollers, B C and D E, arranged reversely to each other, the intermediate endless apron F, and the incumbent roller G, substantially as described.

4. The combination of two separate sets of ironing and clothed rollers, B C and D E, arranged reversely to each other, an intermediate active feeding device, substantially such as described, and a clearing-guide, H, arranged in respect to the feeding device and the lower roller of the first set, as set forth.

5. Two separate sets only of ironing and clothed rollers, of which the ironing-roller B is under the clothed roller C in the first set, and the ironing roller D is over the clothed roller E in the second set, and an intermediate active feeding or carrying device, all combined and operating together substantially as set forth, and having an open feeding-in space, J, between the upper rollers of the two sets, as described.

6. The combination of two separate sets of reversely-arranged ironing and clothed rollers, having the ironing-rollers B D mounted to turn in constant positions, and the clothed rollers C E mounted to turn in journal-boxes which are movable and adjustable toward and from the ironing-rollers, a driving-shaft, L, and two separate sets of gearing, of which one set constantly connects the said driving-shaft with the two ironing-rollers, and the other set continually connects the same driving-shaft with the two clothed rollers, wherever the latter shall be moved and adjusted in respect to the ironing-rollers, as described.

7. The combination, with two separate reversely-arranged sets of ironing and clothed rollers, of a rotary driving-shaft, L, a set of gearing constantly connecting the said driving-shaft with the two clothed rollers C E, and a separate set of gearing connecting the same driving-shaft with the two ironing-rollers B D, and made changeable, so that the rollers can be thereby made to produce either polished or lusterless ironed surfaces, substantially as described.

8. The combination, with two separate sets of reversely-arranged ironing and clothed rollers, of a rotary driving-shaft, L, a set of changeable gearing connecting the said driving-shaft with the two ironing-rollers B D, and a separate set of changeable gearing connecting the same driving-shaft with the clothed rollers C E, whereby the two sets of rollers can be made to properly iron articles of very different thicknesses, and also produce thereon

either lusterless or polished ironed surfaces, as described.

9. In combination with an ironing-roller, B, and a clothed roller, C, over the ironing-roller, and mounted in movable journal-boxes *m*<sup>1</sup>, the hangers N, secured to the said journal-boxes, and connected together by a horizontal bar, P, having thereon weights Q, adjustable along the bar, substantially as described.

10. In combination with ironing and clothed rollers, of which one roller, E, is movable, and arranged under and against an upper one, D, a seat or platform, R, arranged in proper position to be occupied by a person introducing articles between the rollers, and mounted on a lever or levers, S, connected with the said movable roller, so that the weight of the person on the seat or platform shall press the movable roller against the upper one, substantially as described.

11. The combination, with an ironing-roller, D, and a clothed roller, E, movable and under the ironing-roller, of the pressing-levers S, rock-shaft U, lever V, arms *f*, and rods T, arranged to operate substantially as described.

12. Two separate sets of reversely-arranged ironing and clothed rollers, B C and D E, having the two clothed rollers movable toward and from the ironing-rollers, and independently pressed against the latter by two separate weighted pressing devices loosely connected together, substantially as described, so that the movements of one clothed roller away from and toward and against the ironing-roller in one set shall cause like movements of the other clothed roller in respect to the ironing-roller in the other set.

13. In combination with an ironing-roller, a clothed roller having an outer elastic covering of moisture-absorbing fabric, and a covering, *c*, of elastic, heat-resisting, vulcanized india-rubber, impervious to moisture, and arranged between and in combination with the said moisture-absorbing covering and the body of the roller, substantially as described.

14. In combination with an ironing-roller, a clothed roller having an outer cloth covering, *e*, a body, *d*, immediately surrounded by an inner covering, *c*, of elastic vulcanized india-rubber, impervious to moisture, and an elastic porous covering, *b*, of woolen fabric, which is a good non-conductor of heat, and is arranged between and in combination with the said outer and inner coverings, substantially as described.

15. In combination with an ironing-roller, a clothed roller having a tubular covering, *b*, of elastic fabric extended over the edges and into the recessed ends of the body *d* of the roller, and secured therein by removable clamping-rings *a*, substantially as described.

In testimony whereof I hereunto set my hand in the presence of two subscribing witnesses this 9th day of August, 1875.

Witnesses: THOMAS SHIRES WILES.  
AUSTIN F. PARK,  
JAMES THORN GOODFELLOW.