April 15, 1947. F. S. STOUT ET AL 2,418,913

IRONING MACHINE

Filed Jan. 10, 1946 4 Sheets-Sheet 1

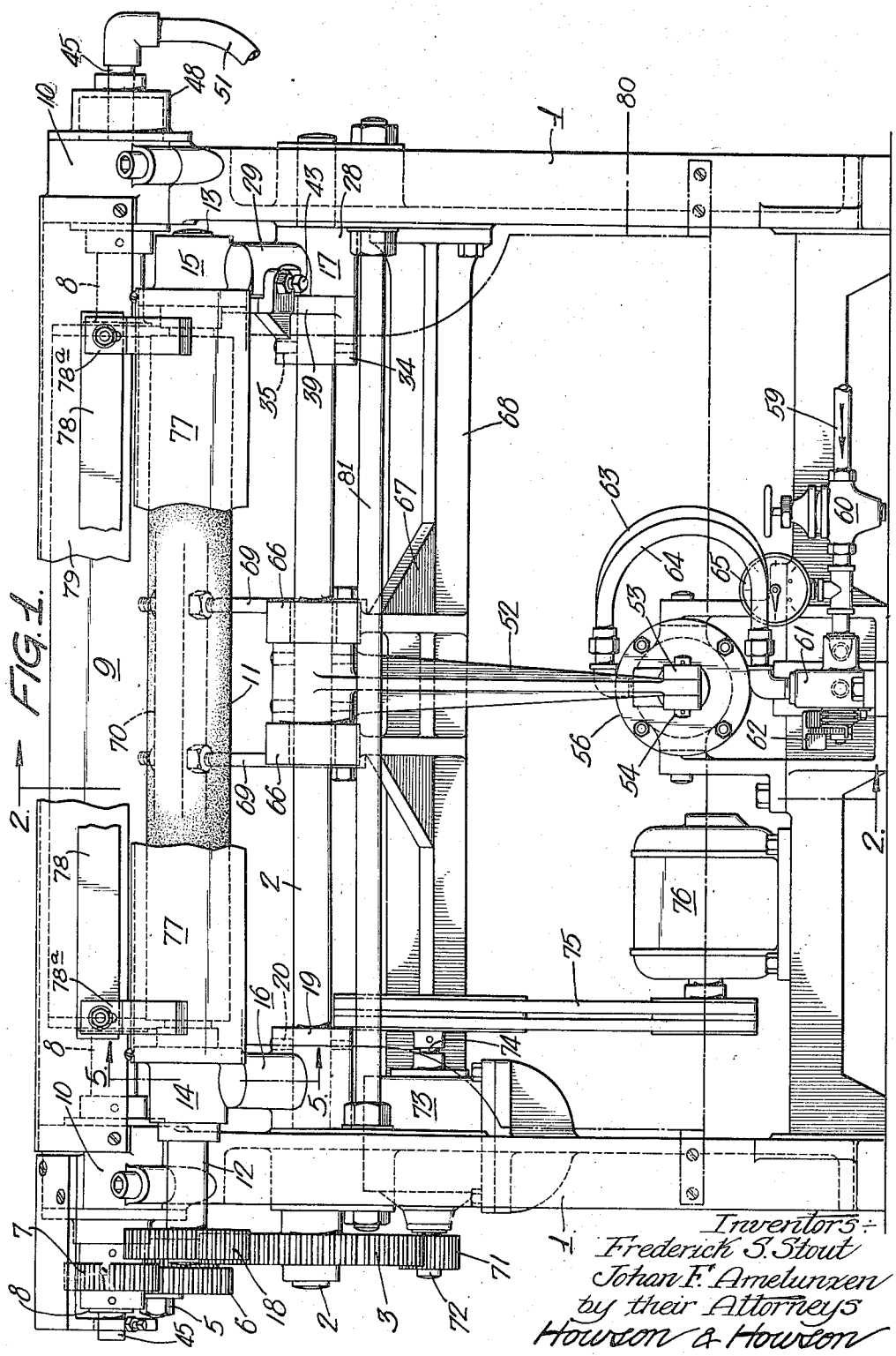


FIG. 1.

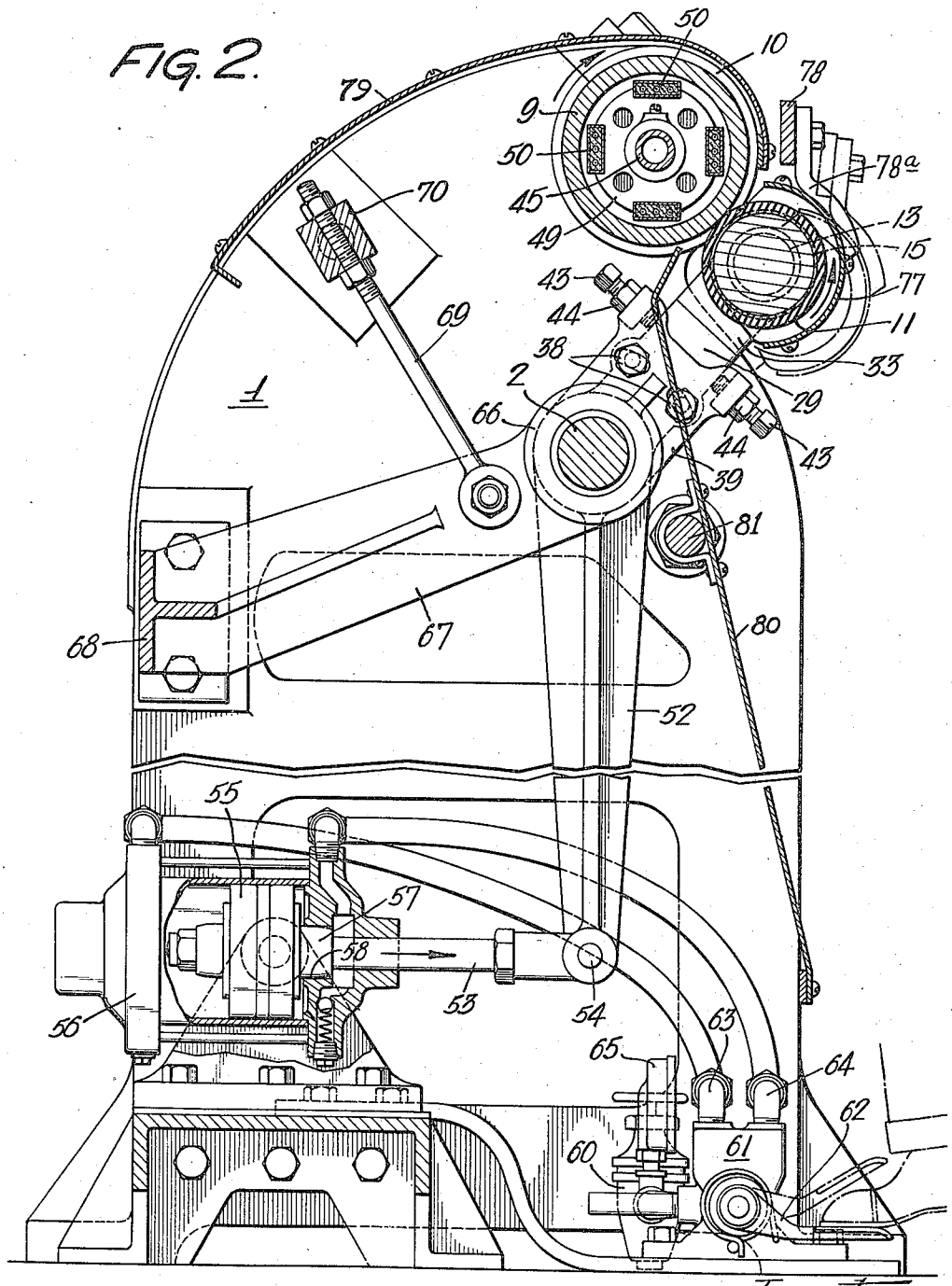
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Filed Jan. 10, 1946 4 Sheets-Sheet 2

FIG. 2.



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IRONING MACHINE

Filed Jan. 10, 1946 4 Sheets-Sheet 3

FIG. 3.

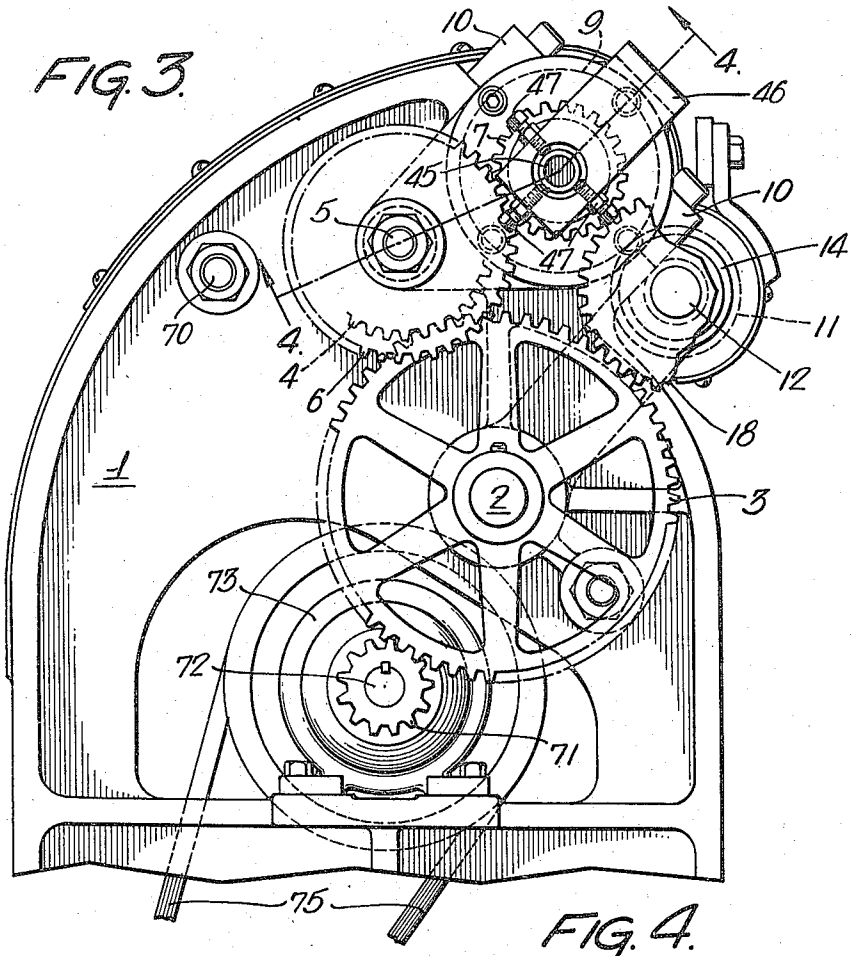
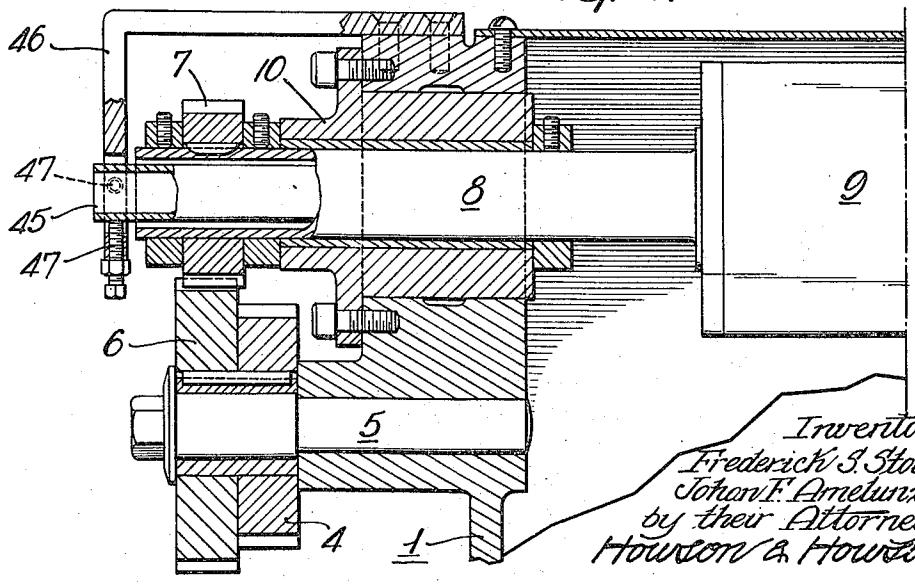


FIG. 4.



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IRONING MACHINE

Filed Jan. 10, 1946 4 Sheets-Sheet 4

FIG. 5.

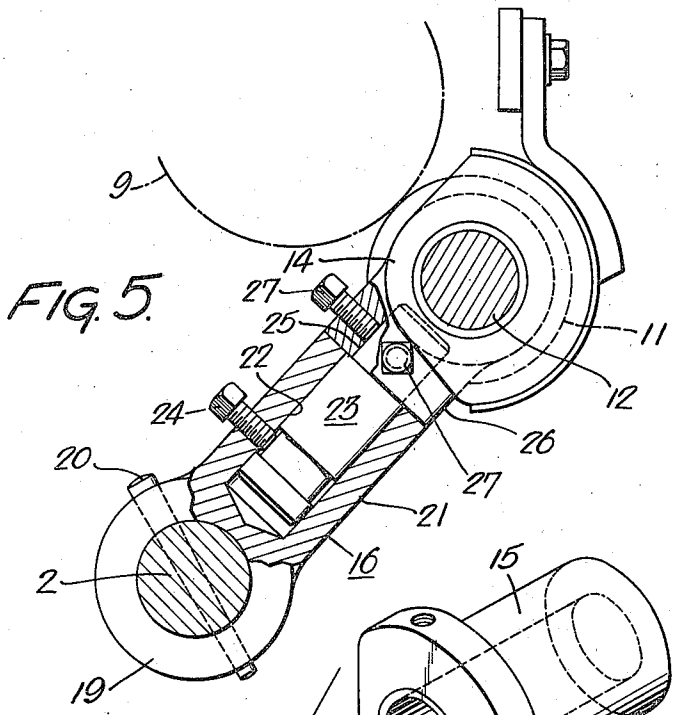
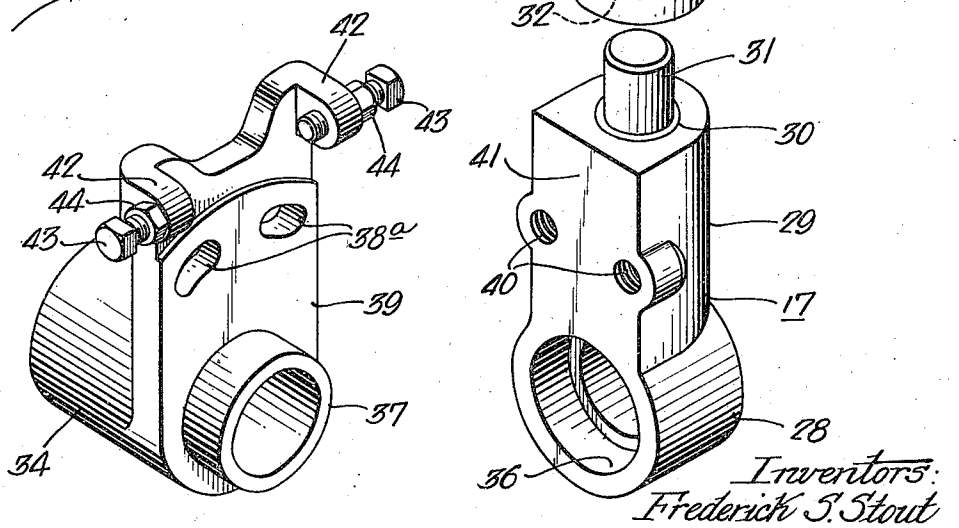


FIG. 6.



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UNITED STATES PATENT OFFICE

2,418,913

IRONING MACHINE

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Application January 10, 1946, Serial No. 640,150

5 Claims. (Cl. 69—43)

1

This invention relates to new and useful improvements in ironing machines, primarily for leather and the like.

Machines of the type with which this invention is concerned usually comprise a heated press roll and an ironing roll together with means for advancing and retracting such rolls into and out of pressure engagement. It is desirable that these rolls engage one another with uniform pressure throughout their length in order that the work passing therebetween may be subjected to uniform pressure over the entire area between the rolls, and hence at least one of the rolls should be supported in a manner that will permit of the extremely accurate adjustment or setting of the rolls with respect to each other. It is also desirable that the ironing roll be readily demountable so that such rolls may be interchanged and replaced with facility as desired or required. Furthermore, in machines of the present type, the mechanisms that have been employed to advance and retract the rolls into and out of pressure engagement have been such as to cause the rolls to engage with substantial impact with the result that the work between the rolls is marked and disfigured. In addition, it is desirable that machines of the present type embody provisions for changing the relative speeds of rotation of the rolls in accordance with the requirements of a particular job to be performed.

With the foregoing in mind, one object of the present invention is to provide an ironing machine of the stated type which embodies novel and improved means for rockably supporting one of the rolls so that the same may be accurately adjusted and set with respect to the other roll to thereby engage the same with uniform pressure throughout its length.

Another object of the invention is to provide a machine of the type set forth which embodies novel and improved mounting means for one of the rolls, said mounting means being constructed and arranged to permit interchange and replacement of the roll with facility.

Another object of the invention is to provide an ironing machine having the features and characteristics set forth having novel and improved mechanism for advancing and retracting the rolls into and out of pressure engagement and which is operable to substantially cushion impact between the rolls so as to prevent marking or disfigurement of the work.

A further object of the invention is to provide an ironing machine having the stated characteristics which embodies new and improved features of construction that permit the relative speeds of rotation of the rolls to be changed in accordance with the requirements of a particular ironing operation.

2

These and other objects of the invention together with the various features and details of the construction and operation thereof are hereinafter fully set forth and described with reference to the accompanying drawings, in which:

Fig. 1 is a front elevational view of a machine made in accordance with the present invention;

Fig. 2 is an enlarged sectional view taken on line 2—2, Fig. 1;

Fig. 3 is a fragmentary end elevational view of the machine;

Fig. 4 is an enlarged fragmentary sectional view taken on line 4—4, Fig. 3;

Fig. 5 is an enlarged fragmentary sectional view taken on line 5—5, Fig. 1; and

Fig. 6 is a view in perspective showing a novel construction made of the present invention, the several parts of said structure being shown in separated relation to better illustrate the structural details of the several parts thereof.

Referring now to the drawings, the machine comprises a suitable frame structure 1 in which is journaled a rock shaft 2. Loosely mounted on one end of the shaft 2 is a gear 3 which meshes with a pinion 4 that is mounted upon a stud shaft 5 journaled in the frame 1. Also mounted upon the stud shaft 5 outwardly of the machine with respect to the pinion 4, is a pinion 6 which meshes with a gear 7 secured to one of the trunnions 8 of a heated ironing roll 9, the trunnions 8, as best shown in Fig. 4, being journaled in bearings 10, 10 at the top of each end of the frame structure 1.

Mounted for cooperative association with the ironing roll 9 is a press roll 11, preferably rubber covered, which has its trunnions 12 and 13 journaled respectively in bearings 14 and 15 that are supported radially with respect to the rock shaft 2 by means of support arms, designated generally as 16 and 17 respectively, secured to the shaft 2 at opposite sides of the frame structure 1. The trunnion 12 at one end of the roll 11 has secured thereto a gear 18 which meshes with the gear 3 as best shown in Figs. 1 and 3 of the drawings, and it will be apparent that rocking movement of the shaft 2 does not disturb the normal meshing relation between said gear 18 and the gear 3. By rocking the shaft 2, the press roll 11 is brought into engagement with the ironing roll 9, as shown in solid lines in Fig. 2, while in a retracted position, as shown in dotted lines in Fig. 2, the roll

11 is removed from the ironing roll 9 to an extent providing for admission between the rolls of leather or other product under treatment.

One feature of the present invention is concerned with the construction and arrangement of the support arms 16 and 17 by means of which the press roll and its bearings 14 and 15 are supported with respect to the rock shaft 2. Considering first the support arm 16, this is most clearly shown in Fig. 5 of the drawings and comprises a sleeve member 19 which is fixedly secured upon the shaft 2, for example, by means of a tapered pin 20. The sleeve member 19 has formed integral therewith a laterally extending portion 21 in which there is provided a radial socket 22 that receives a pin 23 removably secured therein, for example, by means of a set screw or the like 24. The pin 23 is of greater axial length than the socket 22, and the projecting end portion of said pin 23 is received in a socket 25 provided in the extending portion 26 which is formed integral with the press roll bearing 14, the said pin 23 being releasably secured in said socket 25, for example, by means of one or more set screws or the like 27.

In a generally similar manner, the radial support arm 17 for the other press roll bearing 15 is shown in Fig. 6 of the drawings and comprises a sleeve member 28 which is mounted on the shaft 2 and provided with a lateral extension 29 having therein a radial socket 30 in which is removably secured a pin 31 that is in turn releasably secured in a radial socket 32 provided in the extension 33 of the press roll bearing 15 substantially in the manner hereinbefore described in respect to the other press roll bearing 14 shown in Fig. 5. It is to be noted, however, in the case of the support arm 15, that the sleeve member 28 is loosely mounted upon the rock shaft 2 and adapted to be secured against rotation with respect to the rock shaft 2 through an adjacent sleeve member 34 that is fixedly secured upon the shaft 2, for example, by means of a tapered pin or the like 35. The bore or shaft opening through sleeve member 28 is counterbored as indicated at 36 to receive the projecting collar portion 37 of the adjacent sleeve member 34 to thereby provide a firm, rigid interconnection between the adjacent sleeve members 28 and 34.

As previously stated herein, it is desirable that the press roll 11 be supported and carried by the rock shaft 2 in a manner to provide for the accurate adjustment and setting of the press roll 11 with respect to the ironing roll 9 in order that the rolls may engage one another with uniform pressure throughout their length. Thus, provision is made in the support arm structure 17 to permit the sleeve member 28 which carries the press roll bearing 15 to be adjusted through a limited number of degrees circumferentially of the shaft 2 with respect to the adjacent fixed sleeve member 34. To this end, therefore, the adjacent sleeve members 28 and 34 are connected together by means of bolts 38 (see Fig. 2) which extend respectively through arcuate slots 38a provided in the laterally extending portion 39 of the sleeve member 34 and threadably engage tapped openings 40 provided in the adjacent face 41 of the sleeve member 28, the arrangement being such that by loosening these bolts the sleeve member 28, and press roll bearing 15 carried thereby, may be accurately adjusted in a circumferential direction angularly with respect to the fixed sleeve member 34 to the extent limited by the length of the arcuate slots 38a.

To aid in adjusting the position of the sleeve member 28 angularly with respect to the fixed sleeve member 34, there are provided at the extremity of the laterally extending portion 39 a pair of spaced parallel lugs or projections 42 in which are threaded set screws 43 that extend inwardly and are adapted to engage the sleeve member 28 at opposite sides of the lateral portion 29 thereof. Thus, when the bolts 38 which pass through the arcuate slots 38a have been loosened to permit relative movement between the adjacent sleeve members 28 and 34, the set screws 43 may be advanced and retracted in the appropriate direction to effect a positive adjustment of the sleeve member 28 with respect to the fixed sleeve member 34 through very small angles with substantial accuracy. The set screws 43 may be provided with lock nuts 44 to secure the set screws 43 in the positions to which adjusted in setting the sleeve member 28 with respect to the fixed sleeve member 34.

By reason of the construction and arrangement of the press roll bearings 14 and 15 and their respective support arms 16 and 17, it will be apparent that not only may the press roll 11 be set and adjusted with extreme accuracy relative to the ironing roll 9 to provide interengagement therebetween with uniform pressure throughout their length, but that the press roll 11 may be readily demounted and removed from the machine for repair or replacement merely by loosening the set screws 27 thereby permitting the press roll bearings 14 and 15 to be disengaged from the pins 23 and 31 of the support arm structures 16 and 17, respectively.

The trunnions 8 of the ironing roll 9 are hollow to permit the installation in the latter of a tube 45. This tube is supported at one end by a bracket 46 which is secured to the adjacent bearing 10 and which retains the tube 45 in relatively fixed position centrally within the roll 9 and its trunnions 8 by means of set screws or the like 47. At the other end the tube 45 may be supported, for example, by a conventional bearing structure 48. Within the roll 9, the tube 45 provides a support for a number of spiders 49, and these spiders provide in turn a support for a plurality of elongated electrical heating elements 50 which extend over the full length of the roll and in close proximity to the cylindrical wall of the latter. These heating elements are connected to a suitable source of electric energy by means of wires which may extend from one end through the tube 45 through a duct 51. The electrical circuit may also comprise a thermostatically controlled switch or other suitable regulating device mounted in proximity to the surface of the roll 9, and operable to maintain the roll 9 at a predetermined desirable temperature. Control devices of this character are available in the trade, and the device itself forms no part of the present invention.

The shaft 2 is oscillated or rocked to advance and retract the press or feed roll 11 by means of a rocker arm 52 which is secured upon the shaft 2 at a position centrally between the radial support arms 16 and 17. This rocker arm 52 extends downwardly from the shaft 2 and is pivotally connected at its lower end to the free end of a piston rod 53 by means of a pin 54. The piston rod 53 has its other end connected to a piston 55 which is mounted for reciprocation in a cylinder 56 of the double-acting type. In accordance with the present invention the cylinder 56 is of the cushioned type and, to this end, there

is provided at each side of the piston 55 a cushion sleeve 57 which is adapted to enter a bore 58 in the ends of the cylinder 56 as the piston approaches the end of its stroke in either direction.

By this construction, as the cushion sleeve 57 enters the bore 58 air or fluid is trapped between the adjacent face of the piston 55 and the end wall of the cylinder 56 thereby forming a pneumatic or fluid cushion which acts over the entire piston diameter. The taper and tolerances of the cushion sleeves 57 and cooperating bores 58 are accurately predetermined to provide a positive cushion action which remains constant at all times without the necessity of adjustment or maintenance. By utilizing a cushioned cylinder of the type described, it will be apparent that the cushion effect produced in the cylinder 56 likewise will cushion the engagement between the press roll 11 and the ironing roll 9 thereby allowing the former to be advanced rapidly and in a positive manner yet free from substantial impact that would result in the leather or other work being marked and disfigured.

Actuation of the piston 55 is effected by a compressed air system wherein air under pressure is supplied through a pipe 59 (and this system is also adaptable to other fluids), a reducing valve 60 and a distributor valve 61 that is operated by means of a foot treadle or the like 62 to control the flow of air through one of the pipes 63 or 64 to the appropriate side of the piston 55, the said distributor valve 61 operating simultaneously to connect the other of said pipes to the exhaust line (not shown) of the air system. If desired, a suitable pressure gauge 65 may be inserted in the air system ahead of the reducing valve 59 to enable accurate control of the air pressure in the system by manipulation of the reducing valve.

In addition to being journaled in the side portions of the frame structure 1, the shaft 2 is journaled in bearings 66 which embrace the shaft 2 at its midportion at opposite sides of the rocker arm 52 thereon. The bearings 66 are carried at the forward or outer end of a support or arm 67 which inclines forwardly from a cross-member 68 that connects between the side portions of the frame structure 1 at the rear thereof. By this construction, the shaft 2 is supported against deflection as a result of the pressure exerted thereon when the press roll 11 is engaged with the ironing roll 9. Support of the shaft 2 against deflection in this manner may be augmented by providing a tie-bolt 69 between the support or arm 67 and a cross-member 70 of the frame structure.

The gear 3 is driven from a pinion 71 mounted upon the driven shaft 72 of a reduction gear mechanism 73, the drive shaft 74 of which is driven through a conventional belt drive 75 by a motor 76 mounted on the bottom cross-member of the frame structure 1. The reduction gear or transmission 73 preferably is such that, with the particular ratio of the pinion 6 and gear 7, the ironing roll 9 is rotated at a faster rate than the press roll 11, and as the work piece is fed between the rolls the increased friction between the work and the rubber-covered roll 11, the smooth-faced metal ironing roll 9 will slide over the surface of the work, thereby giving the desired ironing action. Rotation of the rolls is in the directions indicated by the arrows in Fig. 2. Apart from the foregoing, it is to be noted that the construction and arrangement of the pinions and gears for driving the ironing roll 9 from the gear 3 is such that the relative speeds of rotation of the roll 9 with respect to the press roll 11 may be varied by substituting different sized pinions and gears for the pinion 6 and gear 7, and the construction and arrangement shown is particularly adapted to this purpose.

The press roll 11 may be protected by a cover plate 77 which has its opposite ends secured to the press roll bearings 14 and 15, and the bite between said roll 11 and the ironing roll 9 may be guarded by a bar 78 secured to the cover plate 77 by arms 78a. In addition, the ironing roll 9 and rearwardly adjacent portions of the machine may be enclosed and protected by a cover plate 79, and the front of the machine may be enclosed and protected by a plate 80 which inclines slightly inwardly (see Fig. 2), and has its upper end configurated and disposed so that the work passing downwardly from between the rolls 11 and 9 is directed forwardly and out of the machine, the plate 80 being supported in the relation described, for example, by means of a cross-member 81 of the frame structure 1.

The mode of operation of the machine will be apparent from the foregoing description. The operator after inserting one edge of the work between the separated rolls 11 and 9 presses the treadle 62, thereby confining the work under the required pressure between the rolls. The work is fed inwardly with the ironing action previously described until the operator releases the treadle 62, at which time the parts return to their original positions as shown in the drawings, releasing the work and permitting its readjustment between the rolls to cover any areas thereof which were not ironed in the first pass. Since the roll-driving elements are all positioned at one side of the machine, the opposite ends of the rolls are left relatively unobstructed, so that the work, if desired, may be passed inwardly between the rolls from that end. As previously described, the pressure of the rolls is uniform over their entire lengths, so that the ironing action is correspondingly uniform over the entire surface area of the work.

From the foregoing description, it will be apparent that the present invention provides an ironing machine of the stated type wherein the movable one of a pair of cooperatively associated rolls is rockably supported in a manner to permit the roll to be accurately adjusted and set with respect to the other roll so as to engage the latter with uniform pressure throughout its length. The invention also provides a machine wherein the mounting means for the movable roll is such that the roll may be readily removed from the machine for purposes of repair or replacement. The invention further provides novel mechanism for advancing and retracting the rolls into and out of pressure engagement that is operable to substantially cushion the rolls against impact upon engagement so that work therebetween will not be marked and disfigured. In addition, the construction of the machine is such as to permit the relative speeds of the rolls to be changed as required or desired.

While particular embodiments of the features of the present invention have been illustrated and described herein, it is not intended that the invention be limited to such disclosures, and changes and modifications may be made and incorporated within the scope of the claims.

We claim:

1. In an ironing machine, a rock shaft, a first roll relatively fixed with respect to said rock shaft,

radial arms on said rock shaft adjacent opposite ends thereof, bearings detachably mounted at the extremities of said radial arms, a second roll journaled in said bearings, said rock shaft being actuable to advance and retract said second roll into and out of pressure engagement with said first roll, means associated with one of said radial arms on the shaft to vary the position of the bearing supported thereby circumferentially of the rock shaft with respect to the bearing on the other arm and thereby set said second roll with respect to the first roll to engage the latter with uniform pressure throughout its length, and mechanism to actuate said rock shaft comprising means operable to cushion impact between said rolls when the same are advanced into pressure engagement.

2. In an ironing machine, a rock shaft, a first roll relatively fixed with respect to said rock shaft, radial arms on said rock shaft adjacent opposite ends thereof, bearings detachably mounted at the extremities of said radial arms, a second roll journaled in said bearings, said rock shaft being actuable to advance and retract said second roll into and out of pressure engagement with said first roll, means to vary the position of one of said arms on the shaft circumferentially thereof with respect to the other arm to set said second roll with respect to the first roll so as to engage the latter with uniform pressure throughout its length, and mechanism to actuate said rock shaft comprising a rocker arm on the shaft intermediate and approximately equidistant between said arms, a fluid actuated piston operatively connected to said rocker arm, and means associated with said piston operable to cushion movement thereof in at least one direction to thereby cushion impact between said rolls when the same are advanced into pressure engagement.

3. In an ironing machine, a rock shaft, a first roll relatively fixed with respect to said rock shaft, a second roll, bearings rotationally supporting said second roll at opposite ends thereof, said bearings each having a socket formed therein radially of the second roll, radial supports on the rock shaft constituting a support for the bearings of said second roll and including means at the extremities of said arms engaging the sockets of said bearings, and means to releasably secure the extremities of said arms in the sockets of said bearings.

4. In an ironing machine, a rock shaft, a first roll relatively fixed with respect to said rock shaft, bearings rotationally supporting said second roll at opposite ends thereof, said bearings each having a radial socket therein, radial support arms on the rock shaft adjacent its opposite ends and

constituting supports for the bearings on said second roll, a radial bearing pin carried by each of said support arms engaging the sockets in said bearings, means releasably securing said pins in said sockets, said rock shaft being actuable to advance and retract said second roll into and out of pressure engagement with said first roll, at least one of said radial support arms comprising a first sleeve member loosely mounted on said rock shaft and carrying the radial bearing pin, a second sleeve member fixed on said rock shaft, means to secure said first and second sleeve members together to fix the position of the latter circumferentially with respect to the shaft, and means on the second sleeve member operable to vary the position of the first sleeve member relative to said second sleeve member and circumferentially of the shaft to accurately align said bearings and set the second roll with respect to the first roll to engage the latter with uniform pressure throughout its length.

5. In an ironing machine, a rock shaft, a first roll relatively fixed with respect to said rock shaft, bearings rotationally supporting said second roll at opposite ends thereof, radial support arms on the rock shaft adjacent its opposite ends and constituting supports for the bearings on said second roll, at least one of said radial support arms comprising a first sleeve member supporting one of said bearings and loosely mounted on said rock shaft, a second sleeve member fixed on said rock shaft, means to secure said first and second sleeve members together to fix the position of the latter and the bearing thereon circumferentially with respect to the shaft, and means on the second sleeve member operable to vary the position of the first sleeve member relative to the second sleeve member and circumferentially of the shaft to accurately align the bearing thereon with the bearing supported by said other support arm.

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