Nov. 8, 1955 P. A. LONG 2,722,761

FLATWORK IRONER

Filed July 10, 1952

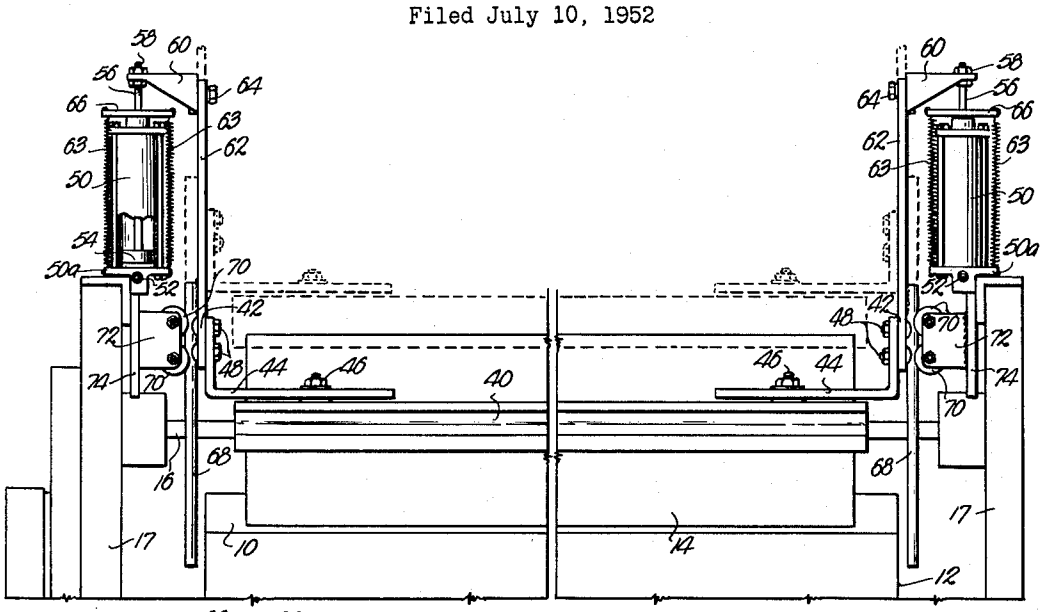


Fig. 1.

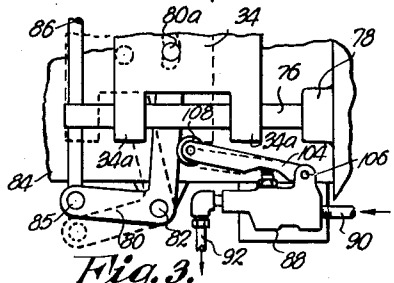


Fig. 3.

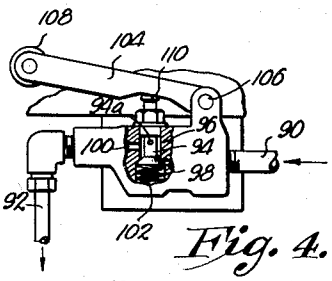


Fig. 4.

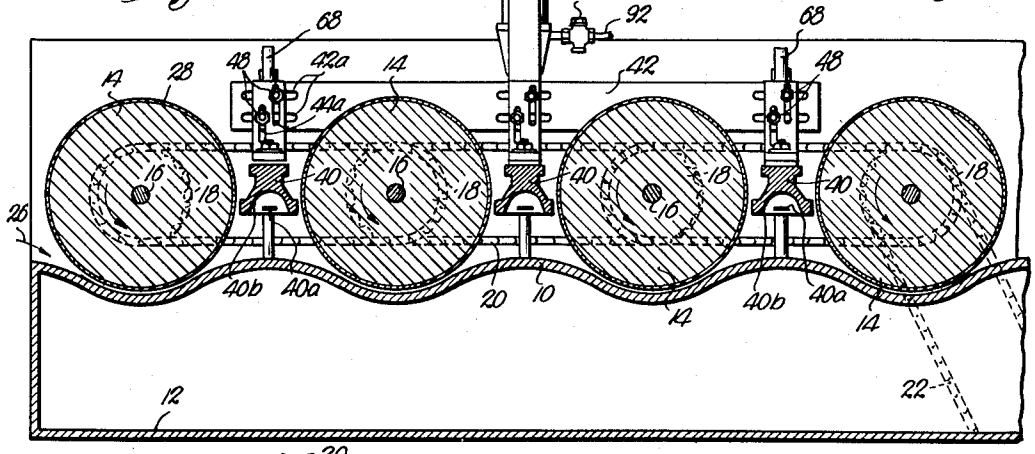


Fig. 2.

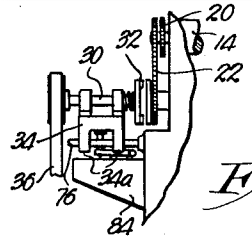


Fig. 5.

INVENTOR.
Phillip A. Long
BY
Thos. E. Scofield
ATTORNEY.

United States Patent Office

2,722,761

Patented Nov. 8, 1955

2,722,761

FLATWORK IRONER

Phillip A. Long, Kansas City, Mo., assignor of one-half to A. O. Long, Jr., Johnson County, Kans.

Application July 10, 1952, Serial No. 298,122

6 Claims. (Cl. 38—56)

This invention relates to continuous flatwork ironers of the type generally used in commercial laundries, and refers more particularly to a heating and supplementary drying apparatus to be used in conjunction therewith.

In most commercial laundries, the "flatwork" (such as sheets, pillowcases, and related items) is ironed by passing it through what is known to the trade as a continuous flatwork ironer. Conventionally, these machines consist of a pressing bed of relatively large area and a plurality of spaced, parallel rolls mounted thereabove, the peripheries of the rolls being located in close proximity to the pressing bed. A drive mechanism is connected with the rolls to rotate them in the same direction, and the flatwork is impelled across the surface of the pressing bed by the action of the rolls, the cloth being fed between the rolls and the pressing bed. The heat necessary for drying of the excess moisture in the cloth is supplied by steam, the pressing bed generally being formed as the upper surface of a steam chest through which live steam is circulated in the conventional manner.

Heretofore, the volume of material which could be passed through the ironer over any given period of time has been limited by the temperature of the steam supplied to the steam chest. Obviously, with low temperatures, the speed of the rolls must be relatively slow to allow sufficient time for the material to dry. Even with the steam at its maximum practicable temperature (approximately 300° F.) the volume capacity of the machine leaves much to be desired, and this condition is aggravated at times when the moisture content of the air in the laundry is high.

A primary object of this invention is to overcome the above difficulties, among others, by providing supplemental heating and drying means which increases the volume output of the ironer without a concurrent loss in ironing efficiency.

Another object is to provide a supplemental heating means which is in operative position with respect to the material while the ironing rolls are engaged with their drive mechanism, but which, upon accidental or intentional disengagement of the drive means, shifts to an inoperative position to avoid scorching or burning of the cloth. In this connection, it is another object to provide a simple and fool-proof mechanism for the above purpose which is responsive to operation of the clutch mechanism of the ironer.

Still another object is to provide a supplemental heating apparatus of the character described above which may be readily adapted to existing ironing machines; which is simple and economical to manufacture; and which is safe in operation.

Other and further objects together with the features of novelty appurtenant thereto will appear in the course of the following description.

In the drawings which form a part of the specification and are to be read in conjunction therewith, and in which like reference numerals indicate like parts in the various views:

Fig. 1 is an end elevational view of a flatwork ironer equipped with a preferred embodiment of my invention, the end-most ironing roll having been removed for purposes of illustration;

Fig. 2 is a sectional view of an ironer equipped with my invention, the section being taken in a plane transverse to the rolls;

Fig. 3 is a detailed plan view of the valve and valve actuating mechanism of the invention;

Fig. 4 is an enlarged plan view of the valve shown in Fig. 3, part being broken away for purposes of illustration; and

Fig. 5 is a somewhat schematic end elevation of the clutch mechanism through which the rolls are engaged and disengaged from the drive means, and which serves as the actuating means for the valve of Figs. 3 and 4.

Referring to the drawing, in Figs. 1 and 2 are shown the essential elements of a flatwork ironer of a type well known to the trade. As is best observed from Fig. 2, the pressing bed of the ironer is formed by the undulated upper surface **10** of a hollow casing or steam chest **12** into which live steam may be introduced by any suitable means. A plurality of parallel rolls **14** are suspended above the pressing bed **10** on shafts **16** which are rotatably journaled at opposite sides of the pressing bed in rigid vertical members **17** which extend the length of the pressing bed and form the sides of the framework of the machine. The rolls **14** can be coupled in any conventional fashion to turn together; conveniently, for example, they are connected with one another through a series of sprockets **18** and horizontal chains **20** (shown in broken lines in Fig. 2) and an inclined drive chain **22** leads from the drive mechanism of the ironer to one of the rolls so that they can be rotated in the direction shown by the arrows.

The fabrics to be ironed are introduced between the endmost roll **14**, and the pressing bed **10** as shown by the arrow **26**, and are passed across the pressing bed by the action of the successive rolls until they are delivered to the discharge of the machine, where they are manually folded and packaged for delivery. Generally, the rolls **14** are provided with relatively porous covers **28**, preferably of fabric and/or asbestos.

Since the drive mechanism for the ironer is conventional in arrangement, it has been schematically shown in Fig. 5. The main drive chain **22** for the rolls **14** is connected to the drive shaft **30** through a conventional disk-type clutch **32** which can be engaged and disengaged through the shifting of a sliding carriage **34**. The drive shaft **30** is driven through a belt **36** which passes around a pulley at the end of shaft **30**; the other end of belt **36** is connected with a conventional prime mover (not shown).

Turning now to the description of the supplemental heating means and the mechanism by which it is operated, and referring again in particular to Figs. 1 and 2, **40** designates each of three radiant heating elements which are positioned between and parallel to the rolls **14**. Heating elements **40** are of a standard construction well-known to the trade, being preferably of the electrical resistance type, and comprising essentially an electrical resistance element or filament **40***a* extending from one end to the other within a concave recess **40**b which provides a reflector surface for directing the heat generated by filament **40***a* downward toward the pressing bed **10**. The length of the heating elements **40** is substantially equal to that of the rolls **14** so that the radiant heat is applied over the entire width of the pressing bed.

The heating elements **40** are suspended at each end from horizontal frame members **42** extending transversely of the rolls **14** and parallel to the sides **17** of the ironer. L-shaped angle members **44** serve as the connecting means

to frame members 42, each having a horizontal leg overlying and bolted to the top of its responsive heating element 40 by a bolt 46, and a vertical leg bolted to the frame member 42 by bolts 48. As is particularly evident from Fig. 2, bolts 48 are received in slots 44*a* and 42*a* formed respectively in angle members 44 and frame members 42 at right angles to each other; this permits of both horizontal and vertical adjustment of the heating elements 40 with respect to the frame members 42 so that they may be centered between the rolls 14 and disposed at a proper height above the pressing bed 10. In the latter connection, it will be understood that the spacing of the heating elements 40 above the pressing bed is based mainly on the speed at which the flatwork is fed through the ironer. For high volume machines, i. e., machines in which the fabrics are fed through at a relatively fast rate, the spacing of the heating elements 40 above the pressing bed 10 (and thus above the fabric) can be considerably less than would be necessary to prevent scorching or burning in a low volume ironer. In any event, this is a factor to be determined by the operator, taking into account also the thickness of the fabrics, porosity of the material, and moisture content of the atmosphere.

To provide means for shifting the heating elements 40 upwardly to a safe position if for any reason the ironer should be stopped and the fabrics thus immobilized, I have provided the cylinder and piston arrangement best seen in Fig. 1. The cylinders, indicated at 50, are disposed vertically on opposite sides of the ironer and are rigidly secured to the upper edges of the respective sides 17 of the ironer. An inlet 52 for a pressurized fluid, preferably air, is provided in the lower portion of each cylinder 50, and located within the cylinder is a reciprocable piston 54 having an upwardly extending shaft 56 which projects through the top of the cylinder. Connected to the upper ends of shafts 56 by any suitable means, for example nuts 58, are laterally extending hanger brackets 60 which in turn are secured to the upper ends of vertical hanger members 62 by bolts 64. The lower ends of members 62 are secured centrally by any suitable means, such as welding, to the horizontal frame members 42 so that in effect the heating elements 40, frame members 42, and hanger members 62 form a rigid unit carried on each side by the pistons 54. Each piston 54 acts vertically against two springs 63 disposed on opposite sides of the cylinder 50, the upper ends of the springs being connected to a cross-arm 66 secured to the piston shaft 56 and the lower ends connected to the base 50*a* of the cylinder.

Tn insure that in shifting the heating elements 40 they will follow a fixed vertical path, secured to the horizontal frame members 42 at the point of attachment for each of the heating elements is a vertical cylindrical rod 68 which rides in a track formed by two vertically spaced circumferentially grooved rollers 70. Rollers 70 are stationary, being rotatably carried in inwardly extending mounting plates 72 which are welded at their rearward edges to transverse members 74 fixedly secured to the respective sides 17 of the ironer. The lengths of rods 68 are, of course, greater than the stroke of the piston 54.

To provide means for supplying air to the cylinders 50 at the proper times, I have developed the following arrangement. As was briefly explained hereinbefore, a conventional clutch 32 (Fig. 5) which is engaged and disengaged by means of a shifting carriage 34 slidably mounted on the drive shaft 30 serves to stop and start the rotation of the rolls at the desired times. As may be best appreciated from Fig. 3, carriage 34 besides being carried by drive shaft 30, has legs 34*a* which are slidably mounted on a rod 76 affixed at 78 to the side 17 of the ironer. A horizontal bell crank 80 is pivotally mounted at 82 on a platform 84 extending outwardly from the side of the ironer, and one end of the bell crank 80 is pivotally connected at 80*a* with carriage 34 to shift it to the position shown in the dotted lines in Fig. 5. The other end of bell crank 80 is pivotally connected as shown at 85 with a push rod 86 which leads to a clutch lever (not shown) for the operator.

Mounted on platform 84 in close proximity to the legs 34*a* of the shifting carriage 34 is a valve unit 88 through which control of the air to the cylinders 50 is obtained. An air line 90 leads from a suitable pressure supply unit such as a compressor (not shown) to one end of the valve body and a discharge line 92 leads from the other end to the inlets 52 of the cylinders 50. Retsricted orifice valves 92*a* are provided in lines 92 near each cylinder 50 to equalize the pressures delivered to the cylinders. The valve unit 88 is of a standard type, having a plunger 94 (see Fig. 4) located in a valve chamber 96 which communicates respectively with air lines 90 and 92 through passageways 98 and 100. The lower portion of the valve plunger 94 normally blocks the entry of air through inlet passageway 98, being maintained in its seated position as shown by a coiled compression spring 102. To depress the plunger 94 and thereby allow the air pressure to be transmitted to line 92, a pivotal depressor arm 104 is pivotally connected with the valve body at 106. The free end of arm 104 is provided with a roller 108 which is positioned in the path of one of the yoke legs 34*a*; as the yoke shifts to the position shown in the broken lines, the leg 34*a* engages the roller 108 thereby causing the arm 104 to pivot inwardly and depress the plunger 94 so that the air pressure in transmitted to the cylinders 50. Upon shifting of the carriage 34 back to its original position (in which the clutch is engaged and the ironer in operation), arm 104 is released and the pressure inlet 98 again closed.

To allow the air in the cylinders 50 to escape when the valve is again seated, plunger 94 has an interior passageway communicating with the valve chamber 94 through a small radial port 94*a* and opening to the atmosphere through a cap-type check valve 110 at the outer end of the plunger. During the time that the depressor arm 104 is engaged by leg 34*a* of the yoke, check valve 110 remains closed; however, when released, the air pressure is sufficient to unseat the valve 110, and the air escapes to the atmosphere thereby allowing pistons 54 to descend, and the heating elements 40 to assume their normal operative position with respect to the pressing bed 10.

The operation is believed to be clear from the foregoing description, and may be briefly summarized as follows: During normal operation of the ironer; i. e., with the clutch 32 engaged and the rolls 14 rotating to pass the fabrics across the pressing 10, the heating elements 40 occupy the position shown in the solid lines in Figs. 1 and 2. The plunger valve 94 in valving unit 88 is seated, thereby preventing the air pressure in line 90 from being communicated to cylinders 50, and pistons 54 are disposed at the bottoms of the cylinders.

When for any reason it becomes desirable to disengage clutch 32 and halt the rollers 14, the operator actuates the push rod (Fig. 3) to pivot the bell crank 80 and thus shift carriage 34 to the position shown in the broken lines. Upon such shifting, leg 34*a* of the carriage engages the depressor arm 104 which causes the plunger valve 94 to move from its seated position with respect to the air inlet passageway 98 and thus communicate the air pressure in line 90 to the cylinders 50. Under the influence of the pressure, pistons 54 are driven upwardly to carry the heating elements 40 to the position shown in the broken lines in Fig. 1, or well above the pressing bed 10. So long as the clutch 32 remains disengaged, the heating elements 40 will be maintained in this position, and scorching or burning of the fabrics immobilized on the pressing bed 10 will be prevented.

Upon engagement of the clutch 32, which is accomplished by drawing the push rod 86 back to its original position and shifting carriage 34 in the opposite direction, the depressor arm 104 is freed, plunger 94 again seats to

close off the air inlet **98**, and as the air escapes through check valve **110** the pistons **54** descend in the cylinders aided by springs **63**. The heating elements **40** are thus returned to their original position, and ironing continues in the normal manner.

I have found that by using the above described unit, the capacity of the ironer based on the volume of material which can be ironed over a fixed period is increased at least 25%. Furthermore, where in many instances prior to the development of the invention, items such as pillowcases having a double or quadruple thickness of cloth had to be run through the ironer a second time to obtain complete drying, the use of radiant heating elements completely obviates the necessity of continuing this practice.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. Apparatus of the character described comprising a continuous ironer having a stationary bed and drive means cooperating therewith for passing a fabric across said bed, clutch means for engaging and disengaging said drive means, a heating element having its heating surface directed toward said bed, a carriage for said heating element movably supported for linear displacement toward and away from said bed, a reciprocable power unit connected with said carriage having a first position in which said heating element is in close proximity to said bed and a second position in which said heating element is displaced linearly to a point more remote from said bed, and control means for said power unit operated responsive to said clutch means to cause said power unit to shift said heating element from said first position to said second position upon disengagement of said drive means.

2. Apparatus of the character described comprising a continuous ironer having a stationary bed and a plurality of rotatable ironer rolls disposed in spaced parallel relation across said bed, drive means for rotating said rolls to pass a fabric across said bed, clutch means for engaging and disengaging said drive means, a plurality of heating elements disposed between said rolls with their heating surfaces directed toward said bed, a shiftable carriage for said heating elements supported for reciprocating movement between a first position in which said heating elements are in close proximity to said bed and a second position in which said heating elements are displaced linearly to a more remote position with respect to said bed with their heating surfaces still directed toward said bed, power means for shifting said carriage between said first and second positions, and control means for said power means operated responsive to said clutch means to cause said carriage to shift from said first position to said second position upon disengagement of said drive means and to cause said carriage to return to said first position upon engagement of said drive means.

3. Apparatus of the character described comprising a continuous ironer having a stationary bed and drive means cooperating therewith for passing a fabric across said bed, clutch means for engaging and disengaging said drive means, a heating element having its heating surface directed toward said bed and movably supported for displacement in a fixed path toward and away from said bed, a cylinder member, a piston member within said cylinder, one of said members being stationary and the other of said members being connected with said heating element, a source of fluid communicating with said cylinder, valve means interposed between said source and said cylinder and actuated responsive to said clutch means to cause said other member to be displaced with respect to said one member thereby to displace said heating element away from said bed upon disengagement of said drive means, and means causing said other member to return to its original position upon engagement of said drive means.

4. Apparatus of the character described comprising a continuous ironer having a stationary bed and a plurality of rotatable ironer rolls disposed in spaced parallel relation across said bed, drive means for rotating said rolls to pass a fabric across said bed, clutch means for engaging and disengaging said drive means, a vertically movable carriage disposed above said rolls, a plurality of heating elements suspended from said carriage and normally disposed between said rolls in close proximity to said bed, power means connected with said carriage for lifting same to a more remote position with respect to said bed thereby to elevate said heating elements to a second position above their normal position, and control means for said power means actuated responsive to said clutch means to cause said lifting of said carriage when said drive means is disengaged and the passage of said fabric halted.

5. Apparatus of the character described comprising a continuous ironer having a stationary bed and drive means cooperating therewith for passing a fabric across said bed, a heating element having its heating surface always directed toward said bed and movably supported for travel along a fixed path toward and away from said bed, said element having a first position in close proximity to said bed and a second position at a point more remote from said bed, reciprocating means connected with said element for shifting same between said first and second positions, and control means for said reciprocating means actuated responsive to said clutch means to cause said element to shift from said first position to said second position upon disengagement of said drive means and to return to said first position upon re-engagement of said drive means.

6. Apparatus of the character described comprising a continuous ironer having a support frame, a stationary bed carried by said frame, a plurality of rotatable ironer rolls journaled in said frame and disposed in spaced parallel relation across said bed, drive means for rotating said rolls to pass a fabric across said bed, clutch means for engaging and disengaging said drive means, a carriage disposed above said rolls, reciprocating means connected with the sides of said carriage and said frame for raising and lowering said carriage with respect thereto, a plurality of heating elements carried by said carriage and depending therefrom between said rolls, and means operatively associated with said reciprocating means and actuated by said clutch means to cause said carriage to rise on disengagement of said drive means and to lower again upon engagement of said drive means.

References Cited in the file of this patent

UNITED STATES PATENTS

1,979,845	Schallis	Nov. 6, 1934
2,127,956	Helmar	Aug. 23, 1938
2,210,032	Hess	Aug. 6, 1940
2,422,481	Grantham	Jan. 17, 1947