J. W. ANTHONY.

LEATHER FOLDING MACHINE.

APPLICATION FILED MAR. 16, 1917.

1,365,648.

Patented Jan. 18, 1921.

2 SHEETS—SHEET 1.

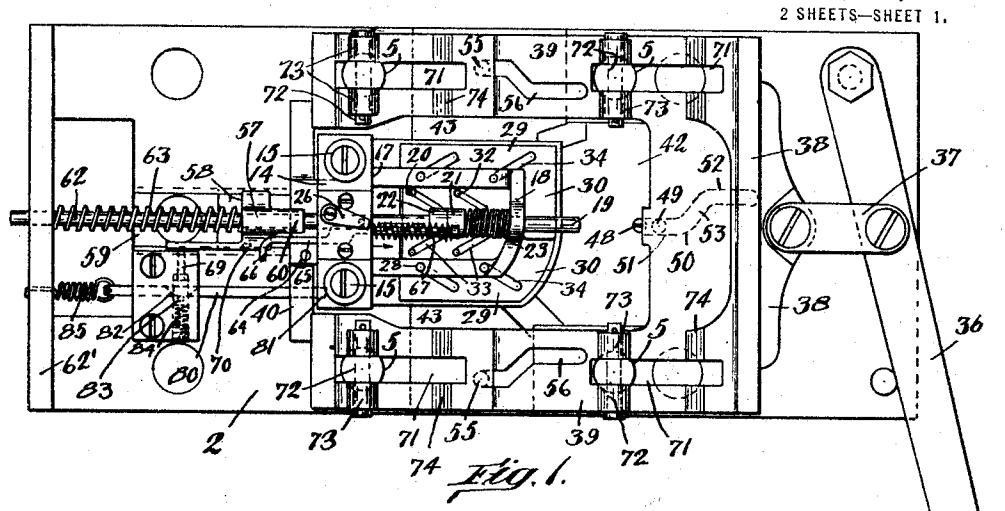


Fig. 1.

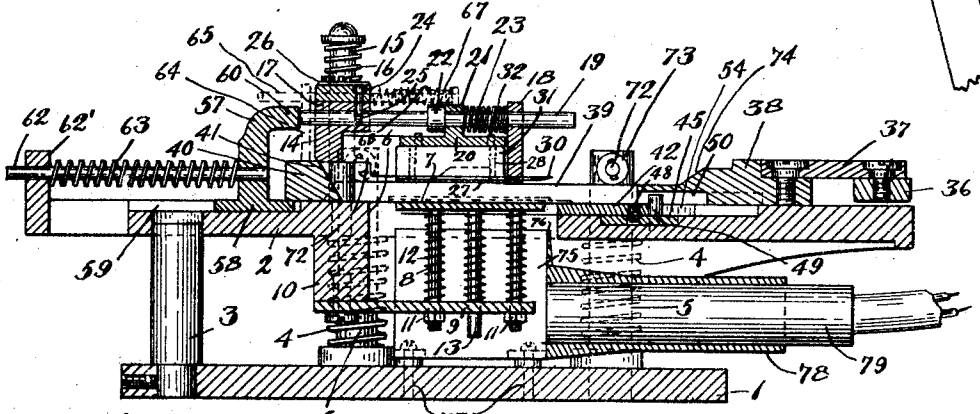


Fig. 2.

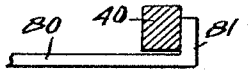


Fig. 12.

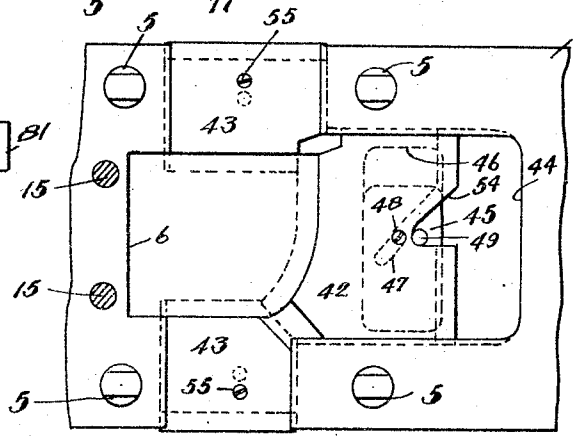


Fig. 3.

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By B. J. Lanyon atty.

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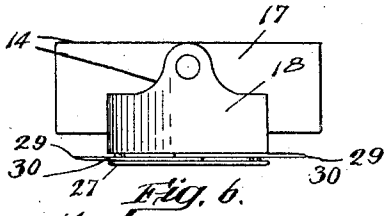


Fig. 6.

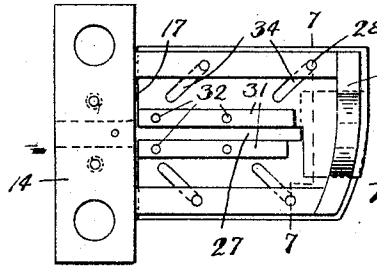


Fig. 4.

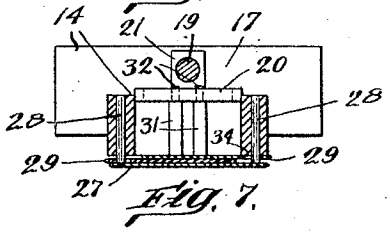


Fig. 7.

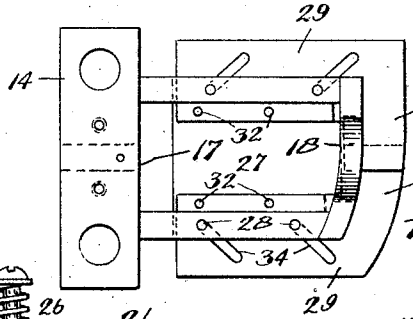


Fig. 5.



Fig. 11.

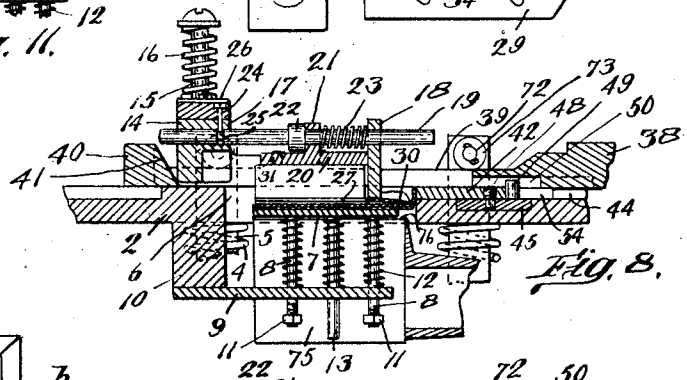


Fig. 8.

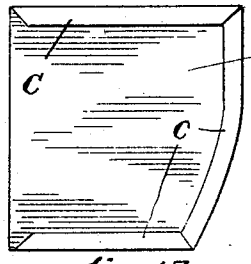


Fig. 13.

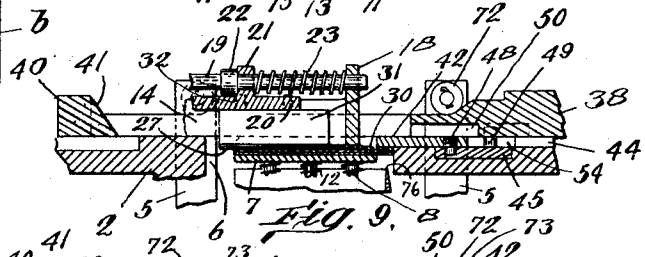


Fig. 9.

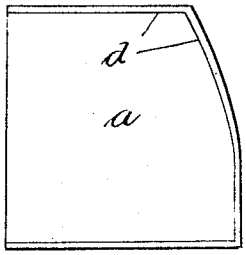


Fig. 14.

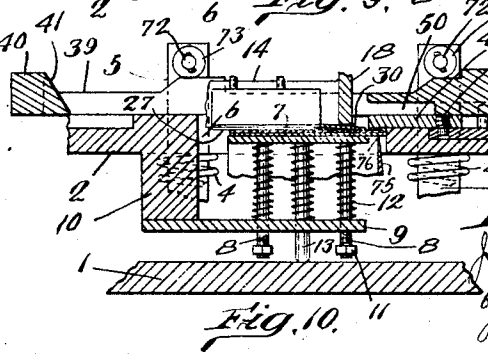


Fig. 10.

Inventor:

Joseph W. Anthony

by B. J. Mayo Attys

UNITED STATES PATENT OFFICE.

JOSEPH W. ANTHONY, OF LYNN, MASSACHUSETTS.

LEATHER-FOLDING MACHINE.

1,365,648. Specification of Letters Patent. **Patented Jan. 18, 1921.**

Application filed March 16, 1917. Serial No. 155,343.

To all whom it may concern:

Be it known that I, JOSEPH W. ANTHONY, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented an Improvement in Leather-Folding Machines, of which the following is a specification.

This invention relates to a machine for edge folding and creasing leather or like material, and is intended as an improvement upon the machine of my application filed February 18, 1916, Serial No. 79,205. Certain features herein shown but not claimed are shown and claimed in my co-pending applications Serial No. 155,344, filed March 16, 1917; and Serial No. 155,345, filed March 16, 1917.

The machine here shown is adapted to turn over and press down a previously cemented edge-portion of a piece of leather or other material onto a backing or stiffening to provide a folded edge throughout a portion or portions of the piece; the machine further provides for the creasing of the leather or other material piece on its face side for ornamental purposes.

The machine described in the above-noted application is designed for operation and control through a treadle and additional hand lever, and involves a somewhat heavy and cumbersome structure, and makes necessary a comparatively large number of independent parts to carry out the desired operation.

The present invention is designed more particularly to provide a comparatively small hand-operated machine in which the edge folding, and pressing of the folded portions into permanent position, is secured through the operation of a single lever with a comparative simplicity of structure and few parts.

The present machine, in its preferred construction and arrangement of details, is illustrated in the accompanying drawings, wherein:—

Figure 1 is a plan view with the parts in normal or inoperative position.

Fig. 2 is a longitudinal central section of the same.

Fig. 3 is a broken plan illustrating particularly the wiper plates in inoperative position and in operative position in dotted line.

Fig. 4 is a broken plan showing the forming-plates in inoperative or withdrawn positions.

Fig. 5 is a similar view showing the parts in projected or operative positions.

Fig. 6 is an edge view showing the relation of the forming-plates and upper clamping plate with the forming-plates projected.

Fig. 7 is a section on line 7—7 of Fig. 4.

Figs. 8, 9 and 10, are sectional details showing the folding and pressing mechanism in different and successive positions.

Fig. 11 is a sectional detail showing the final operative position of the wipers.

Fig. 12 is an enlarged detail illustrating the means for releasing the lock of the forming-plate resetter.

Figs. 13 and 14 are respectively back and face views of the article for the production of which the machine is particularly designed.

The article to be manufactured by the machine is shown in Figs. 13 and 14 and comprises a face section *a* of leather or other material, and a backing or stiffening *b*, the face section being designed to have certain of its edges folded down upon the backing section as at *c*, and to be creased or marked for ornamental purposes as at *d*.

The machine of this invention comprises a base 1, adapted to be arranged upon any suitable support, and above the base there is a bed 2, having a limited movement toward and from the base. The bed is guided in its movement on a post 3 and posts 5, and held in normal or elevated position by springs 4 encircling the posts 5, and bearing between the bed and base.

The posts 5 are formed above the base for coöperation with other mechanism whereby the bed may be depressed against the tension of the springs, during the operation of the machine.

The bed 2, which is preferably of somewhat greater length than the similar dimension of the base, is centrally formed with an opening 6, in which is mounted for a limited vertical movement a table 7, forming part of the article clamp mechanism.

The table is supported by guide rods 8 depending from the table and passing through a supporting plate 9 extending laterally from a depending portion 10 of the bed, so that the plate 9 underlies the table.

Certain of the posts are provided beyond the plate with nuts 11 to limit the upward

movement of the table, manipulation of the nuts obviously adjusting the normal upper position of the table, which position is maintained by springs 12 encircling the guide rods 8.

Certain of the guide rods are extended below the plate 9 to form stops 13, which stops are of such length that in the depression of the table after an operative position, said stops will engage the base 1 or resilient buffers thereon, and maintain the table fixed against farther downward movement.

A clamp frame 14 is slidably mounted on posts 15 secured in the bed and encircled by springs 16, bearing between the heads of the posts and the frame, which when free to act press the frame in the downward direction.

The clamp frame is of hollow rectangular construction having a comparatively enlarged end-wall 17 and an opposite end-wall 18.

A resetting bar 19 is slidably mounted in the end-walls 17 and 18 of the frame, and designed for movement longitudinally of the bed, said bar having a clamp-plate carrier 20 slidably mounted thereon and arranged below the same. The carrier is in the form of a plate section having an upstanding eye 21, through which the resetting bar loosely passes.

A collar 22 is secured upon the resetting bar immediately adjacent and beyond the eye 21, and a spring 23 encircles the resetting bar beyond the eye 21 and the collar 22, whereby the clamp-plate frame is adapted for operation in one direction longitudinally of the bed through the spring 23 when free to operate.

The collar may be omitted and the carrier directly secured to the rod if desired.

In normal position the carrier is supported practically in alinement with the table, and to maintain the resetting bar in this position against the influence of the spring 23 there is mounted in the enlarged end-wall 17 of the frame, a locking pin 24 adapted, when in locking position, to seat in a recess or annular channel 25 in the resetting bar, the pin being held in locking position by a spring strip 26 secured to the frame and overlying the head of the pin.

The clamp plate 27 or that member of the clamping mechanism coöperating with the table 7, is supported in the clamp frame and held at all times in fixed relation thereto.

The clamp frame is of hollow rectangular form and the clamp plate 27 is secured to said frame by pins or rivets 28, which pass through the frame and clamp-plate, with the pins arranged to space the clamp plate from the lower edge of the frame to permit the application and operation of the forming-plates in such space.

The forming plates are, as illustrated, constructed with the principal view to forming the article illustrated and described, under which circumstances, they will have a particular edge outline corresponding with that of the article.

The forming-plates are of angular formation being in general duplicates, excepting so far as their edge formation is concerned, and each comprising a side section 29 and an end-section 30. The forming plates are designed in operative position to be projected beyond the edge of the fixed clamping plate 27, in order to provide a fixed edge and surface over which the material may be folded, the said forming-plates being then withdrawn from beneath the fold to permit the latter to be pressed onto the material. It is, therefore, necessary in the operative movement of the forming-plates to project them beyond the side and one end edge of the clamp plate, and as the forming-plates are of angular formation, their movement must necessarily be in an outward and relatively forward direction.

The end-sections 30 of the forming plates are so formed that they overlap in both the operative and inoperative positions of the plates, to thereby maintain an unbroken forward folding edge. The mechanism by which the plates are operated is illustrated more particularly in Figs. 1, 4, and 5 of the drawings, in which it will be seen that the respective forming-plates are provided with longitudinally extending ribs 31 disposed within the carrier, and each provided at its upper edges with upstanding pins 32.

The plate member of the carrier 20 is formed with slots 33 inclined with respect to the longitudinal line of the machine so that as the carrier is moved by the spring 23, or in the opposite direction by means to be later described, the pins 32 riding in the slots 33 will reciprocate laterally the forming-plates. These plates, however, must have a forward as well as a lateral movement, and are themselves formed with inclined slots 34 which receive that portion of the pins or rivets 28 between the clamp-plate 27 and the clamp-frame, so that as the plates are moved laterally through the movement of the carrier, they are also moved forwardly by the coöperation of the pins 28 and slots 34.

An operating frame is slidably mounted upon the bed 2, and adapted for manual operation through a hand lever 36 pivotally supported upon the bed and connected by a link 37 with the operating-frame.

The operating-frame is of open rectangular form, comprising a forward end section 38, side sections 39, and a rear end-section 40. The rear end-section 40 is centrally enlarged and formed with a downwardly and rearwardly inclined inner face 41, to constitute a lifting face for the clamp-frame, the

enlarged portion being so disposed that in the normal positions of the parts, the enlargement will underlie the enlarged end-wall 17 of the frame, thereby supporting the frame, at its upper limit of movement, in normal position, and against the springs 16.

As the operating frame is moved longitudinally, the enlarged portion 40 will ride from beneath the clamp-frame and permit the latter to descend under the influence of the springs, to dispose the clamp-plate 27 in clamping coöperation with the table.

In connection with the forming-plates, the present invention contemplates the use of wipers or members designed to engage the projecting portions of the material and initially fold the same onto the projected forming-plates and finally, following the withdrawal of such forming-plates, to force the folded material onto the underlying portion of the stiffening section, to complete the fold.

The wipers are designed to be operated in the movement of the operating frame, and, as the article described is to be folded on three edges, there are three such wiper plates provided. These plates, which may be said to include an end-plate 42 and side plates 43, have their inner or operating edges formed to conform to the edge outline of the article to be completed, and are similarly, though not simultaneously operated in the movement of the operating-frame. The end plate 42 is operative in a recess 44 in the bed, and overlies an operating plate 45 which is mounted in a recess 46 in the bed, and is of such size, as compared with the recess, as to permit a movement of the plate longitudinally thereof or transverse the bed, while preventing a movement longitudinally of the bed.

The operating plate is formed with an inclined slot 47 in which is seated a pin 48 depending from the wiper 42, and also with an upstanding pin 49 which operates in a recess or channel 50 in the under side of the operating frame. The channel 50 has two end-portions 51, 52, extending in parallel relation longitudinally of the operating frame, and an intermediate angularly related section 53 connecting the end sections.

The rear edge of the end wiper 42 is notched at 54 in position to receive the pin 49, one wall of the notch being parallel to the line of movement of the operating plate, and the remaining wall being at an acute angle thereto.

The side wipers underlie the side sections 39 of the operating plate and are each provided with pins 55 seating at their upper ends in recesses or channels 56 corresponding in shape to the channel 50 for the end wiper.

From an inspection of the article to be formed, it is apparent that one set of folds, as the side folds, must be positioned slightly in advance of the other, as the end fold, in order that such overlying or end fold may be caused to smoothly overlie the extreme end portions of such side folds.

While the material throughout the edges to be folded is properly notched at the corners to avoid undue accumulation of material in folding, it is preferable that there be a slight lapping of folds at their meeting lines in order to insure a comparatively smooth surface.

To provide for this operation, it is necessary that one set of wipers, in this instance the side wipers, advance to their work slightly ahead of the end wiper, and this result is gained by having the initial longitudinal section of the recesses or channels 56 of slightly less length than the similar section of the channel 50.

The meeting edges of the wipers are appropriately cut away to avoid interference in the folding operation, as it is apparent that they must, when in final folding position, form practically an unbroken section extending throughout the length of fold of the material.

As the operating plate is advanced under the influence of the lever 36, the wipers are caused to approach the clamping mechanism in which the material is held, the side wipers being advanced inwardly toward each other through the coöperation of the pins 55 and channels 56, while the end wiper is similarly advanced through the pin 49 in its coöperation with the channel 50, moving the operating plate 45 transversely of the bed, with the inclined slot 47 of said plate advancing the end wiper through the coöperation of the pin 48 depending from said wiper, the notch 54 avoiding interference with such pin 49.

As so far described, it is apparent that with the material in position upon the plate, the initial movement of the operating frame will permit the clamping frame to descend to cause the plate 27 to engage and clamp the material on the table. As in the normal position of the clamping mechanism, the forming-plates are projected, as the clamp plate carrier is held at its forward limit by the lock on the resetting bar, it follows that the forming-plates are disposed beyond the edge of the table and clamping plate 27 and immediately overlying the material held between said plate and table.

The further movement of the operating frame brings the wipers into operation, their initial movement tending to fold the free edge-portions of the material over onto the forming-plates, as in Fig. 9.

The forming-plates act thus to present an edge outlining the line of fold and also a surface onto which the folded portion of the material may be smoothly laid. The

wipers have the additional function of pressing the folded edge onto the material proper, or onto the stiffening piece as the case may be, to permit which the forming plates must be withdrawn from beneath the folds, immediately succeeding what may be termed the initial folding movement of the wipers.

The movement of the resetting bar toward the rear of the machine under the influence of the spring 23, causes a corresponding movement of the carrier and by the pin and slot connection of the forming plates, previously described, a withdrawal or relatively inward movement of such plates follows.

This operation is automatically carried out at this time releasing the lock of the resetting bar.

A resetting member 57 is mounted for sliding movement with relation to the bed at the rear end of the machine, and comprises a foot 58, slidably mounted in a recess 59 of the bed, and an upright rising from the foot, and having a forwardly projecting nose 60, alined with and normally engaging the end of the resetting bar.

The resetting member is guided by a rod 62 projecting therefrom and slidably mounted in an end upright 62′ of the bed, a spring 63 encircling the rod and bearing between the upright 62′ and the resetting member to actuate said member toward the clamp frame.

The nose 60 contacts with the rear end of the resetting bar 19, when the parts are in normal or inoperative positions.

The resetting-bar unlocking means comprises an unlocking bar 65, mounted on the enlarged end wall 17 of the clamp frame and having a lateral or bent terminal 66 arranged in the path of movement of a pin 64, extending from the end bar 40 of the operating frame.

The unlocking-bar, mounted on the clamp frame for longitudinal movement, is spring-pressed in a direction opposite to that movement caused by the pin 64, by a spring 67, and said unlocking bar is further formed with an offset or cam portion 68, formed and located to ride beneath the head of the locking pin 24 to elevate the same as the unlocking bar is moved by the pin 64.

The resetting member 57 is moved laterally from contact with the resetting bar 19 by contact with said resetting member of the rear section 40 of the operating frame, and the resetting member is locked in its withdrawn or inoperative position by a spring-pressed bolt 69 mounted on the bed and having its nose adapted to engage a keeper notch 70 in an appropriate projecting portion of the resetting member.

The parts described are timed with relation to their coöperation so that in the movement of the operating frame to that position which causes the initial folding operation of the wipers, the unlocking pin will have been moved to release the resetting bar and permit movement of the carrier frame to withdraw the forming plates from beneath the already folded edges of the material.

The resetting member 57 has been previously withdrawn from contact with the resetting bar by engagement of the end-portion 40 of the operating frame, the resetting member being locked in its retracted position.

The folding operation is thus completed and the wipers overlie the folds in position to complete the operation by pressing said folds down into final position.

At this point in the operation, it is necessary to depress the bed to and slightly beyond a point where the table becomes fixed against farther downward movement.

For this purpose, the upper ends of the posts 5 are reduced in size and pass through slots 71 in the side sections 39 of the operating frame. The ends of the posts above the said sections of the operating frame are provided with transverse pins 72 on which immediately beyond the frame sections are mounted rollers 73.

At appropriate points, the side sections 39 of the operating frame are provided with inclined projections or cam ledges 74, which, in the movement of the frame to the proper extent, will ride beneath the rollers 73 and depress the bed against the tension of the springs 4.

The depressing movement of the bed continues to a point slightly beyond that at which the table becomes fixed with relation to the base by contact of the stops 13 with said base.

As the wipers move down with the bed, it is apparent that when the table is held against further movement, a slight further movement of the bed causes the wipers to exert sufficient pressure upon the folded edges of the material as to press said material in place.

With the folded edges pressure located, as by cement or other adhesive, they are, by this pressure, secured in place, and the article is completed, so far as the folding operation is concerned.

As an additional step in the completion of the article, it is designed, as previously stated, to crease the face portion of the article for ornamental purposes.

With the details illustrated, the creasing is designed to follow the folded edge outline of the article, and to secure the result, I arrange a creasing iron 75 beneath the table, the upper creasing edge 76 thereof having the desired outline, and being formed for creasing purposes.

The creasing edge of the iron is, of course, slightly larger than that of the table, and the iron, secured to the base by screws 77 or the like, is so arranged that the creasing edge thereof will engage with the material just prior to the table reaching the limit of its downward movement.

The pressure by the wipers in completing the fold, forces the material into contact with the iron, creasing the material.

The iron is preferably heated, and I have conventionally illustrated such, more particularly in Fig. 2, wherein the iron is formed with a sleeve-like extension 78 to removably receive an electric heater 79 of any appropriate or preferred type.

In the return of the operating frame to normal position, the parts are reset to receive the next article to be folded and creased, and it is necessary in the restoring of the parts to normal position to return the forming plates to their projected positions, it being apparent that the return movement of the operating frame will withdraw the wipers to normal position.

In the restoring movement of the operating plates, the carrier frame must be moved to its normal position, and this is accomplished by the resetting member 57 which following the initial operative movement of the parts has been locked in retracted position.

An unlocking bar 80 is mounted on the bed having its forward end upturned at 81 to be arranged in the path of the section 40 of the operating frame in the return movement of such frame. This unlocking bar 80 has a cam section 82 to engage a pin 83 on the bolt 69 to withdraw the same from locking coöperation with the resetting member, both the locking bolt and unlocking bar having spring connections as 84 and 85 to operate the members against the operating members described.

As the resettting member is released, it returns to normal position under the influence of the spring 63, and as, at this time, the bed has returned to normal position and the inclined face of the section 40 of the operating frame has forced the carrier frame to its extreme upper position, the resetting member, or nose 60 thereof, engages the resetting pin 19 moving it to reset the carrier and to a degree to permit it to be engaged by the locking pin 24.

The unlocking bar 65 for the locking pin 24, has, of course, been released from the pressure of the pin 64, permitting the spring 67 to move said unlocking bar to a normal position to free the locking pin 24 of its influence.

The parts are reset and the device is ready for the next article.

It is to be particularly noted in connection with the present machine, that a single lever controls the entire operation, and that the parts are constructed, arranged, and timed in operation, so that a continuous movement of said lever in one direction causes successive and proper operation of the various parts to fold, set, and crease the article and through the movement of the lever in the opposite direction, restores the parts to normal position for a succeeding operation.

I claim:—

1. An edge folding machine comprising material clamping means, forming plates associated with and normally projected beyond the clamping means, wipers to complete the folding of the material over the forming plates and forming plate withdrawing means normally locked against movement.

2. An edge folding machine comprising clamping means for the material including a clamping plate spring pressed toward clamping position, forming plates associated with the clamping means, wipers coöperating with the forming plates in the folding operation, and means for operating the wipers, said means releasing the clamping plate for clamping movement.

3. An edge folding machine comprising material clamping means including a table and a clamping plate spring pressed toward the table, spring operated forming plates associated with the clamping plate and normally projected beyond the same, means for locking the forming plates against spring operated movement, wipers to fold the material about the forming plates, and means capable in a single operation of releasing the spring pressed clamping plate, operating the wipers and releasing the forming plates.

4. An edge folding machine comprising material clamping means including a table and a clamping plate spring pressed toward the table, spring operated forming plates associated with the clamping plate and normally projected beyond the same, means for locking the forming plates against spring operated movement, wipers to fold the material about the forming plates, and means capable in a single operation of releasing the spring pressed clamping plate, operating the wipers and releasing the forming plates, successively in the order stated.

5. A folding machine comprising a bed, material clamping means including a table to receive the material and a clamping plate coöperating with the table to clamp the material thereon, means for holding the clamping plate out of clamping relation with the table, means for moving the clamping plate into clamping relation with the table on the release of the holding means, means for forming an edge fold in the material beyond the clamping means, and an operating plate

adapted in movement in one direction to release the holding means of the clamping plate and operate the material edge folding mechanism.

6. A folding machine comprising a bed, clamping means associated with the bed, material edge folding means operating to fold an edge of the material, means for depressing the bed following the operation of the edge folding means to likewise depress the material, a creasing iron arranged to contact with the material to crease the same, and means for heating the iron.

7. A folding machine comprising a base, a bed mounted for movement with respect to the base, clamping means associated with the bed including a table movable with and capable of independent movement with respect to the bed, a clamping plate to cooperate with the table for clamping the material thereon and spring pressed toward the table, an operating member formed to normally hold the clamping plate out of clamping coöperation with the table, forming plates associated with the clamping plate, a carrier for the forming plates, a spring for moving the carrier in a direction to withdraw the forming plates, means for locking the carrier against spring actuated movement, and means carried by the operating member to release the lock.

8. A folding machine comprising a base, a bed mounted for movement with respect to the base, clamping means associated with the bed including a table movable with and capable of independent movement with respect to the bed, a clamping plate to coöperate with the table for clamping the material thereon, and spring pressed toward the table, an operating member formed to normally hold the clamping plate out of clamping cooperation with the table, forming plates associated with the clamping plate, a carrier for the forming plates, a spring for moving the carrier in a direction to withdraw the forming plates, means for locking the carrier against spring actuated movement, means carried by the operating member to release the lock, wipers movable on the bed to fold edges of the material over the forming plates, means on the operating member for actuating the wipers, and means on the operating member for depressing the bed following the wiper action.

9. A folding machine comprising associated edge folding mechanism including clamping means made up in part of a clamping plate mounted for spring pressed movement to clamping position, and normally held against such movement, the associated edge forming mechanism including forming plates mounted for projection or retraction relative to the edge of the clamping plate, spring means for operating the forming plates in one direction and a spring operated resetting member for actuating the plates in the opposite direction.

10. An edge folding machine comprising material clamping means, a plurality of angularly related forming plates associated with and normally projected beyond the clamping means, a plurality of angularly related wipers movable to complete the folding of the material over the forming plates, and forming plate withdrawing means.

11. A folding machine comprising a bed, clamping means associated with the bed and including a clamping plate having an independent movement for clamping action, forming plates associated with the clamping plate and normally projected beyond the clamping plate for the edge folding operation, forming plates operating means, locking means for said operating means, spring operated means for withdrawing the forming plates from the edge fold of the material, means for locking said forming plates withdrawing means against movement, wipers mounted on the bed and movable to fold the material over the projected forming plates and means for unlocking said forming plates subsequent to the operation of the wipers and thereafter releasing the lock of the forming plates operating means.

12. A folding machine including material clamping means, a side wiping plate, an end wiping plate, and operating means for said plates arranged to move the side wiping plate over the edge of the material to cause a fold therein in advance of the movement of the end wiping plate.

13. A folding machine comprising a bed, clamping means associated with the bed and including a clamping plate movable relatively to said bed for clamping action, forming plates associated with the clamping plate and normally projected beyond the clamping plate for the edge folding operation, means to lock the forming plates in such extended position, spring operated means for withdrawing the forming plates when unlocked from the edge fold of the material, wipers mounted on the bed and movable to fold the material over the projected forming plates, means for releasing the lock of the forming plates subsequent to the operation of the wipers, and means to depress the bed following the operation of the wipers.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOSEPH W. ANTHONY.

Witnesses:
B. J. Noyes,
H. B. Davis.