Feb. 10, 1931. F. T. JOHNSON 1,792,167

IRONING MACHINE

Filed May 17, 1928 5 Sheets-Sheet 1

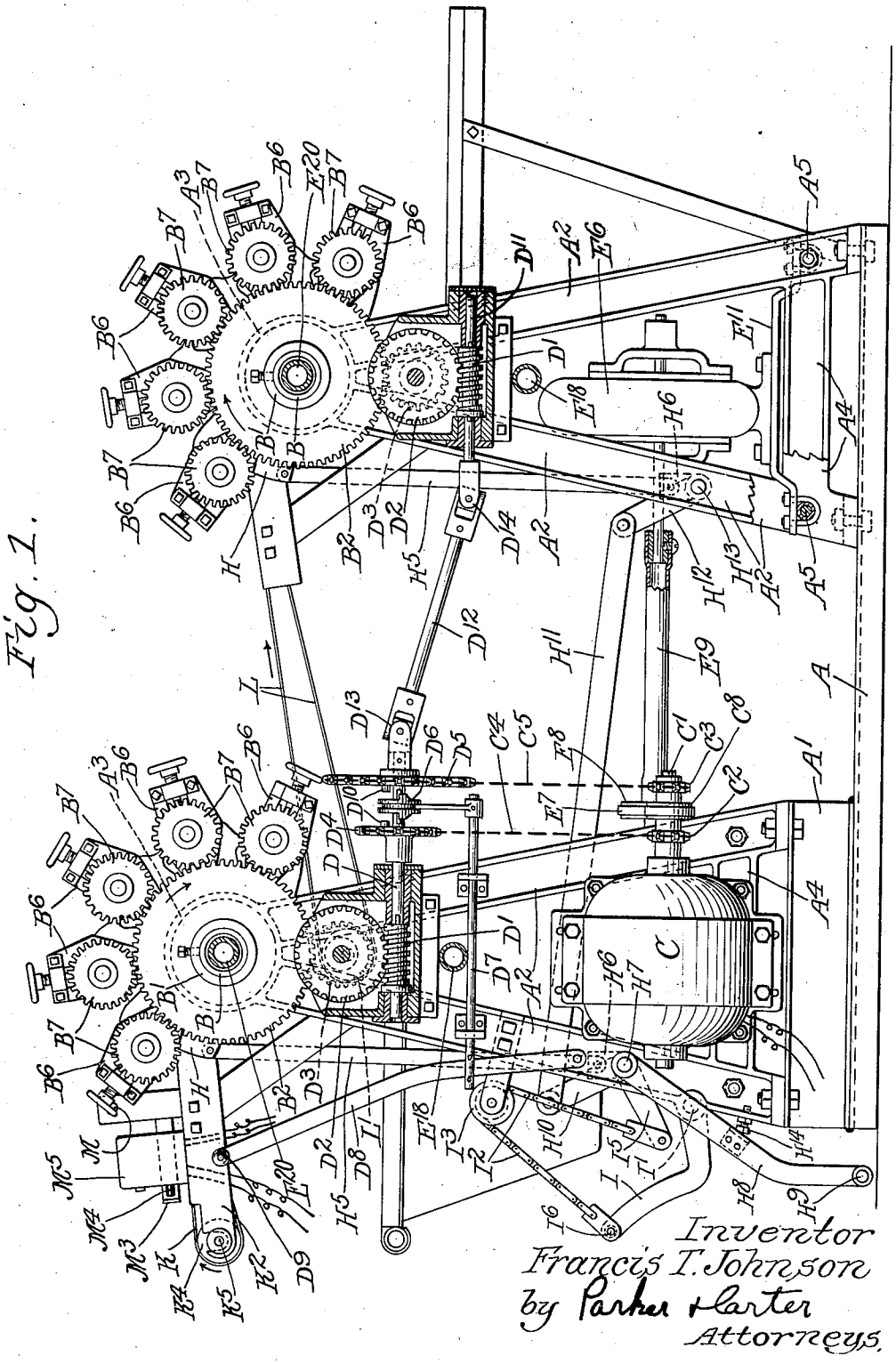


Fig. 1.

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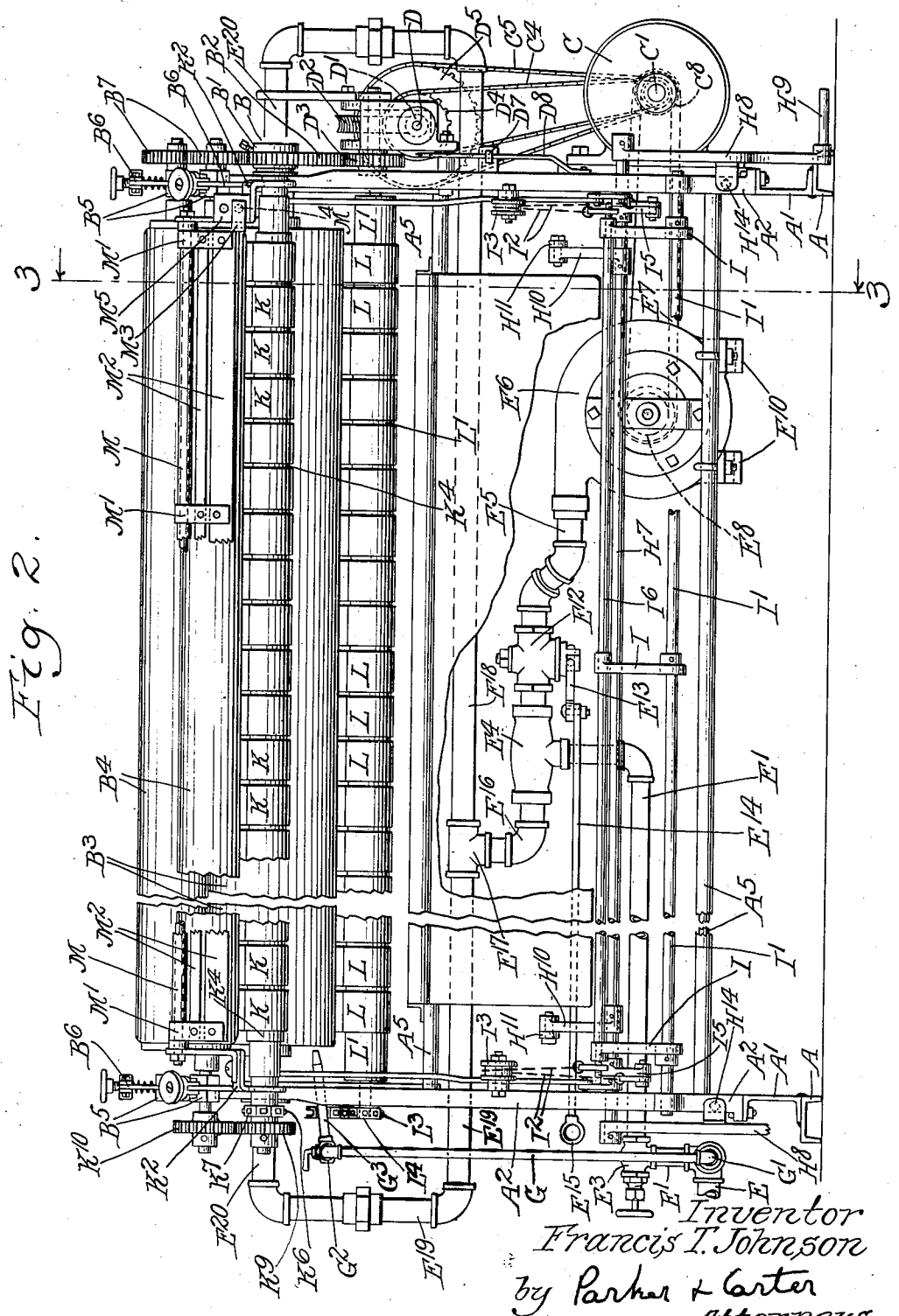


Fig. 2.

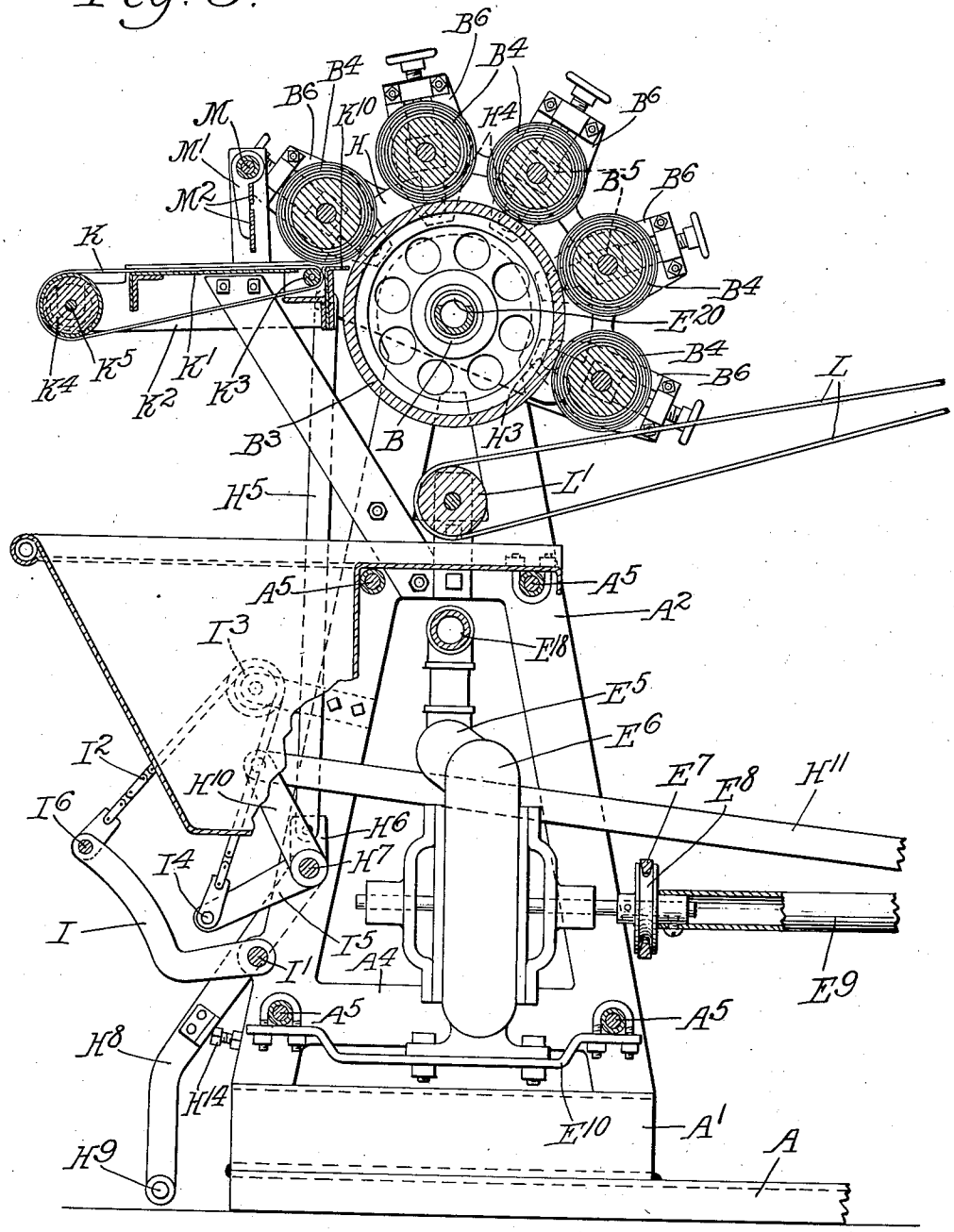
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IRONING MACHINE

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Fig. 3.



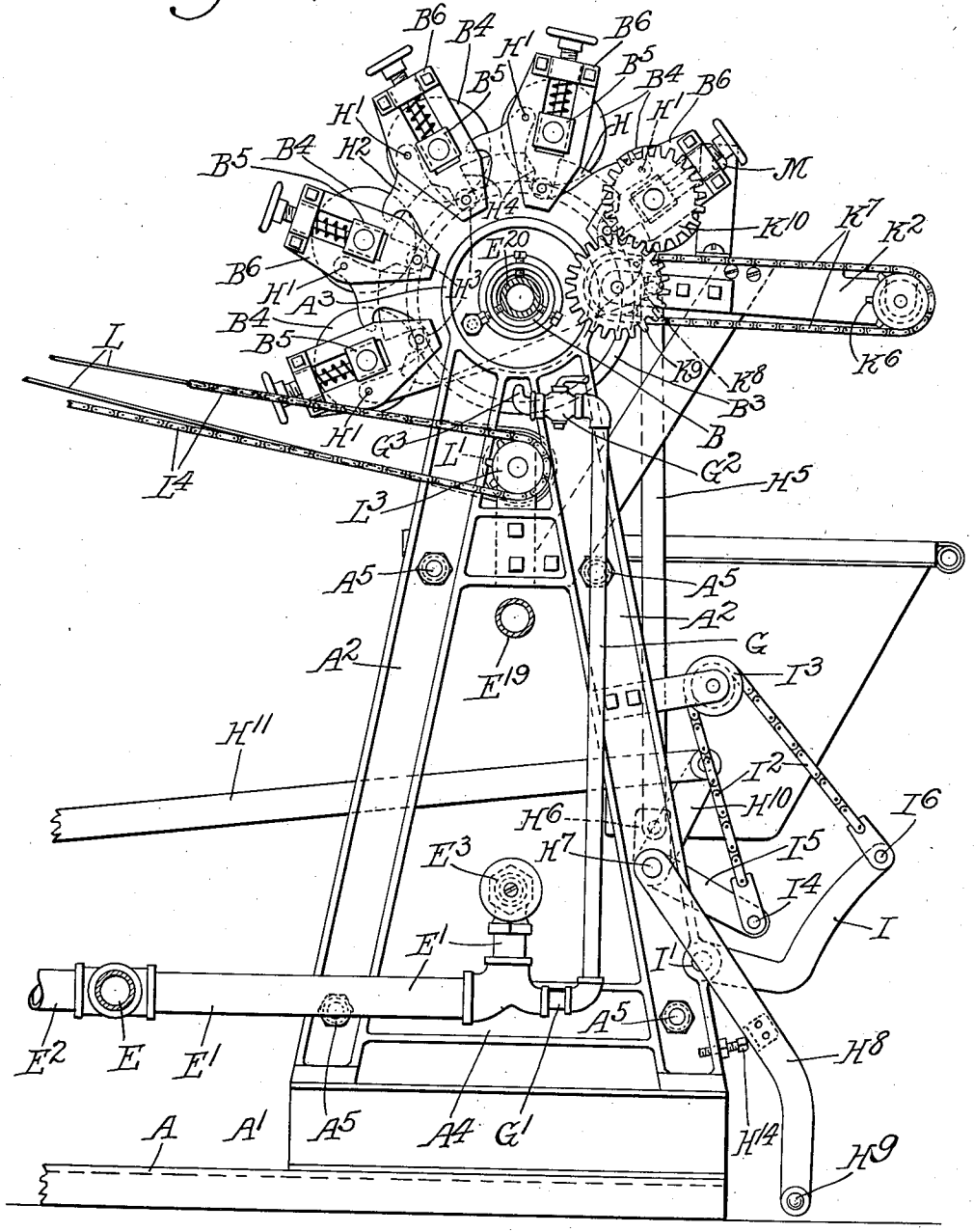
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IRONING MACHINE

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Fig. 4.



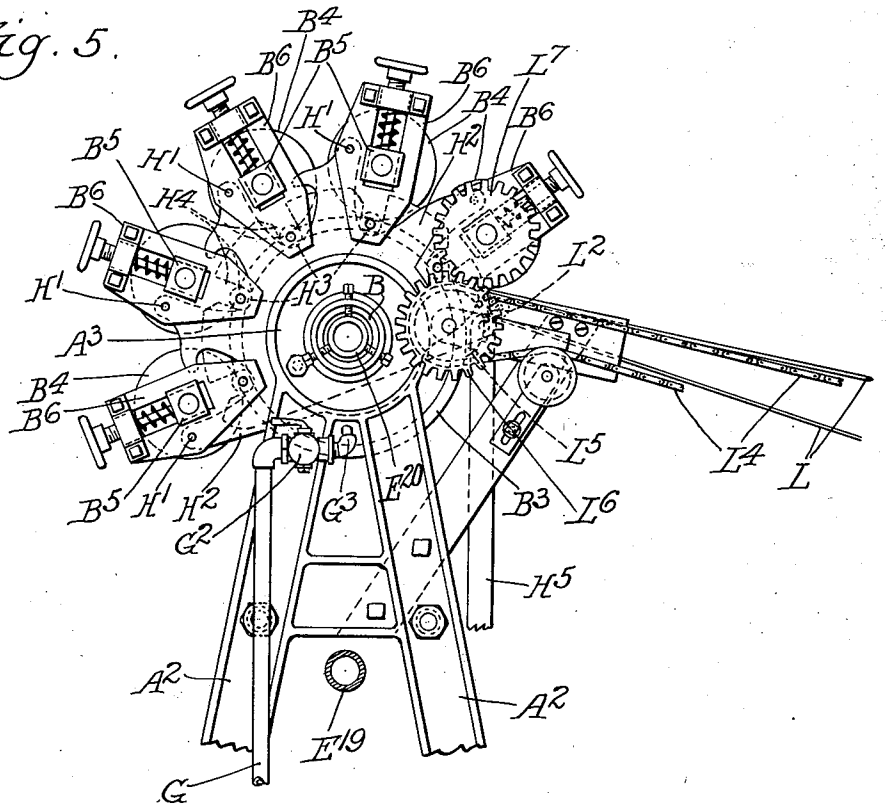
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Fig. 5.



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UNITED STATES PATENT OFFICE

FRANCIS T. JOHNSON, OF CHICAGO, ILLINOIS

IRONING MACHINE

Application filed May 17, 1928. Serial No. 278,426.

My invention relates to a mangle or ironing machine and has for its general purpose the provision of such a machine which is adaptable for high speed and large quantity ironing. One object is the provision of such a machine which shall be safe and easy to operate. Another object is the provision of such a machine which shall be fast and efficient in operation. Another object is the provision of such a machine which shall iron a volume of work per unit of time larger than corresponding machines of like size now on the market. Another object is the provision of improved heating means for such a machine. The present application contains material described in my prior application No. 204,697, filed July 11, 1927, now abandoned. Other objects will appear from time to time in the course of the specification and claim. I illustrate my invention more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is an end elevation with parts in section;

Figure 2 is a front elevation;

Figure 3 is a section on the line 3—3 of Figure 2, illustrating one of the ironing machines;

Figures 4 and 5 together form an end elevation of the opposite end of the device shown in Figure 1, on an enlarged scale.

Like parts are indicated by like symbols throughout the specification and drawings.

Referring to the drawings A indicates any suitable base which may be formed for example of channel iron. Mounted at one end or side thereof is any suitable elevation or sub-base A^1 herein indicated as of channel iron.

Mounted on said sub-base A^1 and also at the opposite end of the frame A are identical frame assemblies herein indicated as including the upwardly and inwardly inclined structural members A^2 which converge at the tops as at A^3 to form a suitable support for the bearings below described. A^4 indicates any suitable transverse bottom frame member. One of the A frames thus constituted is positioned at each end of each of the individual mangles, the A frames being connected for example by the longitudinal rods A^5 A^5, of which as many as necessary may be employed, although I illustrate four, as in Figure 3.

Mounted for rotation at the top of said A frame, as in the enlargement A^3 is a cylindrical member B upon the outer end of which is mounted the hub B^1 of the gear B^2. It will be understood that the cylindrical member B projects inwardly a sufficient distance to support the hollow heated roll B^3, the details of the support of the heated roll forming of themselves no part of the present invention.

I provide, about the hollow heated roller B^3 a plurality of supplemental pressure applying rollers B^4 which may be mounted in any suitable bearing blocks B^5 upon the bearing supports B^6 pivoted to the frame generally above described. In order to drive such rollers I provide, at one end of each, the pinions B^7 which are indicated in Figure 1 as in mesh with the gear B^2. I prefer to form such pinions with a progressively decreasing number of teeth, in order that, as will later be described in greater detail, the rolls rotated thereby may be rotated at slightly different speeds. I prefer to provide the pinion of the first roll B^4 with the largest number of teeth, for example, referring to the left of Figure 1, twenty-five teeth.

The next two may be of twenty-four teeth and the last two of twenty-three. Referring to the second mangle at the right of Figure 1 I employ twenty-four teeth for the pinion of the first roll B^6, twenty-three for the next two and twenty-two for the last two.

In order to rotate the rolls I may provide any suitable prime mover but I here illustrate the motor C herein shown as having an outwardly extending motor shaft C^1 upon which are a plurality of sprockets C^2 C^3 about which pass the sprocket chains C^4 and C^5 respectively.

D indicates a driven shaft mounted on the A frame above the member C and provided with a worm D^1 in mesh with a worm gear D^2 which in turn has associated with it a pinion D^3 in mesh with the gear B^2. The shaft D may be rotated either by the sprocket D^4,

rotatable thereabout, or by the sprocket D^5, the chain C^4 passing about the sprocket D^4 and the chain C^5 passing about the sprocket D^5. D^6 indicates any suitable clutch member feathered for longitudinal movement on the shaft D and held thereby against rotation in relation therewith. Any suitable means may be employed for actuating the clutch member but I indicate the shaft D^7 which may be operated by the lever D^8 with its handle D^9. D^{10} indicate clutch engaging pins or studs on the sprockets D^4 and D^5.

The shaft D of the first machine is flexibly connected to a corresponding driven shaft D^{11} of the second machine by any suitable means. I illustrate however an intermediate driving rod D^{12} having a universal joint connection D^{13} interposed between it and the shaft D and a universal joint connection D^{14} interposed between it and the shaft D^{11}. Otherwise the drive of the second machine is identical with the drive of the first.

Since the clutch is operative upon the shaft D a change of speed is simultaneously effected for both machines by the operation of the lever D^8. As shown in Figure 1, the clutch is in neutral. In order to heat the heated main rolls B^3 I prefer to employ gas. I illustrate a main gas inlet E from which extends a gas line E^1, to the first machine and a gas line E^2 to the second. E^3 indicates a separate valve connection for the line E^1 it being understood that a similar valve connection is provided for the line E^2. Taking the line E^1 as an example it extends to a mixing element E^4 the details of which form no part of the present invention. E^5 indicates an air line thereto to which air may be supplied under pressure as by the blower E^6 which may be driven for example by the belt E^7 about the pulley E^8 on the blower shaft from the pulley C^8 on the motor shaft C^1. It will be understood that a similar blower is provided in the second machine the two blowers being connected for example by a flexible hollow tube E^9 which may be of rubber. In order to make such a connection practical and in order to maintain both blowers at the same general level above the floor I provide downturned bracket members E^{10} on the first machine and upturned brackets E^{11} for the second.

The air delivered along the line E^5 and along the corresponding line of the second machine may be controlled by any suitable valve means for example by the valve generally indicated as E^{12} in Figure 2 which in turn is controlled by the lever E^{13} and the link E^{14} which terminates in a handle or ring E^{15}.

It will be understood that by manipulation of the link E^{14} the valve E^{12} may be set to vary the proportion of air delivered to the mixing chamber E^4. E^{16} indicates the mixture outlet which extends to a union E^{17} from which extend lines E^{18} E^{19} to opposite ends of the burner or burners E^{20} which penetrate the interior of the roll. I may employ a single burner extending from end to end of the roll or I may employ two separate burners penetrating opposite ends of the roll, but in any case I maintain a uniform supply of a mixture of gas and air supplied to opposite ends of the heated roller.

G indicates a supplemental gas line extending as at G^1 from the line E^1 and being provided with a control valve G^2. G^3 indicates a terminal pipe portion or jet whereby gas may be supplied for use as a lighter or pilot light for lighting the mixture supplied to the burner.

I have not illustrated in great detail the mounting of the supplemental or pressure rolls B^4. It will be understood however that when the bearing or carrier members B^6 are at one limit of their excursion the rolls B^4 are thrust against the opposed face of the heated roll B^3, whereas when they are at the opposite limit of their excursion they are withdrawn from the opposed surface of the heated roll B^3. This rotation may be effected by the cam member generally indicated as H, the bearing or supporting members B^6 being each pivoted as at H^1 to a fixed supporting member H^2 and being provided with rollers H^3 in engagement with the slots H^4 in the rotary member H. The member H has pivoted to it the link H^5 the opposite end of which is pivoted to the short lever H^6 on the shaft H^7. The shaft H^7 in turn has extending from it a lever H^8 upon the bottom of which is any suitable transverse foot engageable member H^9.

One such lever H^8 is positioned at each end of the machine.

The rotation of the shaft H^7 may be imparted to a corresponding shaft H^{13} in connection with the second machine, the foregoing being described in connection with the first machine, in the following manner. H^{10} H^{10} are levers on the shaft H^7 to which are secured links H^{11} H^{11} extending to similar levers or crank arms H^{12} upon the shaft H^{13} which corresponds with the shaft H^7 and which effects a corresponding adjustment or movement of the corresponding rolls of the second machine. It will be understood that downward movement of the member H^9 and consequent counter clockwise movement of the lever H^8, as shown in Figures 1 and 3, will bring the rolls B^4 against the heated roll B^3. In order to limit the downward movement of the lever H^8 I may provide any suitable stop H^{14} as shown in Figures 1, 3 and 4.

In order to withdraw the rolls B^4 from the opposed heated roll B^3, in other words, to impart retrograde rotation to the shafts H^7 and H^{13} I provide a number of levers I, I, I, fixed to the rod I^1 which is pivoted to

the A frames. The outer ends of the levers I are connected by the longitudinal rod I^6 which extends across the space between the frames A^2. To the outer ends of the rod I are secured the flexible members I^2 I^2 which pass about fixed rollers or pulleys I^3, I^3. The opposite end of each flexible member I^2 is pivoted as at I^4 to the lever I^5 on the shaft H^7. It will be understood that downward pressure applied to the rod I^6 by the foot of the operator will serve upwardly to lift the lever I^5 and thus to rotate the shaft H^7 in a direction opposite to that imparted to it by the exertion of downward pressure against the member or pedal H^9.

In order to feed the work to the first mangle I provide a moving platform which includes a plurality of parallel but separate belts K. These belts K pass over a table K^1 supported for example by the angle K^2. They pass at their inner ends about the small roller or guide K^3 and at their outer ends about driving pulleys K^4 mounted on the longitudinal shaft K^5 which in turn is rotated by the sprocket K^6 about which passes the chain K^7 to the sprocket K^8 which in turn is driven by the gear K^9 from the gear K^{10}, associated with the first of the rollers B^4.

In order to receive the work delivered from the last of the rolls of the first mangle to the first of the rolls of the second mangle I provide the apron or conveyor belts L which pass about the rollers L^1 and L^2. L^1 serves as the drive roller being driven through the sprocket L^3, the chain L^4, the sprocket L^5 and the gear L^6 from the gear L^7 associated with the first of the rollers B^4 of the second mangle.

In order to prevent accidents to operators I find it desirable to provide some automatic means for terminating the rotation of the moving parts in response to the approach of the hand of the operator to the rolls. I therefore provide the transverse shaft M extending above and across the belts K and having depending from it the levers M^1 to which are mounted transverse slats M^2. It will be understood that rotation of the shaft M in response to the contact of the hand of the operator with the transverse members M^2 forces the contact arm M^3 into contact with the push button M^4 of the switch M^5 which will be understood to control the circuit for the motor C. When the button M^4 is thrust in, the circuit is broken and the motor ceases to rotate.

It will be realized that whereas I have described and shown a practical and operative device, nevertheless many changes might be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. My drawings and description therefore are to be considered as illustrative only rather than as defining the limits of my invention, which are to be determined from the scope of the appended claim.

The use and operation of my invention are as follows:

I provide a pair of mangles with means for delivering the work to the first of said mangles and, from the first of said mangles to the second. In order to maintain the proper feed of material from mangle to mangle, and in order to allow for the stretching or expansion of the material as the water is driven therefrom, I prefer to rotate or move the successive conveyors, rolls and the like at progressively increasing speeds. Thus the feeding apron of the first mangle is driven at a slower feed than the first roll B^4. The second pair of rolls is driven at a more rapid rate than those preceding them. Also the feeding apron L is driven at a more rapid travel than the initial feeding apron K, and slightly faster than the last of the rolls B^4 of the first mangle. There is a similar progressive acceleration of the rolls of the second mangle, obtained by a variation in the number of gear teeth of the gears B^7.

In operating my device the foot pedal H^9 is thrust into downward position, thus moving the rolls B^4 into operative engagement with the heated roller B^3. These rolls are preferably padded or yieldingly formed. The work is fed to the moving apron K and passes beneath the first roll and across the terminal table K^1 which delivers the work directly to the space between the first roll B^4 and the main roll B^3 in such fashion that it is readily seized upon and conveyed through for the ironing action. Since the belt K has a slightly slower speed than the peripheral speed of the first roll B^4 it tends to hold the work back slightly thus assuring the stretching of the work and a proper ironing action. The work passes about the roll B^3 and is delivered to a feeding apron L for conveyance to the second mangle where the same operation is repeated.

By putting each piece of work through two mangles a highly efficient ironing action is obtained and, since the work passes through two mangles, it is possible to speed up the device very substantially and to run through a far larger volume of work, in a given time than can be run through a single mangle.

In order to obtain a satisfactory and efficient heating action of the roll from end to end I provide a fuel supply for each end of the roll. In order to make sure that a like fuel will be supplied to each end of the roll I mix gas and air prior to the taking off, from a single line or chamber of the mixture to be separately supplied to each end of the roll. In order to obtain efficient heating and mechanical combustion of fuel I provide a blower for the air supply, a valve for controlling the supply of air so delivered to the mixing chamber and also a valve for the gas

supply. I am thus able to adjust the quantity of air and gas supplied and the proportion of air and gas. By employing a blower I obtain a constant pressure or delivery of fuel and an efficient combustion.

I am able to employ a single source of power by employing duplicate driven shafts flexibly coupled, both of said shafts rotating in unison in response to the operative connection made between one of them and the motor. I also employ a connecting means whereby the roller controlling shafts of the two machines are moved in unison. Thus depression on the pedals H^9 of the first machine moves the rolls B^4 of both the first and the second machine into operative contact with the opposed heated roller B^3. Similarly, downward pressure of the operator applied to the transverse rod I^6 lifts the rolls of both machines outwardly away from the heated roller.

Since but a single motor is employed the actuation of the switch button M^4 will stop the movement of all the moving parts of both mangles.

It will be seen although I employ a duplex machine, with all the advantage of increased volume and more rapid and efficient work, I nevertheless retain the advantages of single and ready control for both machines.

I claim:

In a mangle, a main roll, a plurality of supplemental pressure applying rolls positioned thereabout, an endless conveyor adapted to deliver work between said main and pressure applying rolls, unitary means for driving said endless conveyor and said rolls and means for imparting to said rolls a peripheral rotary movement at a rate increasing progressively from the point of entry of the work to the point of discharge of the work passing through said rolls, the peripheral rate of movement of the pressure applying roll next after the point of delivery of the work from the endless conveyor exceeding the rate of movement of the endless conveyor.

Signed at Chicago, county of Cook and State of Illinois, this 15th day of May, 1928.

FRANCIS T. JOHNSON.