May 15, 1928.

1,669,798

G. C. WILKINSON ET AL

IRONING MACHINE

Filed July 2, 1923

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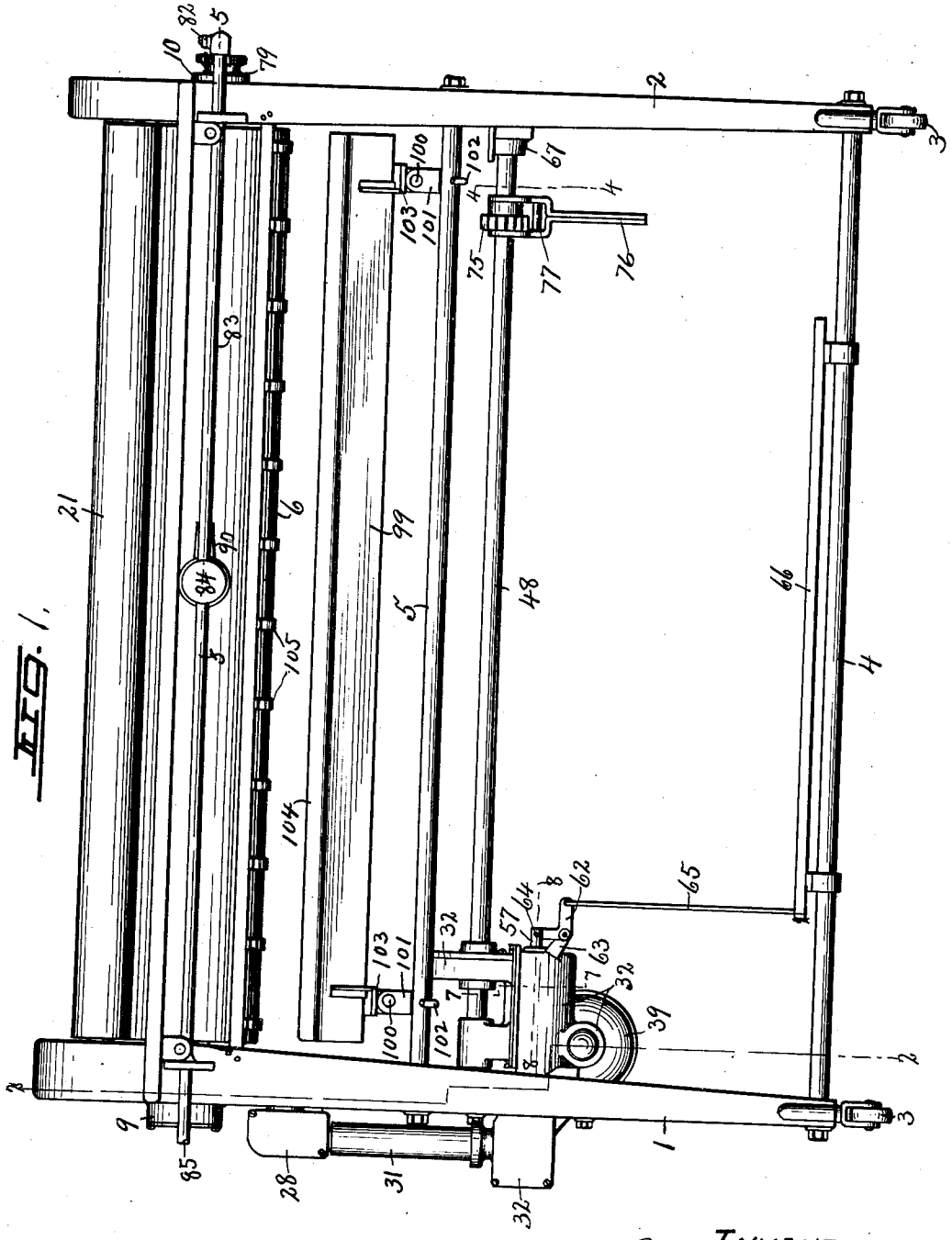


FIG. 1.

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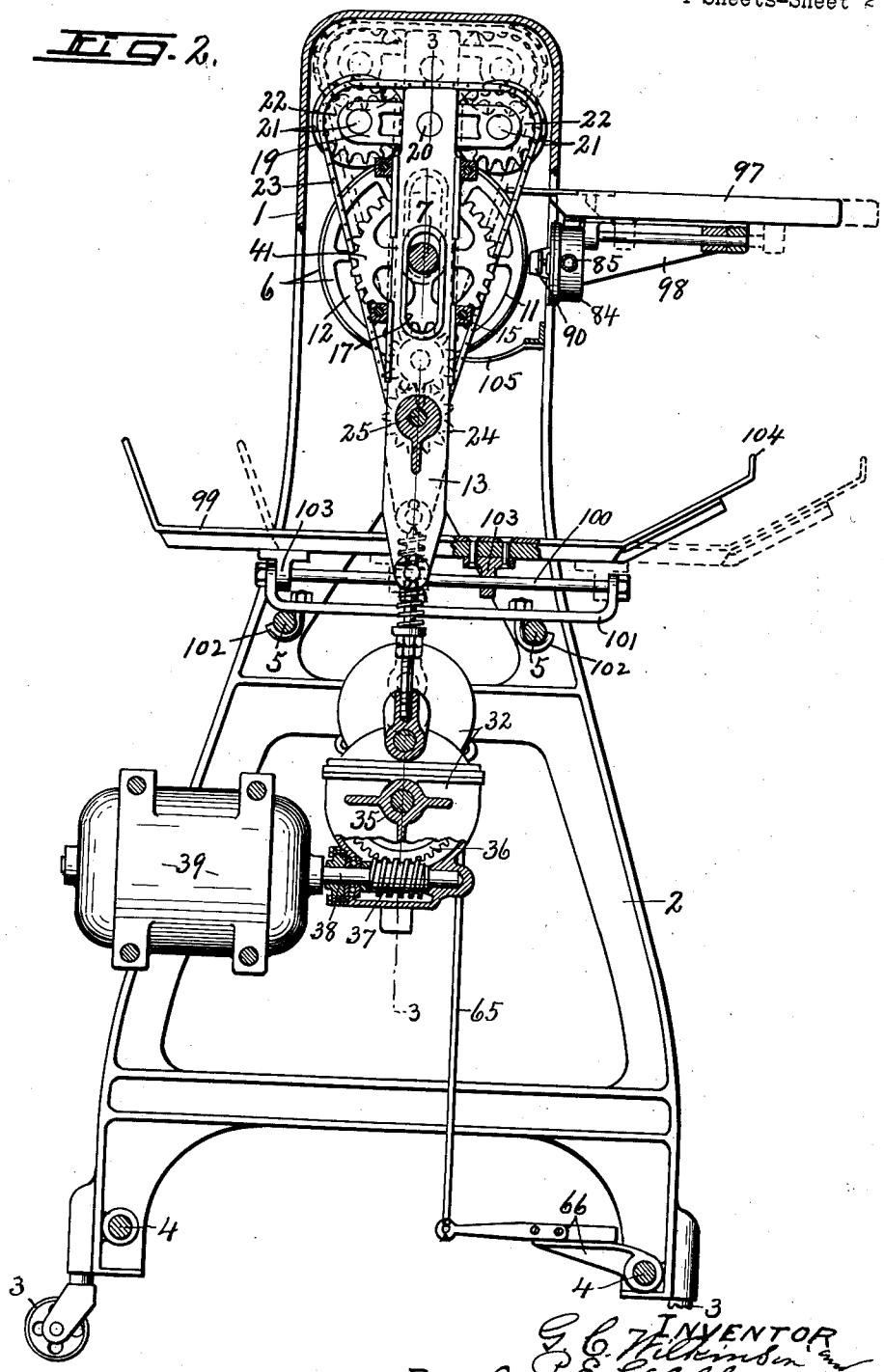
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Fig. 2.



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Fig. 3.

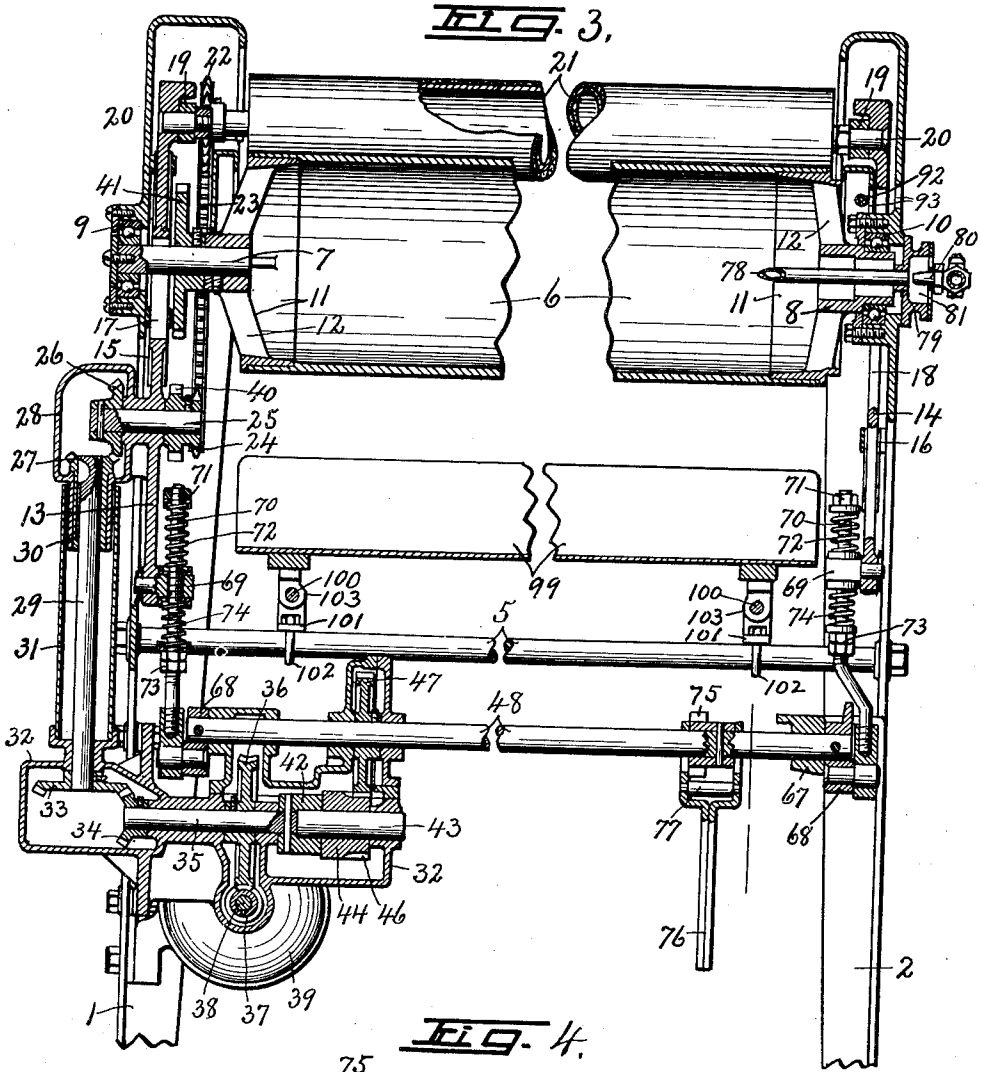
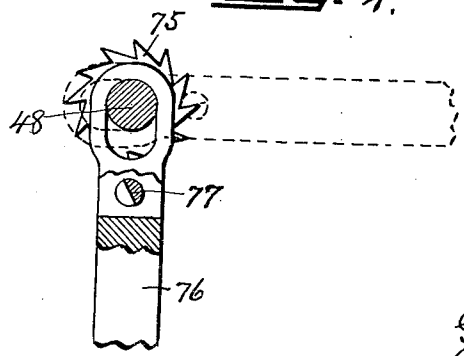


Fig. 4.



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FIG. 5.

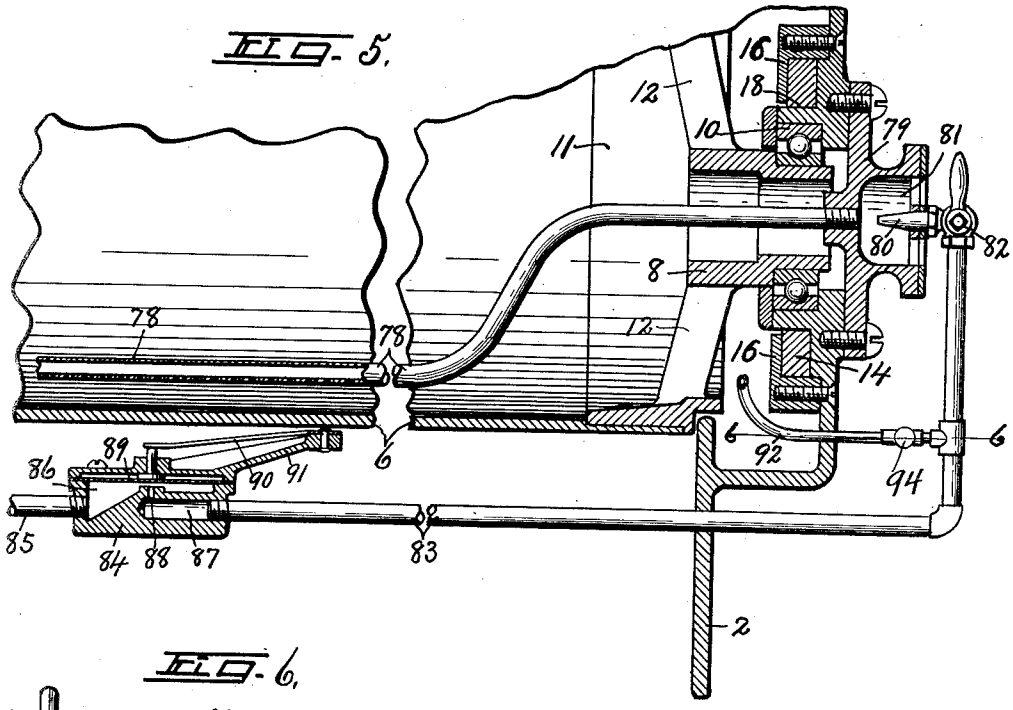


FIG. 6.

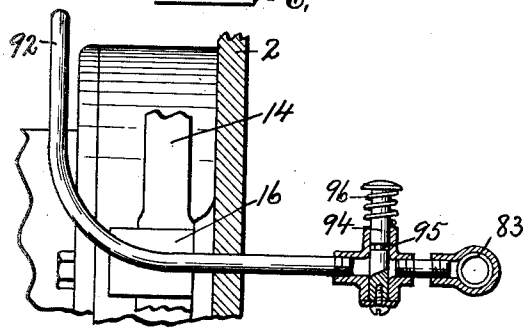


FIG. 7.

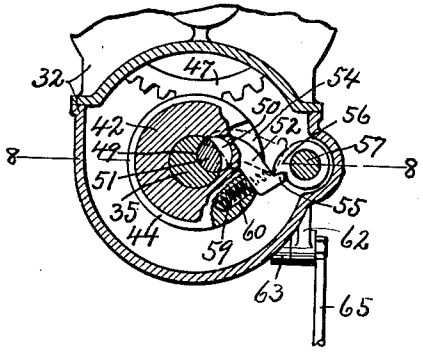
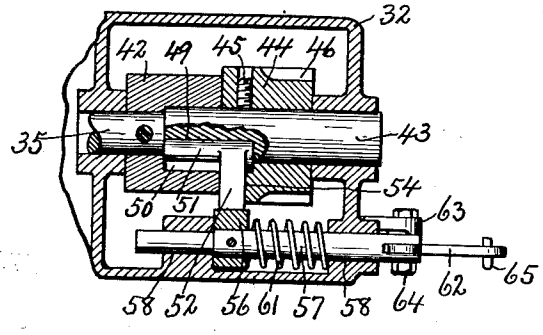


FIG. 8



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Patented May 15, 1928. 1,669,798

UNITED STATES PATENT OFFICE.

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IRONING MACHINE.

Application filed July 2, 1923. Serial No. 649,020.

This invention relates to a machine for ironing what is commonly known as "flat work", in which a pair of padded feed rollers are mounted for vertical movement toward and from the periphery of an underlying ironing drum which is rotatable about a horizontal axis parallel with that of the rollers and is provided with a smooth cylindrical surface over which the articles to be ironed are fed by the feeding rollers for imparting the desired finish thereto.

One of the objects is to provide a horizontal work table movable toward and from the front side of the feeding rollers and drum for feeding the work thereto. Another object is to enable the receiving table to be moved forwardly and rearwardly so that the finished work may be brought to the front of the machine for convenience of removal by the operator, while in a position for feeding the unfinished articles into the machine and thereby to avoid the necessity of passing around to the rear of the machine for collecting the finished articles, resulting in a largely increased output of work in addition to the operator's ability to watch the feeding of the unfinished work into the machine.

The feed rollers are power-driven and adapted to be rotated continuously, and are also adapted to be moved bodily into and out of pressing coaction with the drum by mechanism actuated from the same source of power including a clutch which is controlled by the operator. In some instances, the rollers might remain in contact with the heated drum during an intermission between the feeding of articles to be ironed therethrough, which might result in the overheating or charring of the padded surfaces of the rollers, and one of the specific objects of the invention is to provide means operable at will whereby the pressure rollers may be raised away from the rollers independently of the clutch control to avoid such overheating.

The drum is preferably heated by means of an internal gas burner, and a further object is to provide simple and efficient means for preventing the overheating of the drum.

Other objects and uses relating to specific parts of the machine will be brought out in the following description.

In the drawings,

Figure 1 is a front elevation of an ironing machine embodying the various features of this invention.

Figure 2 is an enlarged vertical sectional view through one end of the machine taken on line 2—2, Figure 1.

Figure 3 is a longitudinal vertical sectional view of the same machine taken in the plane of line 3—3, Figure 2.

Figure 4 is an enlarged detail sectional view taken on line 4—4, Figure 1, except that the lower portion of the lever is broken away.

Figure 5 is an enlarged horizontal sectional view through the center of the heating drum taken on line 5—5, Figure 1, except that portions of the drum and frame are broken away showing more particularly the heating system and temperature controlling means.

Figure 6 is an enlarged detail sectional view of the gas feeding and controlling means for the pilot light taken in the plane of line 6—6, Figure 5, showing also, a portion of the frame of the machine.

Figure 7 is an enlarged transverse sectional view taken on line 7—7, Figure 1, showing particularly, the clutch mechanism.

Figure 8 is an enlarged horizontal sectional view taken on line 8—8, Figure 1 showing further details of the clutch mechanism.

Roller driving means.

As illustrated, the frame of the machine comprises a pair of upright end standards —1— and —2— supported by suitable castors —3— and connected by lower and upper sets of tie rods —4— and —5— running lengthwise of the machine in parallel relation near the front and rear side thereof.

A rotary ironing drum —6— is mounted between and upon the upright standards —1— and —2—, and for this purpose is provided at its opposite ends with trunnions —7— and —8—, journaled in suitable bear-

ings —9— and —10— on said standards so as to rotate about a horizontal axis, one of the trunnions as —8— being tubular for receiving one end of a relatively stationary gas burner hereinafter described.

The drum —6— is preferably made of hollow metal such as steel, having a smooth cylindrical periphery for ironing purposes and is also provided with opposite end heads —11— having openings —12— for permitting the circulation of air through the drum to support combustion of the gases and also for venting purposes.

A pair of upright plates —13— and —14— are mounted for vertical sliding movement on suitable ways —15— and —16— on the inner faces of the upright standards —1— and —2— and are provided with vertically elongated slots or openings —17— and —18— for receiving the trunnions —7— and —8— respectively and permitting said plates to move vertically relatively to the drum.

A pair of rock arms —19— are centrally pivoted at —20— upon the upper ends of the plates —13— and —14— directly over the axis of the trunnions —7— and —8— of the drums —6— to rock about axes parallel therewith for receiving and supporting a pair of feed rollers —21— which are journaled thereon at opposite sides of the pivots —20— parallel with the axis of the drum and together with the rock-arms constitute a pressing element for pressing coaction with the periphery thereof.

The surfaces of these rollers are preferably padded to contact with and feed the work between them and the adjacent surface of the drum and thereby, to impart the desired finish to the work and at the same time, to assist in taking up the moisture therefrom.

The object in mounting the rollers upon slidable plates is to permit the rollers to automatically adjust themselves to different thicknesses of work and to be raised entirely away from the drum to prevent overheating of the pads. The object in mounting the rollers upon the supporting rock arms carried by the slidable plates is to permit the rollers to maintain an equalized pressure upon the work fed between the drum and the rollers.

The feed rollers —21— are provided at one end adjacent the upright standard —1— with sprocket wheels —22— which are connected by a belt —23— to an underlying sprocket wheel —24— on the inner end of the revoluble stub shaft —25—, the latter being journaled in a suitable bearing in the adjacent vertically movable plate —13—, Figure 3.

The outer end of the stub shaft —25— is provided with a beveled gear —26— meshing with a companion beveled gear —27— which is journaled in a gear case —28— and is splined upon the upper end of an upright shaft —29— so as to slide vertically thereon.

That is, the gear case —28— in which the beveled gears —26— and —27— are mounted, forms a part of the vertically movable plate —13— and is provided with a downwardly extending sleeve —30— telescoping with the upper end of an upright tubular case —31— having its lower end secured to an underlying gear case —32—.

A beveled gear —33— is secured to the lower end of the upright shaft —29— and is engaged by a beveled pinion —34— on the outer end of a horizontal shaft —35— which in turn is journaled in the gear case —32— containing the beveled gears —33— and —34—.

A worm gear —36— is secured to the intermediate portion of the horizontal shaft —35— within the gear case —32— and meshes with a worm —37— on the inner end of a motor shaft —38— of an electric motor —39—, the latter being secured to the adjacent upright standard —1— and serves as the source of power for operating the feed rollers and other parts of the machine presently described.

A pinion —40— is secured to the stub shaft —25— for driving connections with a relatively larger gear —41— on the trunnion —7— of the drum —6— when the sliding plates —13— and —14— are elevated to separate the feed rollers —21— from the drum —6— thereby effecting a positive rotation of the drum but only when the feed rollers are elevated.

On the other hand, when the feed rollers are lowered to press the work against the drum, the gears —40— and —41— are separated and the drum is rotated by frictional engagement of the work therewith, as the work is fed rearwardly by the feed rollers.

It is evident, however, that the inertia of the drum causes more or less slipping of the work thereon which in turn is beneficial in that it produces the desired ironing or polishing effect upon the work.

The object in rotating the drum when the feed rollers are elevated therefrom is to maintain a uniform distribution of the heat from the internal gas burner throughout the area thereof.

Roller raising and lowering means.

Suitable means controlled by the operator, is provided for reciprocating the roller supporting slides or plates —13— and —14— to move the feed rollers —21— into and out of pressing coaction with the drum —6— and for this purpose the inner end of the shaft —35— is provided with a clutch member —42— having a coaxial socket for receiving one end of a coaxial shaft section —43— having its other end journaled in the gear case —32—, Figures 3, 7 and 8.

A clutch member —44— is secured by a set screw —45— to the intermediate portion of the shaft section —43— and is provided at one end with peripheral gear teeth —46— meshing with a relatively larger gear —47— which is secured to a coaxial horizontal shaft —48— presently described.

As shown in Figures 7 and 8, the shaft section —43— is provided with a semi-circular key-way —49— carved out of its surface adapted in one position of the rotating clutch member —42— to be opposed to a semi-circular key-way —50— carved out of the bore of the clutch member —42—. A clutch key —51— is journaled partially in the shaft —43— and partially in the clutch member —44— on an axis eccentric to the axis of the shaft —43—. That portion of the key —51— which extends into the key-way —49— has a surface eccentric to the journal portion and which normally lies within the circumference of the shaft —43—, but, when rotated, lies partially in the key-way —50— so as to form a driving connection between the clutch member —42— and the shaft —43—. The clutch key is provided with a crank arm —52— for rotating the same extending outwardly through a circumferentially elongated slot —54— in the end of the clutch member —44— adjacent the clutch member —42— for rotating the key —51— into and out of the key-way —50—.

The outer end of the crank arm —52— is provided with a shoulder —55— for engagement with a stop shoulder —56— on the intermediate portion of an axially movable slide rod —57— which is guided in suitable openings —58— in the gear case —32—.

A light coil sping —59— is seated in a socket —60— in the clutch member —44— for engaging the crank arm —52— and rocking the key —51— into the recess —50— and locking the clutch member —42— to —44—, and thereby to transmit rotary motion from the shaft section —35— to the shaft section —43—for rotating the shaft —48— through the medium of gears —46— and —47—.

The stop collar —56— on the slide rod —57— is normally held in the path of movement of the crank arm —52— by means of a coil spring —61—, Figure 8, but is adapted to be withdrawn out of the path of movement of said crank arm against the action of said spring by means of a bell crank lever —62— which is pivoted to a bracket —63— and has one arm pivotally connected at —64— to the slide rod —57— and its other arm connected by a link —65— to an underlying pedal lever —66— which extends lengthwise of the machine and is fulcrumed upon the lower front rod —4— of the main supporting frame as shown in Figures 1 and 2, so that the depression of the pedal lever —66— will draw the slide rod —57— endwise against the action of the spring —61— to effect a corresponding movement of the stop collar —56— out of the path of the crank arm —52—.

This withdrawal of the stop collar —56— permits the spring —59— to rock the key —51— to its locking position for transmitting motion from the shaft section —35— to the shaft section —43— as long as the stop member —56— remains withdrawn by the pressure of the foot of the operator upon the pedal —66—, but as soon as this pressure upon the pedal is released the stop member —56— and its slide rod —57— are returned to their normal positions with the stop collar —56— in the path of rotation of the crank arm —52— whereby the latter with its key —51—, will be automatically released from its locking position against the action of the spring 59 resulting in the stopping of the shaft —43— and parts driven thereby, while the shaft section —35— continues to be rotated by the motor —39— through the medium of the worm —37— and gear —36—.

The shaft —48— is journaled at one end in suitable bearings in the gear case —32— and has its other end journaled in a bearing —67— on the adjacent upright standard —2—, both ends of said shaft being provided with similar crank arms —68— projecting radially therefrom in the same direction.

A pair of similar lugs —69— are pivotally journaled in the lower ends of the roller supporting plates —13— and —14— and are provided with vertical guide openings for receiving and guiding a pair of vertically movable connecting rods —70— having their lower ends pivotally connected to the adjacent crank arms —68— and their upper ends extended through and some distance above the lugs —69— and provided with adjustable nuts —71— and springs —72— between the said nuts —71— and upper faces of the lugs —69—.

Additional nuts —73— and buffer springs —74— are mounted on the rods —70— below the lugs —69—, the springs —74— being interposed between said nuts —74— and lugs —69—.

These tie-rods —70— and springs —72— constitute yielding connections between the crank arms —68— and upright roller supporting plates —13— and —14— and together with said plates, constitute the means for raising and lowering the feed rollers —21—, the springs —74— being sufficiently stiff to support the weight of the plates —13— and —14— and parts carried thereby, while the springs —72— allow the feed rollers to be drawn into engagement with various thickness of the work under a yield-

ing pressure without interfering with the complete revolutions of the crank shaft —48—.

In other words, the object of the relative sliding movement of the rods —70— in the lugs —69— and the employment of the springs —72— and —74— is to compensate for varying movements of the feed rollers according to the thickness of the work operated upon without changing the throw of the crank arms —68—.

The ratio of the gears —46— and —47— is shown as one to two, and therefore, the shaft —48— would be rotated one-half revolution at each revolution of the shaft —43—, while the stop collar —56— is arranged to release the clutch key —51— from its locking position when the feed rollers are in one or the other of their extreme positions of movement.

That is, the vertical movement of the roller supporting plates —13— and —14— will be stopped either in their extreme lower positions or their extreme upper positions when the stop collar —56— is released to return to its normal position in the path of movement of the crank arm —52—.

In case the rolls ceased rotating due to the failure of the motor when the plates —13— and —14— were in their lowest positions, the feed rollers —21— would of course, be held in non-rotatable contact with the periphery of the heated drum —6— which would be objectionable in that the heat of the drum might char the padding on the rollers. In order to manually release the rolls from contact with the cylinder so that this liability may be avoided, the shaft —48— is provided with a ratchet wheel —75— and a hand lever —76— turnable on the shaft, and also movable radially thereon. Said lever is provided with a pawl —77— movable into and out of engagement with the teeth of the ratchet wheel —75— by the radial movement of the lever —76— on the shaft so that when the lever is moved in one direction the pawl —77— engages with the teeth of the ratchet wheel and then upon rocking the lever, the shaft may thereby be rotated a half turn to shift the feed rollers away from the drum to avoid injury thereto by the heat from said drum.

Heating system.

A perforated burner pipe —78— extends lengthwise of and within the drum —6— substantially the entire length thereof and near its front side and has one end secured to and supported by a stationary cap —79— on the upright standard —2— coaxial with the axis of the drum.

Fuel gas is supplied to the burner pipe —78— through a nozzle —80— on the head —79— coaxial with the adjacent end of the burner pipe, said head —79— being provided with an air chamber —81— communicating with the atmosphere for supplying the necessary air to support combustion, the nozzle being provided with a suitable valve —82— to control the fuel supply.

The valve is connected by a pipe —83— to an automatic gas supply regulator —84— which in turn may be connected by a pipe —85— to any available source of gas supply not shown.

The regulator —84— is provided with an inlet chamber —86— and an outlet chamber —87— connected respectively to the supply pipe —83— and partitioned from each other except through a relatively small connecting port —88—.

This port is controlled by a diaphragm valve —89— which in turn is adapted to be operated by the free end of a thermostatic bar —90— having its other end secured to an extension —91— of the regulator so as to contact with or lie in close proximity to the front side of the periphery of the drum —6— directly opposite the burner —78—.

The thermostatic bar —90— is adjusted to operate the valve —89— for reducing the amount of gas passing through the port —88— to the burner when the temperature of the drum reaches a pre-determined degree as may be regarded most efficient for ironing purposes.

The fuel feed pipe —83— is provided with a pilot branch pipe —92— extending through an opening in the upright standard —2— and having its discharge end terminating near the adjacent open end of the drum where it is accessible for lighting purposes through openings —93—, Figure 3, the discharge opening in the inner end of the pilot being arranged to direct its flame toward the perforated portion of the burner pipe —78— so as to quickly ignite the fuel gas when the controlling valve —82— is opened.

The branch pipe —92— is provided with a self-closing plunger valve —94— having an annular groove —95— movable into and out of registration with a direct passage through the pipe —92— but normally retracted to its closed position by a spring —96—.

In lighting the burner as —78—, the valve —94— is first depressed, and the gas escaping from the nozzle thereof is ignited through the opening —93— after which the valve —82— is opened to admit gas to the burner —78— which is immediately ignited by the pilot —92— whereupon the pressure upon the pilot valve —94— is released to allow it to close and thereby cut off the supply of gas to the pilot.

The supply of gas to the burner may be controlled at will by the valve —82—, but

will be automatically controlled by the regulator —84— through the medium of the thermostatic bar —90—.

Work table.

A work table —97— is mounted upon suitable supporting brackets —98— on the upper front portions of the standards —1— and —2— and is adapted to be moved forwardly and rearwardly just below the plane of the meeting faces of the drums —6— and feed rollers —21— so that when the table is drawn forward thereon, the work may be placed thereon well toward the rear edge thereof and the table with the work thereon fed rearwardly until the edge of the work is caught between and fed rearwardly by the feed rollers across the upper face of the ironing drum.

A receiving table —99— is mounted for forward and rearward movement in a horizontal plane some distance below the drum —6— and is preferably movable by hand along suitable guide rods —100— which in turn are supported by brackets —101—, the latter being clamped by bolts —102— to the tie rods —5—, Figure 2.

The receiving table —99— is provided on its underside with apertured lugs —103— for receiving the guide rods —100—, said lugs permitting said receiving table to be moved rearwardly a sufficient distance to receive the finished work from the ironing drum when the finished work is completed, the receiving table may be drawn forwardly by hand to permit the removal of the work from the same side of the machine at which the unfinished work is fed into the machine thus permitting the same operator to take care of both the feeding and delivery at one and the same side of the machine without changing position.

The front and rear edges of the receiving table —99— are preferably deflected upwardly to better retain the finished work thereon although the front edge is of slightly less incline than the rear edge and is provided with a vertical flange —104— serving as a handle by which it may be moved forwardly and rearwardly. A series of spring stripping fingers —105— are mounted upon the frame of the machine to extend rearwardly against the underside of the roller —6— for stripping any articles which may tend to cling to the roller as the latter is revolved.

Operation.

Assuming that the motor —39— is in operation, and that the fuel in the burner —78— has been ignited in the manner described, then the work is properly spread out upon the table —97— preparatory to ironing; the pedal —66— is then depressed for an instant or long enough to allow the clutch key —51— to move to its locking position by the spring —59— which in turn will cause the lowering of the feed rollers into pressing coaction with the drum and if the pedal —66— has been allowed to return before the complete revolution of the clutch shaft —43—, the clutch key will be automatically released from its locking position at the end of such revolution in the manner described, thus leaving the feed rollers in their pressing positions as long as may be desired or at the will of the operator.

The work table with the work thereon may then be fed rearwardly until the work is caught and fed by and between the drum and feed rollers to the rear of said drum where it is deposited upon the receiving table —99— and in case any of the work should tend to adhere to the periphery of the drum, it will be removed by stripping fingers —105—.

The receiving table with the finished work thereon may be brought forward as fast as finished and removed at the front of the machine by the same operator feeding the work into the machine.

We claim:

1. In an ironing machine, a rotary drum, supports at the opposite ends of the drum movable transversely of the axis thereof, means for reciprocating said supports, arms pivoted to the supports to rock transversely of the axis of the drum, presser rollers journaled on said arms at opposite sides of their pivots for pressing co-action with the drum, a power driven shaft mounted on one of said supports, means for transmitting rotary motion from said shaft to the drum, and additional means for transmitting rotary motion from said shaft to the presser rollers.

2. In an ironing machine, a frame, a rotary ironing drum journaled on the frame, vertically movable slides guided on the frame at opposite ends of the drum, pressure rollers operatively mounted on the slides to move therewith toward and from the drum, a shaft mounted on one of the slides some distance below the drum, means for rotating said shaft and means for transmitting rotary motion from said shaft to the pressure rollers.

3. In an ironing machine of the character described, a main supporting frame, a rotary ironing drum journaled on the frame, a pressure roller, means including a pair of vertically movable slides guided on the frame at opposite ends of the drum for moving the pressure roller toward and from the drum, power driven means including a rotary crank shaft for reciprocating said slides, and means operable at will for adjusting the crank shaft angularly to move the pressure rollers away from the drum in case the power-driven means should stop with the pressure rollers in engagement with the drum.

4. In an ironing machine of the character described, a frame, a rotary ironing roller journaled on the frame, slides reciprocably movable on the frame at opposite ends of the drum, rotary pressure rollers operatively mounted on the slides to move therewith toward and from the drum, a shaft rotatably mounted on one of the slides some distance below the drum, means for rotating said shaft, and means for transmitting rotary motion from said shaft to the pressure rollers.

5. In an ironing machine of the character described, a frame, a rotary ironing drum journaled on the frame, a pressure roller movable toward and from the drum, means including a pair of slides reciprocably movable on the frame for imparting similar reciprocal movement to the pressure roller, a crank shaft journaled on the frame, motor-driven means including a clutch for rotating the crank shaft and means for transmitting reciprocal movement from the crank shaft to the slide.

In witness whereof we have hereunto set our hands this 13th day of June, 1923.

GUY C. WILKINSON.
PETER E. GELDHOF.