

(No Model.)

2 Sheets—Sheet 1.

F. C. WENDELL.
IRONING MACHINE.

No. 518,871.

Patented Apr. 24, 1894.

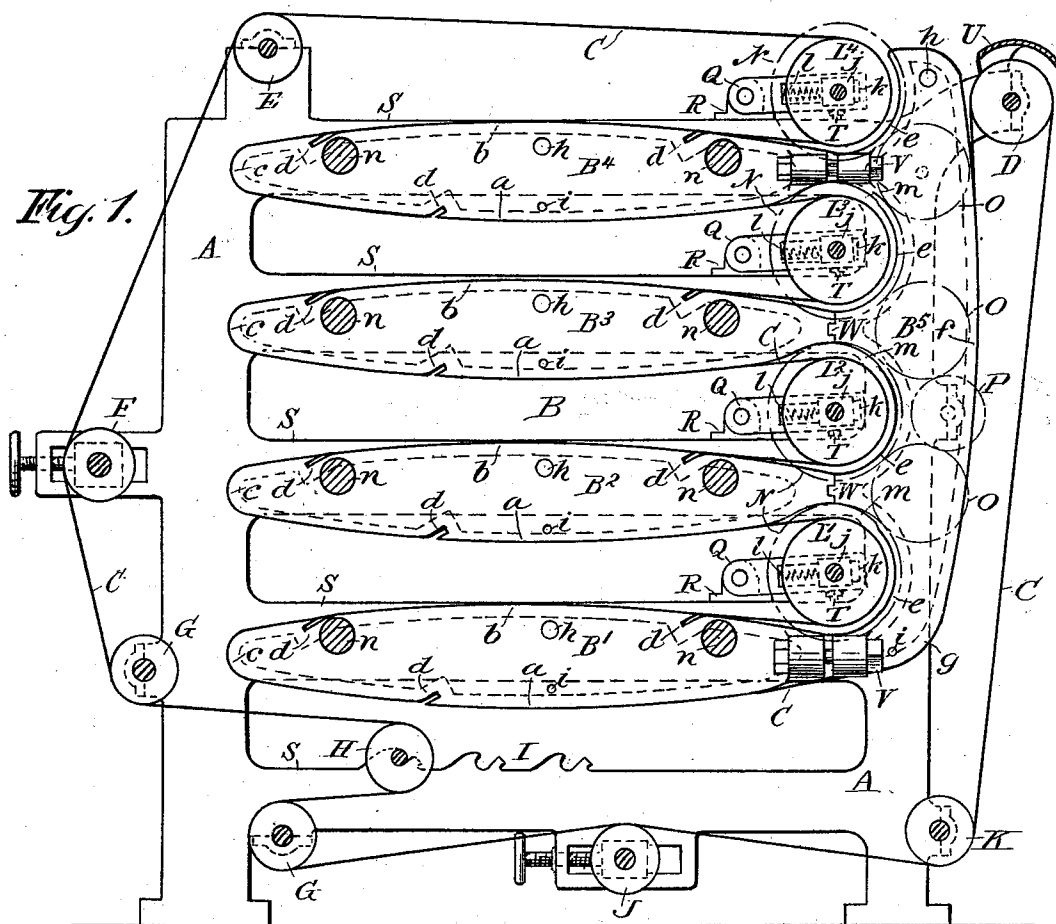
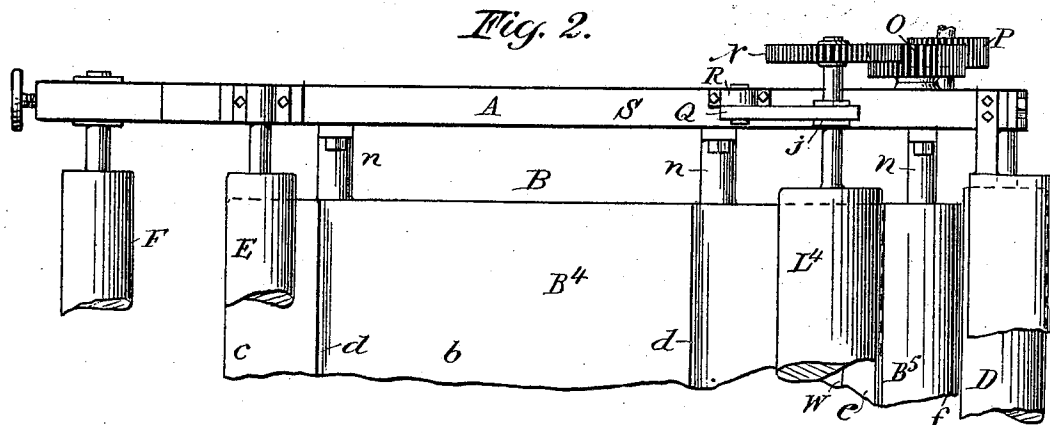


Fig. 2.



WITNESSES:

Fred White
C. K. Draper

INVENTOR:

Fred C. Wendell,

By his Attorneys,

Arthur C. Braver & Co

(No Model.)

2 Sheets—Sheet 2.

F. C. WENDELL.
IRONING MACHINE.

No. 518,871.

Patented Apr. 24, 1894.

Fig. 3.

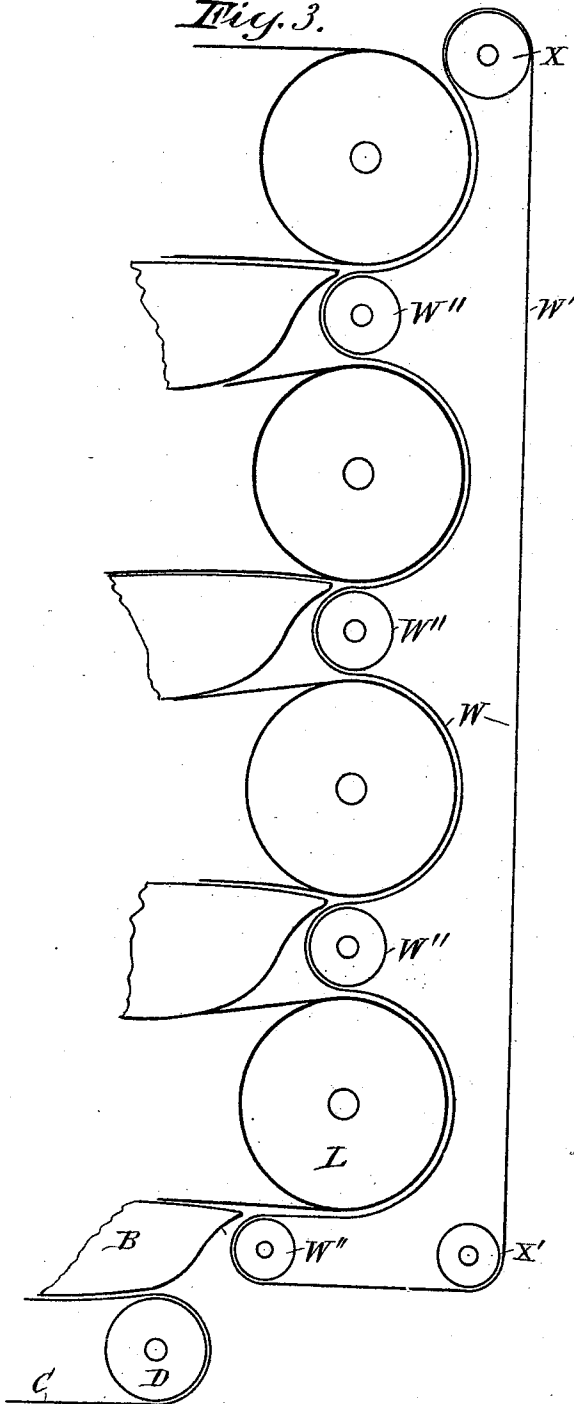


Fig. 4.

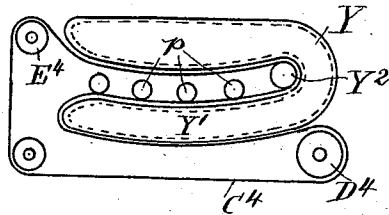
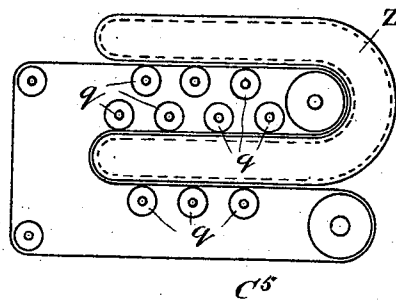


Fig. 5.



WITNESSES:

Fred White
C. K. Fraser.

INVENTOR:

Fred C. Wendell,

By his Attorneys,

Arthur C. Fraser & Co.

UNITED STATES PATENT OFFICE.

FREDERICK C. WENDELL, OF BROOKLYN, NEW YORK.

IRONING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 518,871, dated April 24, 1894.

Application filed March 20, 1893. Serial No. 466,957. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK C. WENDELL, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Ironing-Machines, of which the following is a specification.

This invention relates to ironing machines or mangles, and aims to provide an improved machine of this character which will be simple in its structural features, will occupy comparatively little space while having an extensive ironing surface, and in which a large proportion of the heat applied to the machine can be utilized in the ironing operation.

Ironing machines have been constructed with steam heated drums, some rotary, about which the material to be ironed has been carried by aprons and rollers, and others stationary, and across one side of which the material has been dragged by an apron.

My invention is especially designed to improve the latter class of machines, but certain of its features can be availed of generally in ironing machines.

In carrying out my invention I provide certain features of improvement which will be hereinafter fully set forth.

In the accompanying drawings which illustrate certain adaptations of my invention, Figure 1 is a vertical section, between the frame and drums, of a mangle constructed according to the preferred form of my invention. Fig. 2 is a fragmentary plan view thereof, the apron being omitted. Fig. 3 is a diagrammatic elevation of a modified form of mangle, one half being broken away. Fig. 4 is a similar view of another modification, and Fig. 5 is a similar view of still another modification.

Referring to the drawings, let A indicate the framework of the machine, B the drums as a whole, C the apron carrying the goods to be ironed, D the feed roller over which this apron passes on entering the machine, E the delivery roller for the apron at the exit of the machine, F the usual adjusting roller for adjusting the tension of the apron and taking up the slack of either side thereof as usual, G G idler rollers for the apron, H a reefing roller between the idler rollers, I a rack for holding the reefing roller in its various posi-

tions, which is of known construction, J another adjusting roller, and K the return idler roller over which the apron passes to the feed roller.

Referring to Figs. 1 and 2 I will now describe the preferred form of my invention. According to this construction I provide an oblong and substantially flat hollow steam drum having preferably convex opposite faces *a b* and a rounded end face *c*, which faces constitute the ironing faces of the drum, being substantially the entire outside thereof. The goods to be ironed are dragged over these faces by the apron, being carried successively over the first face *a* and then across the rounded end *c* and back over the second face *b*. Preferably the entrance and discharge ends of the opposite faces are within the bulge of their convexity, and the apron enters and leaves in contact with these entrance and discharge faces, whereby by its tautness it maintains intimate contact of the goods against the remainder of the convex portions of the respective ironing faces of the drum.

Preferably improved moisture escape grooves are provided in the ironing faces according to my invention. These grooves lettered *d* are preferably formed integrally in the metal walls of the drum and traverse laterally the entire width of the ironing faces thereof. In the construction shown one groove is provided in the face *a* and two in the face *b*, and the grooves are disposed at an inclination relatively to the faces, their openings in the faces opening toward the direction of movement of the goods over the latter, whereby the passage of the goods over the grooves is not resisted. Preferably the farther side of the groove is slightly rounded at its junction with the face to facilitate the passage of the goods. Any moisture driven from the goods while in contact with the drum can escape through these grooves.

Preferably a plurality of analogous substantially flat drums are employed, grouped together in as close proximity as convenient, and disposed in substantially parallel planes. In the drawings four of these drums are shown, the lowermost lettered *B'*, the next *B''*, the next *B'''*, and the next *B''''*, and the apron C traverses the ironing faces of one, then those of another, and so on travers-

ing successively the respective faces of all the drums. Preferably the apron traverses the drum B' first and B⁴ last, whereby the goods rise from the bottom to the top of the machine and are delivered at the top, traversing a tortuous or circuitous path of substantially continuous ironing surface.

Various expedients for transferring the apron and the goods it carries from the ironing face of one drum to the adjacent face of the next drum may be employed. According to the preferred form of my invention, I provide transfer rollers carrying the apron and its goods from one ironing surface to the next. Preferably a plurality of these are employed, four being shown in Fig. 1 where they are lettered L¹, L², L³ and L⁴ respectively. The first carries the apron and its goods from the delivery end of the ironing face *b* of the lower drum to the entrance end of the ironing face *a* of the succeeding drum. The next performs the same function between the two succeeding ironing faces, the next the same between the next faces, and the last L⁴ carries the apron and its goods from the top face of the drum B⁴ upwardly and free from the ironing faces. The apron passes over this roller and rearwardly over the delivery roller E, at which point the ironed goods may be removed in any suitable manner.

Preferably I continue the ironing surface around the transfer rollers by providing an intermediate ironing face *e* between each drum and the next, which at one end coincides with the face *b* of the one drum, and at the other end meets the face *a* of the next drum, whereby in their transit from one drum to the next the goods are substantially continuously ironed and the ironing surface is a substantially continuous, tortuous ironing surface. Preferably these ironing surfaces *e* constitute the walls of a steam jacket or drum, giving a heating surface as well as an ironing surface. This may be variously accomplished, but I prefer to provide an auxiliary steam drum B⁵, one side of which embraces all the ironing faces *e*, and the other side of which, as well as its end, is also utilized to form ironing faces *f* and *g* respectively. By disposing the other drums horizontally and the auxiliary drum vertically, the latter can embrace the ends of all the horizontal drums, all the transfer rollers, and provide a long substantially vertical ironing face from the top of the machine to the face *a* of the lower drum. Thus the goods entering at the feed roller D at the top of the drum B⁵ will traverse downwardly its ironing face *f*, then turn under on its face *g*, and go to and around the faces *a c b* and *e* of the respective drums before reaching the delivery end of the machine. Preferably the face *f* is convex, and the feed roller D is disposed inside the bulge of its convexity, whereby the apron presses against the greater part of the surface of this face.

Steam will be admitted to the various drums, and the water of condensation withdrawn

therefrom, in any suitable manner, as for example through the steam holes *h* and the outlets *i* for each drum, shown in Fig. 1.

My invention comprises an improvement in driving the apron C, which consists in making each of the transfer rollers a drive roller for the apron. This may be accomplished by driving these rollers by any suitable mechanical provision, but I prefer to use a spur gear N on the shaft of each roller, to provide idlers O between and meshing with these spur gears for communicating motion from one to the other, and drive pinion P meshing with one spur wheel or idler as desired for supplying the power to drive all. Thus the four drive rollers are disposed at points most advantageous for the peculiar sinuosity of the belt, and can be driven in a very simple manner.

I prefer to mount the transfer rollers yieldingly so that in case of inequality in the thickness of the goods ironed there will be no danger of jamming at the circular ironing faces *e*. To this end each roller is preferably mounted on a fulcrumed slotted link Q, which receives the bearing *j*, of the shaft of the roller, in its slot, and carries a spring *l* acting to force the bearing and roller toward the face *e*, this motion being arrested by the end *k* of the slot in the link. Preferably each link is carried by an eye R, bolted to a corresponding cross brace S of the frame A. To permit a slight upward movement of the transfer roller, I provide a slight hollow *m* in the ironing faces *e* and *a* where they join above this roller, into which hollow the roller can ride when it yields upwardly.

The frame A shown, is constructed with a cross brace S for each of the horizontal drums, which drums are connected to the frame in any suitable manner as by their lugs *n* which are bolted to the inner faces of the frame. To stop the downward movement and sustain the weight of the transfer rollers I prefer to tap a screw stop T into the frame under each link Q, by adjusting which stop the lower position of its transfer roller can be determined.

Preferably a guard U of thin sheet metal is provided to house the feed roller D, over which guard the goods are fed to the apron C.

In operation the operator will feed the goods to the apron over the guard U at the top of the vertical drum and the goods will then traverse the various ironing faces and be removed from the apron at the rear, preferably at the discharge roller E. The pieces of goods will be fed in one after another, and in their transit will be dried, smoothed and polished, leaving the machine completely finished. Any jamming of the goods at faces *e*, or any unusual tension of the apron, will be compensated by the yielding transfer rollers. The bends *g c* and *e* will be particularly effective in imparting a polish to the surface of the goods.

It will be seen that my invention provides an improved mangle which will be effective

in operation, light in weight, exceedingly compact, and in which almost the entire surface of each heating drum is utilized for contact with the goods to be treated. By utilizing
 5 nearly the entire sides of the drums the necessity of covering them with non-conducting substances to prevent waste of heat is avoided, and the maximum results are obtained from the heat supply. By disposing the drums in
 10 such manner that the apron traverses over several sides of each, and arranging them as close together as will conveniently permit the passage of the apron and goods on their opposite faces, great compactness for a very extensive ironing surface results. In practice
 15 the machine shown in Fig. 1 gives an ironing surface in excess of thirty feet in length, while the length of the entire machine is less than eight feet and the height approximately five feet. The vertical and horizontal drums can
 20 be united together by bolts V at top and bottom, the intermediate drums of the horizontal series being in engagement with the vertical drum simply by grooved joining faces W.
 25 It will be understood that the invention is not limited to the exact details of arrangement, construction, and operation, described and shown as its preferred form, as it may be
 30 availed of according to such modification as circumstances, or the judgment of those skilled in the art, may dictate, without departing from its essential features.

Fig. 3 is a fragmentary view of a modification in which only four horizontal drums are
 35 used, and the goods are shifted from the top face of one drum around the transfer roller and to the next drum by a series of tapes W', which pass over small rollers W'' opposite
 40 the end of each drum, and then around the transfer roller between the two drums, and so on until at the last transfer roller the tapes ride around a return wheel X, from which
 45 they return over an idler X' to the lower small roller W''. As the apron leaves the ironing face and passes onto the transfer roller the tapes W' hold the goods against the face
 50 of the apron and move therewith from the lower to the upper side of the transfer roller, thereby preventing displacement of the goods on the apron, until they are in position for
 contact with the next drum.

Fig. 4 is a diagrammatic view of a simple modification in which the drum here lettered
 55 Y has two branches the lower one Y' having convex lower ironing face and concave upper ironing face, over which faces the apron here
 lettered C⁴ rides, while the upper branch has a convex space against which the apron rides
 60 after traversing a roller lettered Y² which transfers it from the lower to the upper branch. Presser rolls p press the apron against the
 65 concave face of the branch Y'. The interiors of the several branches of the drum Y are hollow and in communication. The apron passes
 over the feed roller D⁴, along the ironing faces of the drum, around the discharge roller E⁴, and back over an idler to the feed roller.

Fig. 5 shows a modification similar to Fig. 4 except that the drum here lettered Z has its
 70 branches constructed with plain flat ironing faces, and presser rollers lettered q are employed for holding the apron lettered C⁵ against all these faces.

What I claim is, in ironing-machines, the following-defined novel features and combinations,
 75 substantially as hereinbefore set forth, namely:

1. In an ironing machine, an oblong drum having frictional polishing ironing faces on its opposite sides against and across which
 80 the goods to be ironed are successively passed, and means for pressing the goods against and rubbing them over the ironing faces of said drum successively and in opposite directions,
 85 on the different faces, substantially as and for the purpose set forth.

2. In an ironing machine, an oblong drum having ironing faces on its opposite sides, and an intervening ironing face on its end connecting said faces on its sides, over which
 90 faces the goods to be ironed are successively passed, and means for pressing the goods against and rubbing them over said ironing faces substantially as and for the purpose set forth.

3. In an ironing machine, a stationary drum having a curved frictional polishing ironing face on its one side, and a frictional polishing ironing face on its opposite side, and means
 95 for pressing the goods to be ironed against and rubbing them over one ironing face of said drum in one direction to the end of such face, and means for receiving said goods after
 100 traversing said face and pressing them against and rubbing them over the other ironing face of said drum to the end thereof in the opposite direction, whereby the goods traverse the
 105 respective faces of said drum successively, substantially as and for the purpose set forth.

4. In an ironing machine, a stationary heated drum having a frictional polishing ironing face on one of its sides, and a convex frictional polishing ironing face on its other side, an
 110 apron passing across said convex face and pressing the goods to be ironed thereagainst and rubbing them thereover in one direction,
 115 and means for pressing said goods against and rubbing them over the other of said ironing faces of said drum in the opposite direction, substantially as and for the purpose set forth.

5. In an ironing machine, a stationary drum having frictional polishing ironing faces on two of its sides, and a curved intervening frictional polishing ironing face between and
 120 connecting said ironing faces, and means for pressing the goods against and rubbing them over one of the ironing faces on one of the sides of the drum, and an apron moving
 125 against said intervening face and across the ironing face on the other side of the drum and pressing the goods against and rubbing them over said faces successively, substantially as and for the purpose set forth.

6. In an ironing machine, an oblong drum having frictional polishing ironing faces on its opposite sides, in combination with means for pressing the goods against and rubbing them over one of said ironing faces in one direction, then transferring them to the other side of the drum, and then pressing them against and rubbing them over the other ironing face of the drum in the opposite direction.

7. In an ironing machine, an oblong drum having convex ironing faces on its opposite sides, in combination with an apron for carrying the goods to be ironed against said faces, whereby the goods to be ironed can be passed successively over said faces, and by reason of the convexity thereof will be held by said apron in intimate contact therewith.

8. In an ironing machine, an oblong drum having long convex ironing faces *a* and *b* on its opposite sides, and an intermediate rounded end face *c* connecting said faces *a* and *b*, substantially as and for the purpose set forth.

9. In an ironing machine, an oblong drum having ironing faces on its opposite sides, in combination with an apron embracing both sides of said drum, a feed roller carrying said apron to the entrance end of one face of said drum, and a transfer roller over which said apron passes at the delivery end of the other face of said drum, whereby the goods to be ironed can be fed on to said apron, and will be drawn by the latter across the one face of the drum and then back across the other face of the drum, substantially as and for the purpose set forth.

10. In an ironing machine, an oblong drum having ironing faces on its opposite sides, in combination with an apron for carrying goods to be ironed against said faces, a feed roller over which said apron passes in approaching the entrance end of the first ironing face, a transfer roller over which said apron passes at the delivery end of the other face, and a curved ironing face embracing said apron opposite said transfer roller, whereby the goods are successively drawn over said ironing faces of said drum, and then over said curved ironing face while traversing said transfer roller.

11. In an ironing machine, a drum having an ironing face, in combination with an apron for carrying the goods to be ironed against said face, a yielding transfer roller over which said apron passes at the end of said face, and a concave ironing face fixed relatively to said drum opposite said roller and embracing the goods while passing thereover on said apron, whereby the goods are ironed while traversing said roller, and the latter can yield to prevent jamming of the goods against said curved face, substantially as and for the purpose set forth.

12. In an ironing machine, a plurality of stationary drums disposed in proximity, and each of said drums having an ironing face on its side adjacent to the ironing face of the

next drum, in combination with means for carrying the goods to be ironed in contact with and rubbing them against said faces successively, substantially as and for the purpose set forth.

13. In an ironing machine, a plurality of oblong drums having convex ironing faces on their opposite sides, in combination with a transfer roller between the adjacent drums, and an apron for carrying the goods to be ironed and traversing successively the opposite faces of one drum, said transfer roller, and the face of the adjacent drum.

14. In an ironing machine, a plurality of drums disposed in proximity, and having ironing faces on their adjacent sides, in combination with a curved ironing face between said drums and connecting the ironing faces thereof, a transfer roller between said drums adjacent to said curved ironing face, and an apron passing over said roller and traversing successively the ironing face of one drum, said curved ironing face, and the ironing face of the adjacent drum, substantially as and for the purpose set forth.

15. In an ironing machine, a plurality of oblong drums disposed in proximity, and having ironing faces on the opposite sides, in combination with a drum opposite the end of said drums and having a curved ironing face at one side communicating between the adjacent ironing faces of said oblong drums, and an outer ironing face on its opposite side communicating with the opposite ironing face of one of said drums, a transfer roller between said oblong drums within said curved ironing face, and an apron traversing successively said outer ironing face, the ironing face of the drum with which said outer ironing face connects, said transfer roller, and the curved ironing face opposite it and the ironing face of the succeeding drum, substantially as and for the purpose set forth.

16. In an ironing machine, a plurality of horizontally disposed oblong drums having ironing faces on their outer sides and arranged in proximity, in combination with a vertical drum, curved faces on its inner side communicating respectively between the adjacent ironing faces of the adjacent horizontal drums, and having a substantially vertical outer ironing face communicating with the ironing face of the end drum of said horizontal series, transfer rollers between the adjacent faces of said horizontal drums, a feeding roller opposite the outer face of said vertical drum, a delivery roller beyond the last drum of the horizontal series, and an apron passing over said feeding roller and traversing successively the outer face of said vertical drum, the opposite faces of the horizontal drum in connection therewith, the curved ironing face between said drum and that adjacent to it, the transfer roller between said drums, the corresponding ironing faces and rollers of the succeeding drums, and said de-

livery roller, whereby said apron traverses the opposite sides of said drums, substantially as and for the purpose set forth.

17. In an ironing machine, an ironing face constructed with a moisture-escape groove *d* inclined relatively to the line of the face and having a curved wall merging into the surface of the face to permit the free passage of the goods over such groove, substantially as and for the purpose set forth.

18. In an ironing machine, a sinuous frictional polishing ironing surface, in combination with an endless apron for carrying the goods to be ironed in contact with said surface, traversing the latter throughout all its sinuosity substantially as and for the purpose set forth.

19. In an ironing machine, a plurality of ironing surfaces disposed in proximity and one above another, in combination with an endless apron for carrying the goods to be ironed traversing successively all such ironing surfaces, and moving in a sinuous path, substantially as and for the purpose set forth.

20. In an ironing machine, the drums *B*¹ and *B*² having opposite ironing faces, the curved ironing face *e* communicating between said faces and having the recess *m* at top,

in combination with a transfer roller yieldingly mounted within said face *e* opposite said recess *m*, and an apron traversing said ironing faces and passing over said roller, whereby when the latter yields it can move into said recess *m*, substantially as and for the purpose set forth.

21. In an ironing machine, the drums *B*¹, *B*², *B*³ and *B*⁴ having ironing faces on their opposite sides, in combination with curved ironing faces *e* communicating between the adjacent faces of adjacent drums, transfer rollers *L*¹, *L*², *L*³ between said drums respectively, gears *N* on said transfer rollers, idlers *O* meshing with said gears, and drive-pinion *P* driving one of said idlers, and an apron traversing the respective ironing faces and each of said transfer rollers, whereby the driving power is applied to said apron between each of said drums, substantially as and for the purpose set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

FRED. C. WENDELL.

Witnesses:

GEORGE H. FRASER,
CHARLES K. FRASER.