

Sept. 12, 1950

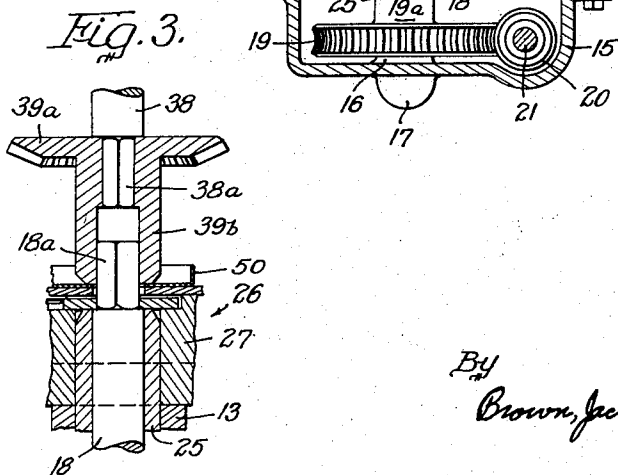
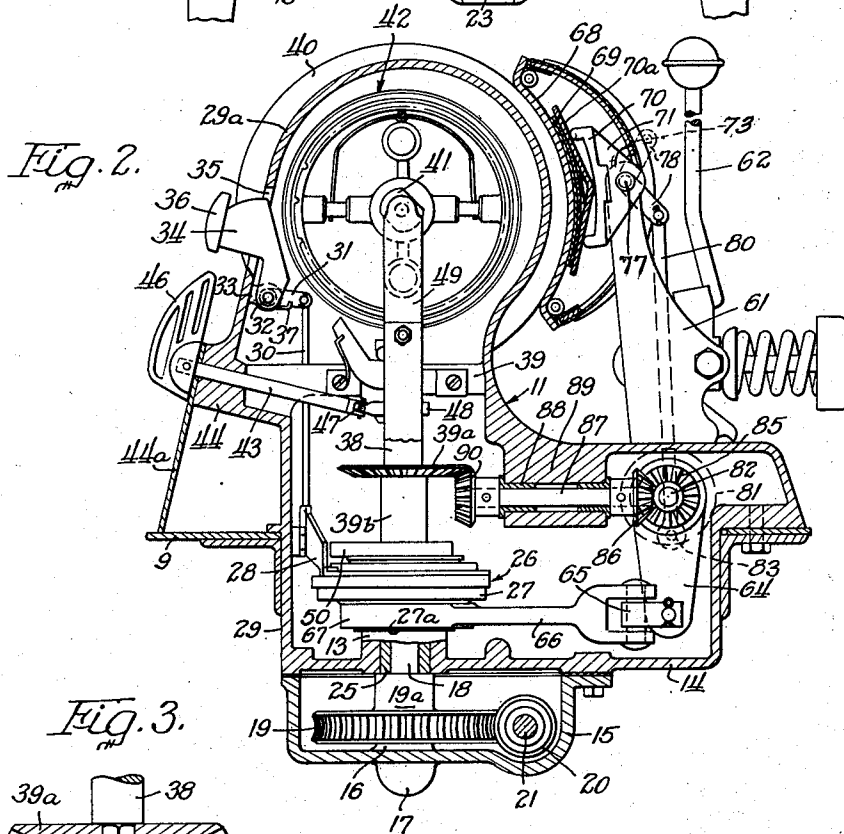
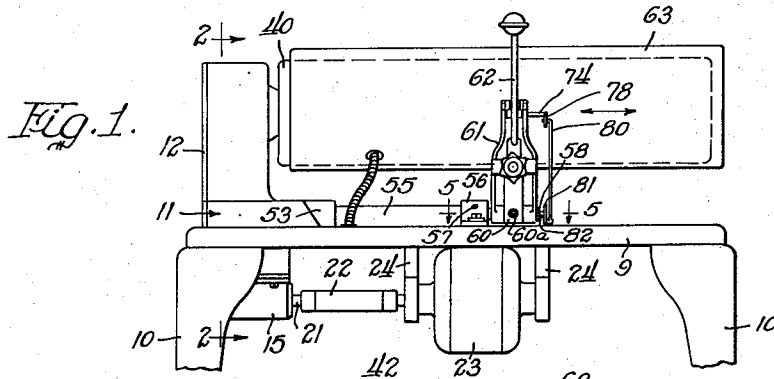
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2,522,432

IRONING MACHINE WITH RECIPROCATING IRONING SHOE

Filed March 13, 1948

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

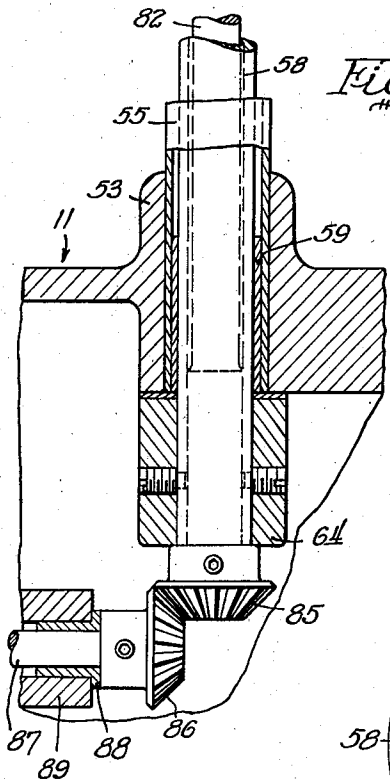


Fig. 4.

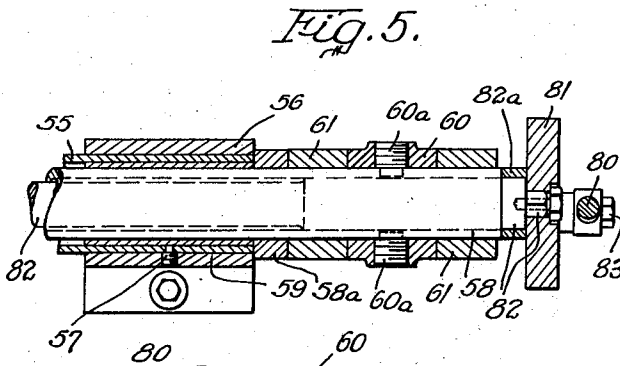


Fig. 5.

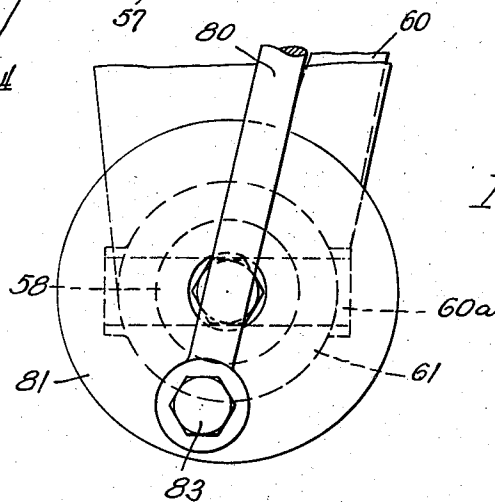


Fig. 6.

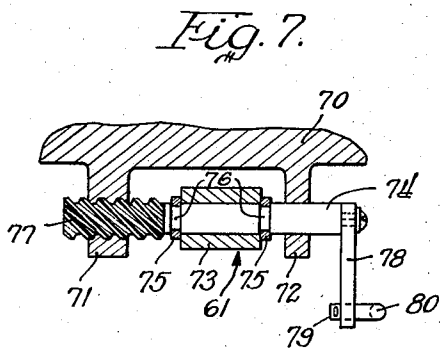


Fig. 7.

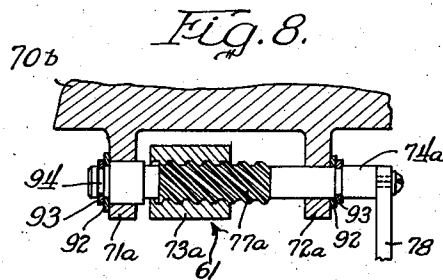


Fig. 8.

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UNITED STATES PATENT OFFICE

2,522,432

IRONING MACHINE WITH RECIPROCATING IRONING SHOE

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9 Claims. (Cl. 38—47)

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This invention relates to ironing machines, and has to do with ironing machines intended more particularly for domestic use.

In ironing articles by hand, it is customary to move the iron over the articles in first one direction and then another, such directions being in general substantially perpendicular to one another. This has the effect of smoothing out the articles and preventing wrinkles or creases therein. Further, the changes in direction of movement of the iron, in contact with the article, subjects the threads of the fabric to substantially the same pressure and tension both lengthwise and transversely of the article, avoiding any distortion thereof and imparting thereto a desirable smoothness and sheen. Hand ironing thus produces a noticeably better finish to the articles than it is possible to accomplish by machine ironing, as usually practiced, but is open to the objection that it involves more time and labor than ironing by machine.

There is disclosed, in Patent No. 2,217,522, issued October 8, 1940, to Frederick K. Mueller an ironing machine in which the shoe is reciprocated lengthwise of the cooperating roll, this machine, in operation, closely approximating hand ironing and imparting to the articles that smoothness and sheen characteristic of articles ironed by hand. In the machine of the Mueller patent, the ironing shoe is carried by a reciprocatory and rockably mounted shoe operating shaft mounted in appropriate bearings, this shaft, and with it the shoe supporting arm and the shoe, being reciprocated in the operation of the machine. When the shoe is in cooperating relation to the roll, it is subjected to substantial pressure which reacts on the shoe operating shaft and tends to bend or spring that shaft to a certain extent. That results in the bearings supporting the reciprocating shaft being subjected to objectionable pressure which tends to cause excessive wear of such bearings. My invention is directed to simple and efficient means for reciprocating the ironing shoe of the machine while avoiding subjecting the bearings for the shoe operating shaft to objectionable wear. More particularly, I provide means whereby the shoe may be reciprocated without reciprocating the shoe operating shaft and the shoe supporting arm mounted on that shaft. To that end, I provide means whereby the shoe is mounted on the shoe supporting arm for movement thereby to and from the roll and is also mounted on the shoe supporting arm for relative reciprocation lengthwise of the roll, such mounting means including means for reciprocating the shoe. Further,

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the shoe reciprocating means comprises means whereby the shoe is positively moved in alternately opposite directions, assuring equal movement of the shoe in each direction, which may not occur when the shoe is moved in one direction by a compression spring or yielding means, as in the above identified Mueller patent. Further objects and advantages of my invention will appear from the detailed description.

In the drawings:

Figure 1 is a rear view, partly broken away, of an ironing machine embodying my invention, showing the shoe at the limit of its movement in one direction lengthwise of the roll;

Figure 2 is a fragmentary sectional view, on an enlarged scale, taken substantially on line 2—2 of Figure 1, certain parts being shown in elevation and broken away;

Figure 3 is a vertical sectional view, on an enlarged scale, of the roll drive shaft and associated parts, certain parts being shown in elevation and certain other parts being broken away;

Figure 4 is a fragmentary horizontal sectional view of the gear housing, showing the outer portion of the shoe operating shaft and associated parts, certain parts being shown in plan and certain other parts being broken away;

Figure 5 is a sectional view, on an enlarged scale, taken substantially on line 5—5 of Figure 1, certain parts being shown in elevation and certain other parts being shown partly broken away and in section;

Figure 6 is an inner face view, on an enlarged scale, of the disc and associated parts for operating the shoe reciprocating means, the shoe supporting arm being shown in elevation and broken away and certain other parts being broken away;

Figure 7 is a fragmentary horizontal sectional view of the upper end of the shoe supporting arm and the adjacent portion of the shoe and associated parts, certain parts being shown in plan; and

Figure 8 is a view similar to Figure 7 but showing a modified form of the means for reciprocating the shoe.

I have illustrated my invention, by way of example, as embodied in an ironing machine which is, in general, similar to that disclosed in the above identified Mueller patent and to that disclosed in Patent No. 2,054,631, issued September 15, 1936, to Rudolph W. Janda, for ironing machine.

The machine comprises a suitable stand having a top bed plate 9 supported by depending legs 10. A main gear housing 11, closed at its outer

end by a removable cover plate 12, is appropriately mounted upon bed plate 9, at one end thereof, and extends downward therethrough. A sleeve 13 is formed integrally with, and extends upward from, bottom wall 14 of housing 11.

A worm gear housing 15, appropriately secured to and depending from housing 11, is provided with a collar 16 aligned with a depending bearing boss 17, the latter receiving the lower end portion of a shaft section 18, which passes upward through collar 16. A worm wheel 19 is secured upon shaft section 18 and meshes with a worm 20 fixed on a shaft 21 rotatably mounted in housing 15, the latter shaft being driven, through a flexible coupling 22, by an electric motor 23 suspended from bed plate 9 by hanger brackets 24.

Shaft section 18 passes upward through a bushing 25, mounted in sleeve 13 with its lower end contacting the upper end of hub 19a of worm wheel 19. Bushing 25 extends above sleeve 13, through an eccentric and clutch assembly designated generally by the reference number 26. The assembly 26 is similar to the eccentric and clutch assembly disclosed in the above identified patent to Rudolph W. Janda and in Patent No. 1,867,839, issued July 19, 1932, to Rudolph W. Janda, and need not be illustrated nor described here in detail, a brief description thereof being sufficient.

Assembly 26 comprises a member 27, loose on bushing 25, having a depending eccentric 27a seating at its lower end upon the upper end of sleeve 13. Suitable means is provided for clutching and declutching member 27 to and from shaft section 18. This clutch means is controlled by a trip finger 28 pivoted to the front wall 29 of gear housing 11 and normally held in operative position. Finger 28 is connected, by a rod 30, to an arm 31 secured upon a pin 32 loosely mounted through a lug 33 extending inward from upper portion 29a of front wall 29 of housing 11. An angle lever 34 has its lower end secured upon pin 32, extends through a slot 35 in wall portion 29a, and is provided at its outer end with a head or knob 36. Lever 34 normally is held in its outer position by a coil wire spring 37 disposed about pin 32, with one arm engaged beneath arm 31 and its other arm extending across the top of lug 33, in rear of lever 34 and effective as a stop for limiting outward movement thereof. Spring 37 also serves normally to hold trip finger 28 in normal position, effective for declutching member 27 from shaft section 18 and maintaining it declutched.

When lever 34 is moved inward a short distance, trip finger 28 is moved into inoperative position, releasing the clutch means, which is spring actuated, thus clutching member 27 to shaft section 18 for rotation therewith. Lever 34 is moved inward but momentarily, and is then released, returning trip finger 28 to operative position. Rotation of member 27 with shaft section 18 continues during a predetermined portion, about 180°, of the ensuing rotation of shaft section 18; at which time an element of the clutch contacts finger 28 and member 27 is declutched from shaft section 18. In this manner member 27 is clutched to shaft section 18, turns therewith to a predetermined extent, and is then automatically declutched therefrom. The particular clutch means employed is not of the essence of my invention, though I preferably employ the clutch means disclosed in Patent No. 1,867,839, above referred to. Suffice it to state that suit-

able means is provided for optionally clutching member 27 to shaft section 18 for rotation therewith to a predetermined extent, and declutching member 27 from the shaft section when it has been turned to the desired extent.

Shaft section 18 is disposed below and coaxially with an upper shaft section 38 rotatably mounted through a relatively thick rib 39 extending from the inner end wall of gear housing 11. Shaft section 38 is provided, at its lower end, with a reduced squared stud 38a which fits into a corresponding bore in the upper end of an elongated hub 39b of a bevel gear 39a. Shaft section 18 is provided, at its upper end, with a reduced squared stud 18a which fits into a corresponding bore in the lower end of hub 39b. In this manner, the two shaft sections are coupled together for rotation as a unit.

An ironing roll 40, provided with a suitable pad, extends from gear housing 11 inward over bed plate 9 thereabove and parallel therewith. Roll 40 is mounted for rotation about its axis, and is secured to a shaft 41, extending into gear housing 11 and appropriately mounted for rotation. Conveniently the roll 40 and shaft 41 are mounted and secured together in the manner disclosed in the two above identified Patents No. 1,867,839 and No. 2,054,631. The particular manner of mounting roll 40 and shaft 41, and connecting them together, is not of the essence of my invention, and need not be set forth in greater detail. Suffice it to state that the roll and the shaft are rotatably mounted and connected together in an appropriate manner.

Roll shaft 41 is driven, as desired, from shaft section 38 through a change speed gearing assembly indicated generally by the reference number 42. The assembly 42 is similar to that disclosed in Patent No. 2,054,631, and need not be described here in detail. It has associated therewith suitable control means whereby shaft 41, and consequently roll 40, may be driven at either one of two speeds, or rotation of the roll may be prevented, as desired. The control means is operated by a control rod 43 mounted for turning movement through a boss 44 at the bottom of upper portion 29a of front wall 29 of gear housing 11. Rod 43 also extends through and projects outward beyond a plate 44a seating upon the outer face of boss 44, suitably secured thereto and extending downward therefrom to the upper surface of bed plate 9. An operating handle 46 is secured upon the outer end of rod 43, the inner end of which is connected, by a universal connection 47, to the forward end of a turnably mounted control member 48. Means is also provided, comprising a two-part control lever 49 and a cooperating eccentric 50 rotatable with member 27, for automatically enabling and disabling the drive between assembly 42 and roll shaft 41, in accordance with predetermined turning of the latter. The variable speed driving means and associated control means referred to, are fully disclosed in Patent No. 2,054,631 and need not be described in greater detail here. If desired, any other suitable means may be provided for driving the roll shaft, such, for example, as the means disclosed in Patent No. 1,867,839 or in Patent No. 2,026,345, issued December 31, 1935, to Rudolph W. Janda, for Ironing Machine. It will be seen, from what has been said, that the shaft sections 18 and 38, together with hub 39b of bevel gear 39a, constitute a unit or shaft and that this shaft has appropriate driving connection to the roll for driving or rotating the latter

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from the motor 23. The ironing machine illustrated and so far described is, in general, similar to that disclosed in Patent No. 2,054,631.

Gear housing 11 is provided, at its rear inner corner, with an exterior boss 53. An elongated tube or sleeve 55 is mounted at its outer end in boss 53, extends therefrom along bed plate 9 in close proximity thereto and parallel with roll 40, and has its inner end portion secured in a bracket 56 (Figs. 1 and 5) in an appropriate manner, as by a set screw 57, which bracket is bolted or otherwise suitably secured to bed plate 9. A shoe operating shaft 58 extends through bushings 59 mounted in the ends of sleeve 55 (Fig. 5) and is mounted therein for rocking movement about its axis. Shaft 58 extends through the outer end of sleeve 55 and boss 53 into gear housing 11, and also projects through the inner end of sleeve 55 a considerable distance beyond bracket 56, as shown in Figures 1 and 5.

A shoe operating arm 60 is suitably secured, as by means of screws 60a, on the inner end of shaft 58, and is straddled by a bifurcated shoe supporting arm 61, loosely mounted at its lower end on shaft 58 and confined against relative movement lengthwise thereof by arm 60. Means, including an emergency release lever 62, is provided for normally coupling the arms 60 and 61 together for movement as a unit. An ironing shoe 63, conveniently heated by electrical resistance elements contained therein, is mounted upon the upper end of arm 61 for movement therewith to and from roll 40. This shoe is of known construction and has a concaved ironing or operating surface conforming in transverse curvature and in length to the cooperating surface of the roll 40. It will be clear that the shoe 63 is mounted on shaft 58 and connected thereto for movement therewith, when the arms 60 and 61 are coupled together. The arrangement of the arms 60 and 61 and the associated coupling means and the shoe is similar to that disclosed in Patent No. 1,867,839. It is not essential to my invention, however, that this particular arrangement be used, and any other suitable means may be provided for supporting the shoe and operatively connecting it to its associated operating shaft.

A arm 64 (Figure 2) is secured upon the outer end of shoe operating shaft 58, within gear housing 11, and extends downward therefrom. The lower end of arm 64 is connected, by a universal connection 65, to the rearward end of a connecting rod 66 provided at its forward end with an eccentric strap 67 fitting about eccentric 27a. Turning of eccentric 27a to predetermined extent, into one position, turns shaft 58 about its axis in one direction, and turning of the eccentric from that position through 180° into its other position, turns shaft 58 about its axis in the other direction. In this manner eccentric 27a serves to turn shoe operating shaft 58 about its axis in alternately opposite directions and to predetermined extent, effective for moving the shoe 63 to the roll 40 in cooperating relation therewith and moving the shoe away from the roll out of such cooperating relation.

The shoe 63 is of known construction and comprises face plate 68 and associated heating elements 69 secured to the plate by means of suitably spaced clamp members, the central one of which is shown at 70, bearing on a clamp plate 70a, the clamp members 70 being secured in position by screw studs welded to face plate 68 and passing through the clamp members 70, these studs receiving nuts screwed thereon, as is

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known. In Figure 2 the securing stud and nut have been omitted for clearness of illustration. The central clamp member 70 is provided with a pair of spaced rearwardly extending ears 71 and 72 rigidly secured thereto, conveniently formed integral therewith. The ears 71 and 72 receive between them a sleeve 73 fixed to the upper end of the shoe supporting arm 61, conveniently formed integral therewith. A shaft 74 extends through the ears 71 and 72 and is rockably mounted in sleeve 73, this shaft receiving snap rings 75 engaging in circumferential grooves 76 formed therein and disposed in contact with the ends of sleeve 73. It will be seen that shaft 74 is thus mounted for oscillatory movement in sleeve 73 and is restrained against lengthwise movement relative thereto. One end portion 77 of shaft 74 is threaded, being provided with rather large or heavy threads of quite steep pitch, and screws through the ear 71. As will be clear from what has been said, the shaft 74 extends parallel with the shoe 63 and with roll 40, so that by oscillating shaft 74 the shoe 63 is positively moved in alternately opposite directions and thereby reciprocated relative to roll 40 and to the shoe supporting arm 61, lengthwise of the roll.

A crank arm 78 is fixed, in a suitable manner, on the other end of shaft 74 and extends rearward therefrom. Arm 78 receives, at its rearward end, an angularly bent finger 79 at the upper end of a connecting rod 80 pivoted at its lower end to a disc 81 fixed on the inner end of a shaft 82, rotatably mounted in the tubular shoe operating shaft 58 and projecting beyond the inner end thereof adjacent the shoe supporting arm 61. The pivotal connection 83 of the lower end of rod 80 to disc 81 is remote from the axis of the disc, as will be clear from Figure 6, so that when the shaft 82 is rotated the shaft 74 is turned through a substantial arc.

A bevel gear 85 is secured on the outer end of shaft 82, within the gear housing 11, and meshes with a bevel pinion 86 fixed on the rearward end of a stub shaft 87 rotatably mounted, in suitable bushings 88, in a boss 89 integral with the upper wall of the lower portion of gear housing 11. A bevel pinion 90 is secured on the forward end of stub shaft 87 and meshes with the bevel gear 89a. It will be seen that when the machine is in operation, the shaft 82 is rotated and the shoe 63 is reciprocated relative to shoe supporting arm 61 and to roll 40, lengthwise of the latter, as indicated by the double headed arrow in Figure 1. The threaded connection between the oscillatory shaft 74 and the shoe assures that the shoe 63 will be moved positively and to equal extent in alternately opposite directions, thereby assuring that articles passing between the shoe 63 and the roll 40 and being ironed thereby will also be subjected to the ironing action of the shoe in directions perpendicular to the travel of the articles between the shoe and the roll, thereby assuring a smooth finish and sheen to such articles, as above explained. Since the shoe is reciprocated relative to the shoe supporting arm 61, the latter and the rockably mounted shoe operating shaft 58 are not reciprocated. That is advantageous in that it avoids subjecting the bearings for shaft 58 to objectionable wear such as may occur when that shaft is reciprocated lengthwise for reciprocating the shoe supporting arm and the shoe carried thereby, as has been previously explained. Also, the power required to reciprocate the shoe alone

is substantially less than that which would be required to reciprocate the shoe supporting shaft and the parts carried thereby, which is conducive to reciprocation of the shoe with a minimum expenditure of power while relieving the driving mechanism of the machine and associated parts of objectionable stresses.

In the modification shown in Figure 8, shaft 74a is rockably mounted through ears 71a and 72a of clamp member 70b, and is restrained against lengthwise movement relative to ears 71a and 72a by associated washers 92 and snap rings 93 engaging in circumferential grooves 94 in shaft 74a. The intermediate portion 77a of shaft 74a is provided with a heavy thread of steep pitch and screws through the sleeve 73a at the upper end of the shoe supporting arm 61. Shaft 74a has crank arm 78 secured to one end thereof and connected to the disc 81 eccentrically of the latter, as before. It will be seen that, when the machine is in operation, the shaft 74a is oscillated and is effective for reciprocating the shoe 63 in the manner previously described. In both forms of my invention illustrated, the roll is driven by the motor 23, which conveniently also operates the means for moving the shoe to and from the roll and the means for reciprocating the shoe. In the broader aspects of my invention, however, it is not essential that the shoe be reciprocated by power derived from the motor 23, and any suitable means may be provided for reciprocating the shoe.

The rockably mounted tubular shoe operating shaft 58 is restrained against lengthwise movement by arm 64 and a collar 58a mounted on shaft 58, between bracket 56 and arm 61. The shaft 52 is restrained against lengthwise movement by the bevel gear 85, in conjunction with arm 64, and a collar 82a disposed about shaft 52 between disc 81 and the inner end of the tubular shoe operating shaft 58.

As above indicated, and as will be understood by those skilled in the art, changes in construction and arrangement of parts of my invention may be restored to without departing from the field and scope thereof, and I intend to include all such variations, as fall within the scope of the appended claims, in this application in which the preferred forms only of my invention have been disclosed.

I claim:

1. In an ironing machine comprising a rotatably mounted roll, means for driving said roll, a rockably mounted shoe operating shaft, and a shoe supporting arm mounted at its lower end on said shaft for movement thereby toward and away from said roll; a shoe mounted on said arm for movement thereby to and from said roll and for relative reciprocating movement lengthwise of the latter, an oscillatory shaft mounted on said arm restrained against relative endwise movement and having threaded connection to said shoe, and operating connections between said roll driving means and said oscillatory shaft for oscillating the latter.

2. In an ironing machine comprising a rotatably mounted roll, means for driving said roll, a rockably mounted shoe operating shaft, and a shoe supporting arm mounted at its lower end on said shaft for movement thereby toward and away from said roll; a shoe mounted on said arm for movement thereby to and from said roll and for relative reciprocating movement lengthwise of the latter, an oscillatory shaft mounted on said arm restrained against relative endwise

movement and having threaded connection to said shoe, a rotatably mounted shaft adjacent and substantially paralleling said shoe operating shaft, driving connections between said rotatably mounted shaft and said roll driving means, and operating connections between said rotatably mounted shaft and said oscillatory shaft effective for oscillating the latter.

3. In an ironing machine comprising a rotatably mounted roll, means for driving said roll, a rockably mounted shoe operating shaft, and a shoe supporting arm mounted at its lower end on said shaft for movement thereby toward and away from said roll; a shoe mounted on said arm for movement thereby to and from said roll and for relative reciprocating movement lengthwise of the latter, a rotatably mounted shaft telescoping said shoe operating shaft, means for driving said rotatably mounted shaft, and operating connections between said rotatably mounted shaft and said shoe for reciprocating the latter.

4. In an ironing machine comprising a rotatably mounted roll, means for driving said roll, a rockably mounted tubular shoe operating shaft, and a shoe supporting arm mounted at its lower end on said shaft for movement thereby toward and away from said roll; a shoe mounted on said arm for movement thereby to and from said roll and for relative reciprocating movement lengthwise of the latter, a second shoe operating shaft mounted in said first shoe operating shaft for relative turning movement and extending therebeyond adjacent said arm, means for driving said second shaft, and operating connections between said second shaft and said shoe effective for reciprocating the latter.

5. In an ironing machine comprising a rotatably mounted roll, means for driving said roll, a rockably mounted shoe operating shaft, and a shoe supporting arm mounted on said shaft for movement thereby toward and away from said roll; a shoe cooperating with said roll, means mounting said shoe on said arm for movement thereby to and from said roll and for relative reciprocation lengthwise of the latter, said mounting means comprising an oscillatory shaft restrained against lengthwise movement relative to said arm and having threaded connection to said shoe, and means for oscillating said shaft.

6. In an ironing machine comprising a rotatably mounted roll, means for driving said roll, a rockably mounted tubular shoe operating shaft, and a shoe supporting arm mounted at its lower end on said shaft for movement thereby toward and away from said roll; a shoe cooperating with said roll, means mounting said shoe on said arm for movement thereby to and from said roll and for relative reciprocation lengthwise of the latter, said mounting means comprising an oscillatory shaft restrained against lengthwise movement relative to said arm and having threaded connection to said shoe, a second shoe operating shaft mounted in said first shoe operating shaft for relative turning movement and extending therebeyond adjacent said arm, and operating connections between said second shaft and said oscillatory shaft.

7. In an ironing machine comprising a rotatably mounted roll, means for driving said roll, a rockably mounted tubular shoe operating shaft, and a shoe supporting arm mounted at its lower end on said shaft for movement thereby toward and away from said roll; a shoe cooperating with said roll, said shoe having fixed thereto a pair of spaced rearwardly extending ears, an oscillatory

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shaft mounted on the upper end of said arm restrained against relative lengthwise movement and having threaded connection to one of said ears, a second shoe operating shaft mounted in said first shoe operating shaft for relative turning movement and extending therebeyond adjacent said arm, and operating connections between said second shaft and said oscillatory shaft.

8. In an ironing machine comprising a rotatably mounted roll, means for driving said roll, a rockably mounted shoe operating shaft, and a shoe supporting arm mounted at its lower end on said shaft for movement thereby toward and away from said roll; a shoe cooperating with said roll, said shoe having fixed thereto a pair of spaced rearwardly extending ears, a sleeve fixed to the upper end of said arm extending between and spaced from said ears, an oscillatory shaft mounted in said sleeve restrained against relative lengthwise movement and extending through said ears with threaded connection to one thereof, and means for oscillating said oscillatory shaft.

9. In an ironing machine comprising a rotatably mounted roll, means for driving said roll,

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a rockably mounted shoe operating shaft, and a shoe supporting arm mounted at its lower end on said shaft for movement thereby toward and away from said roll; a shoe cooperating with said roll, said shoe having fixed thereto a pair of spaced rearwardly extending ears, a sleeve fixed to the upper end of said arm extending between and spaced from said ears, an oscillatory shaft threaded through said sleeve extending through said ears and restrained against lengthwise movement relative to the latter, and means for oscillating said oscillatory shaft.

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