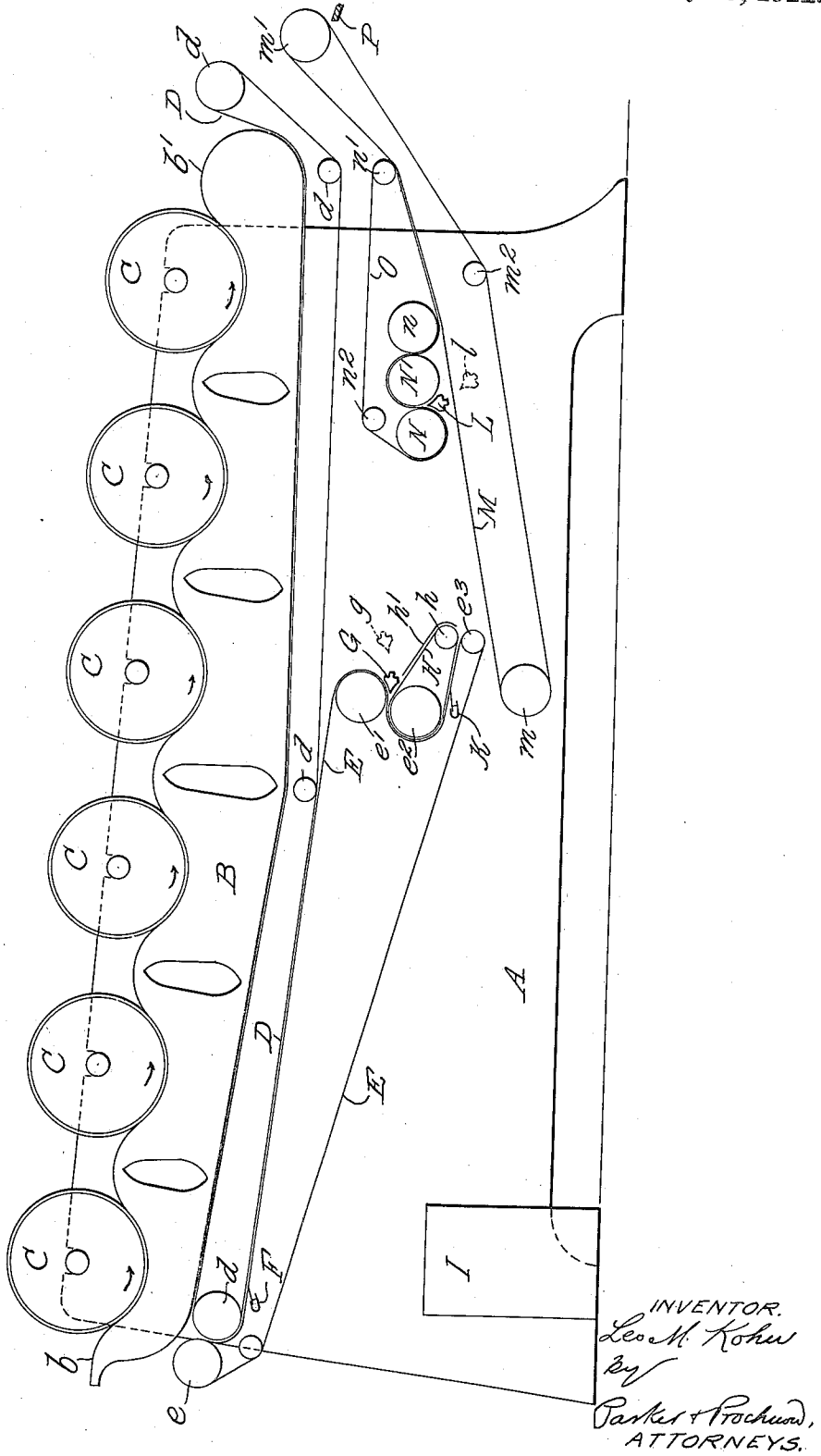
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COMBINED IRONING AND FOLDING MACHINE.

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COMBINED IRONING AND FOLDING MACHINE.

1,417,255. Specification of Letters Patent. Patented May 23, 1922.

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To all whom it may concern:

Be it known that I, LEO M. KOHN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Improvement in Combined Ironing and Folding Machines, of which the following is a specification.

This invention relates to machines of the kind used in connection with the ironing, mangling, pressing or drying of sheets of flexible material of any kind.

The objects of the invention are to produce a single machine of this kind which performs two operations on the articles, namely the ironing, smoothing or mangling and the folding of the same; also to provide a machine of this kind which is compact in arrangement and in which both operations of ironing and folding can be accomplished in practically the same amount of floor space heretofore required for ironing alone; also to provide feeding means of improved construction for conducting the articles from the ironing mechanism to the folding means; also to improve the construction of machines of this kind in other respects hereinafter specified.

The accompanying drawing is a side elevation of a combined ironing and folding machine embodying the invention, the folding mechanism being shown diagrammatically.

A represents the frame of a machine which may be of any usual or suitable construction and on which suitable ironing, mangling or smoothing mechanism is arranged. The ironing mechanism shown in the drawings includes a steam chest B which may be of any usual or suitable construction and may be heated by steam or other means. The upper face of the steam chest is provided with depressions into which a plurality of padded rolls C extend, the rolls being rotated by any suitable means, (not shown), in the direction indicated by the arrows, so as to feed the material to be ironed or mangled from the receiving end b of the steam chest to the discharge end b' thereof. The articles to be ironed or mangled are advanced over the surface of the steam chest by the padded or cloth-covered surfaces of the rolls and are ironed or smoothed by engagement with the smooth and heated surface of the steam chest B. After the articles have passed to the discharge end b' of the steam chest they are taken up by an endless apron D passing over rolls d and are carried on the upper run of this apron in close proximity to, or in contact with the steam chest B, so as to effect a further drying of the articles. All of these parts have heretofore been used in connection with ironing machines or mangles and of themselves constitute no part of this invention. In ironing machines as heretofore used, means were provided for taking the sheets from the apron D at the receiving end of the machine and returning them to the discharge end of the machine, but these means are dispensed with in the improved machine and the ironed or mangled articles pass to the conveyors or tapes of a folding mechanism at the front end of the machine and may be discharged at the rear end of the machine in folded condition.

In the construction shown, this folding mechanism includes a suitable conveyor E for the articles, which may be in the form of an endless apron or of a plurality of endless tapes passing over a roller e at the receiving end of the machine and over the rollers e' e^2 and e^3. Any of these rollers may be driven in any desired manner to impart movement to the conveyor E. The conveyor E also bears against the roller d of the conveyor D in such a manner that the articles immediately upon passing out of contact with the steam chest B are taken up by the conveyor E which passes the articles to the folding mechanism. After passing on to the conveyor E, the articles to be folded engage a contact device F, having a part which extends into the path of movement of the articles to be folded and which closes an electric circuit, not shown, during the time that the article to be folded is in engagement with the contact device F. G represents the first folding member which is represented diagrammatically in the drawing and which when not in operation occupies the position shown in dotted lines at g. When the part of the article to be folded reaches the path of movement of the folding member G, this member is moved into the position shown in full lines and thus forces the sheet between the conveyor or tapes E and an endless folding conveyor or set of tapes H, passing around the roller e^2, and a roller h in such a manner that the article will be car-

ried around the roller e^2 between the conveyors or tapes E and H.

The mechanism for effecting the folding of the articles, including the contact member F and the folding member G, preferably acts to fold each article at a distance from the ends of the article proportional to the length of the article and is not shown in the drawing. This timing mechanism connecting the contact member F and the folding member G may be of any suitable construction, for example, the timing mechanism may operate in a manner similar to the mechanism shown in Patent No. 1,313,713, of Aug. 19, 1919, assigned to me. No attempt is made in this application to describe the operation of the timing mechanism for causing the actuation of the folding member G at a definite interval of time after the article has passed the contact member F, since mechanism for accomplishing this result is fully described in my hereinbefore mentioned patent. I represents diagrammatically a housing or container for the timing mechanism. The tape H is preferably partly covered by means of a guard h' which prevents the article to be folded from being carried between the conveyors E and H before the actuation of the folding member G.

Before the article which has been folded by means of the folding member G is discharged from the conveyor E, it passes and actuates a second contact member K which may be of similar construction to the member F. This member makes contact to complete an electric circuit while the folded article is in contact therewith and is operatively connected through the timing mechanism with the second folding member L. The articles to be folded for the second time are discharged from the first main conveyor E to a second main conveyor preferably consisting of a plurality of tapes M passing over rollers m m' and m^2. The folding member L may be constructed as shown in the patent above referred to so as to extend into the spaces between the tapes M and carry the articles to be folded from the tapes M between two rollers N and N', between which rollers the article is folded for the second time. A guiding conveyor or set of tapes O passes around the rollers N N' and also around rollers n n' and n^2 so as to guide the articles around the folding roller n' and deliver them back upon the tapes M by means of which they are carried over the roller m' and discharged on a platform P or other suitable receiving means at the discharge end of the machine.

In case long sheets are folded the sheets after passing over the shield or guard h' will fall upon the tapes M and will be carried by the same toward the discharge end of the machine until the folding member G is actuated, whereupon the article will be drawn back and passed between the rollers e' e^2. By means of this arrangement of the first and second main conveyors E and M, long sheets will not be creased before the folding and a very compact arrangement of the folding mechanism is made possible, and since the sheets do not actuate the contact member K until after they have been folded, the passing of the long, unfolded sheets upon the tapes M will have no effect whatever upon the second folding member L, since the contact member K is only actuated by sheets which have been folded by the member G.

The arrangement of the folding devices beneath the steam chest of the ironing machine is extremely desirable since it utilizes a space which is now of no use and furthermore a more thorough drying of the sheets is effected owing to the fact that the same are folded in close proximity to the steam chest B. By means of the folding mechanism described, the sheets, after passing through the machine are discharged in a condition in which they can be easily handled by a single operative for further folding, if desired, or for removing from the platform P. The arrangement of the folding mechanism underneath the ironing machine also effects a very material saving in the floor space necessary, since both folding and ironing machines require a large amount of floor space in order to enable them to handle large sheets of material. The folding mechanism also helps to insure proper drying of the articles since the tape conveyors support the articles in such a manner that the moisture may pass from the articles through the spaces between adjacent tapes. The folding mechanism further helps the drying of the articles by passing the same through the machine by a circuitous route and by passing the same from one set of tapes to another.

The machine shown in the drawings and described includes a flat work ironer of well known construction, but it is understood that it is not intended to limit the invention to use in connection with an ironer of this kind since ironing apparatus, mangles or analogous machines for smoothing or drying sheets of substantially flat material may be used in place of the flat work ironer shown and described, and the word "ironing" as used in the specification and claims is not intended to limit the invention to use in connection with ironing machines of the kind shown, but is intended to apply to mangling and analogous machines for smoothing or performing similar operations on the articles.

I claim as my invention:

1. In a combined ironing and folding machine, the combination with the frame of a machine, of ironing devices arranged on said frame, means for passing the articles

through said ironing devices, a plurality of article conveyors arranged on said frame in close proximity to said ironing devices, and folding devices co-operating with said conveyors to effect the folding of the articles in a direction transverse to the direction of movement of said articles and to deliver said articles from the machine.

2. In a combined ironing and folding machine, the combination with the frame of a machine, of ironing devices arranged on the upper portion of said frame, means for passing the articles through said ironing devices, a plurality of article conveyors on said frame below said ironing devices adapted to receive the articles when they are discharged from said ironing devices, and folding devices co-operating with said conveyors to effect the folding of the articles transversely of the direction of movement of said articles and passing said articles from one conveyor to another.

3. In a combined ironing and folding machine, the combination of a mechanism for ironing substantially flat articles, and folding mechanism arranged below said ironing mechanism and adapted to receive the articles from said ironing mechanism and to deliver them folded at the discharge end of the machine, said articles being subjected to heat from the ironing mechanism while operated upon by the folding mechanism.

4. In a combined ironing and folding machine, the combination with the frame of a machine, of a steam chest arranged on said frame, means for passing articles to be ironed along the surface of said steam chest, a plurality of article conveyors arranged on said frame and adapted to receive the articles after the same have been ironed, and folding devices co-operating with said conveyors to effect the folding of the articles while passing through said machine, said folding devices transferring said articles from one conveyor to another.

5. In a combined ironing and folding machine, the combination of a mechanism for ironing substantially flat articles including a steam chest and means for passing the articles along the upper and lower faces of said steam chest, and folding mechanism arranged below said steam chest and adapted to receive the articles from said ironing mechanism and to move said articles in various directions under said steam chest and deliver them folded at the discharge end of the machine, said articles being subjected to heat from said steam chest while the articles are operated upon by said folding mechanism.

6. In a combined ironing and folding machine, the combination of a mechanism for ironing substantially flat articles including means for passing the articles from the receiving end of the machine to the discharge end thereof and back to the receiving end, and a folding device which takes the articles from said ironing mechanism at the receiving end of the machine and effects the folding thereof and delivers the folded articles at the discharge end of the machine.

7. In a combined ironing and folding machine, the combination of a mechanism for ironing substantially flat articles including means for passing the articles from the receiving end of the machine to the discharge end thereof and back to the receiving end, conveying means for receiving the articles from said ironing mechanism at the receiving end of the machine and conveying the articles to the discharge end of the machine, and means for effecting the folding of the articles while carried by said conveying means.

8. In a combined ironing and folding machine, the combination of a mechanism for ironing substantially flat articles, and folding mechanism arranged below said ironing mechanism and including a first conveyor which receives the articles from said ironing mechanism, a second conveyor, the receiving end of which is arranged below the discharge end of the first conveyor, whereby articles which are not folded will be delivered from said first conveyor to said second conveyor, and folding means at the discharge end of the first conveyor including means for delivering folded articles to the second conveyor.

9. In a combined ironing and folding machine, the combination of a mechanism for ironing substantially flat articles, and folding mechanism arranged below said ironing mechanism and including a first conveyor which receives the articles from said ironing mechanism, a second conveyor, the receiving end of which is arranged below the discharge end of the first conveyor in a position to receive unfolded articles from said first conveyor and which delivers the articles to the discharge end of the machine, folding means at the discharge end of the first conveyor including means for delivering folded articles to said second conveyor, and a second folding device arranged between the ends of the second conveyor for imparting a second fold to the articles.

10. In a combined ironing and folding machine, the combination of a mechanism for ironing substantially flat articles and folding mechanisms arranged in close proximity to said ironing mechanism so that the articles while being folded are subjected to the action of heat from the ironing mechanism, said folding mechanism including a plurality of endless article conveyors arranged adjacent to each other and means for causing the articles to be folded between adjacent conveyors.

11. In a combined ironing and folding machine, the combination with the frame of

a machine, of ironing devices arranged on said frame, means for passing the articles through said ironing devices, a plurality of article conveyors arranged on said frame and each including a plurality of tapes spaced apart to form spaces through which the moisture may escape from the articles, and folding devices cooperating with said conveyors to pass the articles from one conveyor to another, whereby further drying of the articles is effected.

12. In a combined ironing and folding machine, the combination of means for first ironing the articles, means for conveying the articles from the ironing means, and means for thereafter folding the articles transversely of their direction of movement while subjected to the heat of the ironing machine and after they have passed out of engagement with the ironing means.

13. In a combined ironing and folding machine, the combination of means for first ironing the articles and carrying the articles to the receiving end of the machine, and folding mechanism which takes the articles at the receiving end of said machine from said means and which folds said articles transversely of the direction of movement thereof and which delivers said articles at the discharge end of the machine.

14. In a machine for ironing and folding substantially flat articles, the combination of means for completely ironing the articles while the same are passing from the receiving end of the machine to the discharge end thereof and back to said receiving end, means for folding said articles transversely of the direction of movement thereof while subjected to heat from the ironing machine, said folding mechanism at the same time carrying the articles from the receiving end of the machine to the delivery end thereof.

15. In a combined ironing and folding machine, the combination of means for ironing the articles and which includes continuously operable means for conveying the articles through said ironing means which are adapted to receive the articles at any part of the cycle of movement of said conveying means and which discharge the unfolded articles therefrom, and means for folding the articles while subjected to heat from the ironing machine including a continuously operable carrier for the articles, which receive the articles as they are discharged from said ironing means and continues the movement thereof through said folding mechanism.

Witness my hand this 9th day of December, 1919.

LEO M. KOHN.

Witnesses:
DANIEL J. HESS,
R. LEE M. COUBRIE.