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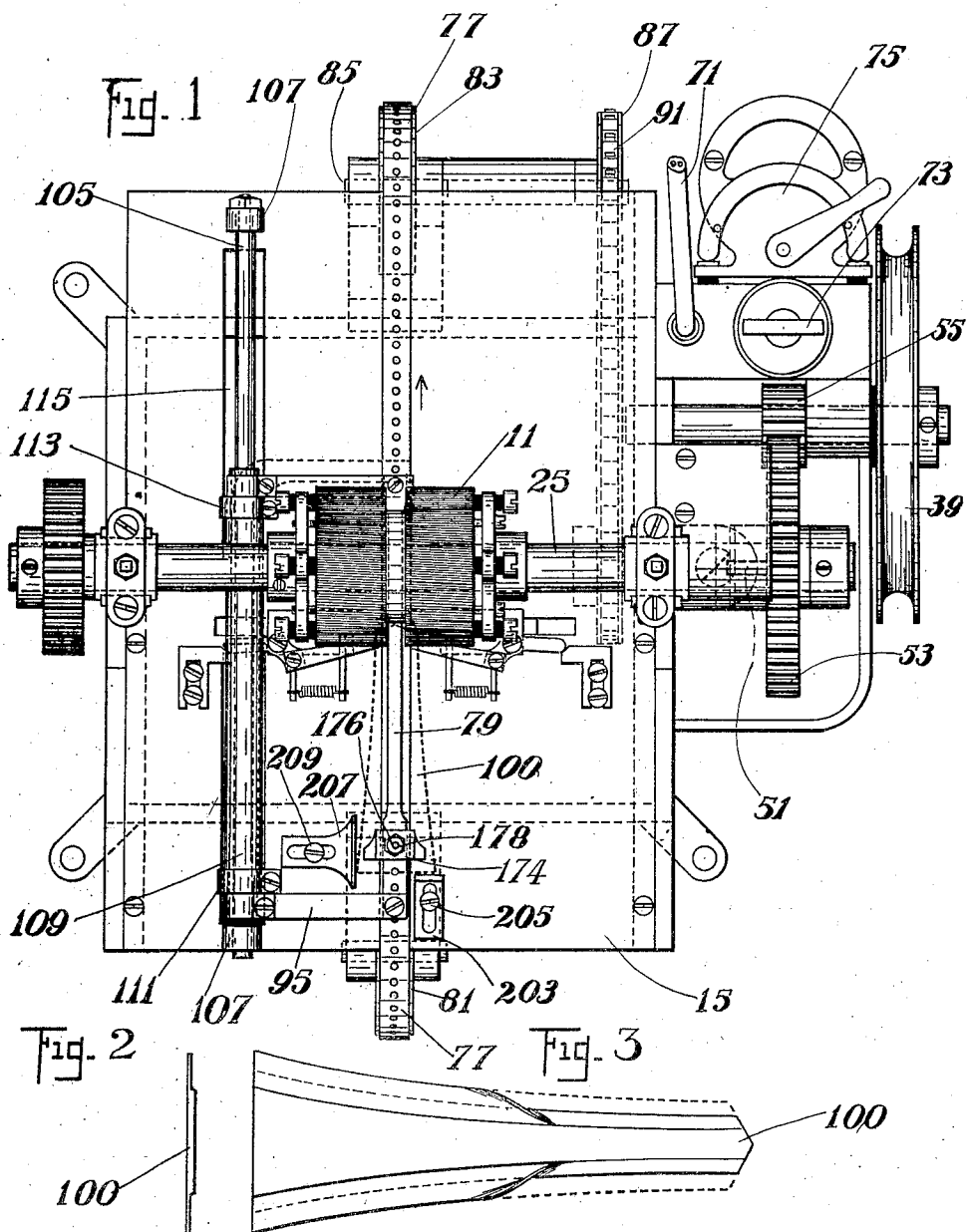
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A. W. BRICE ET AL

FOLDING MACHINE

Filed Nov. 29, 1920

4 Sheets-Sheet 1



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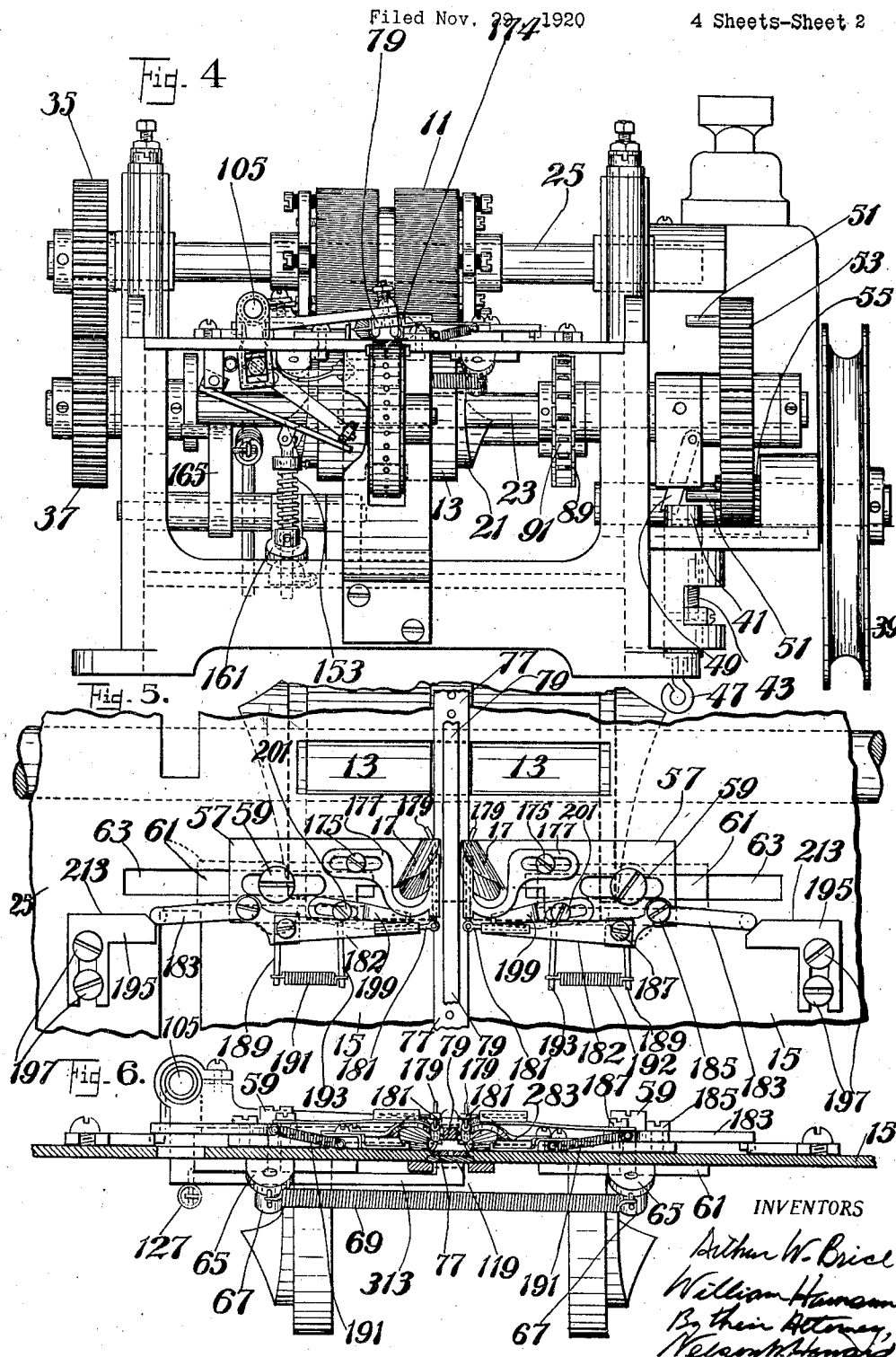
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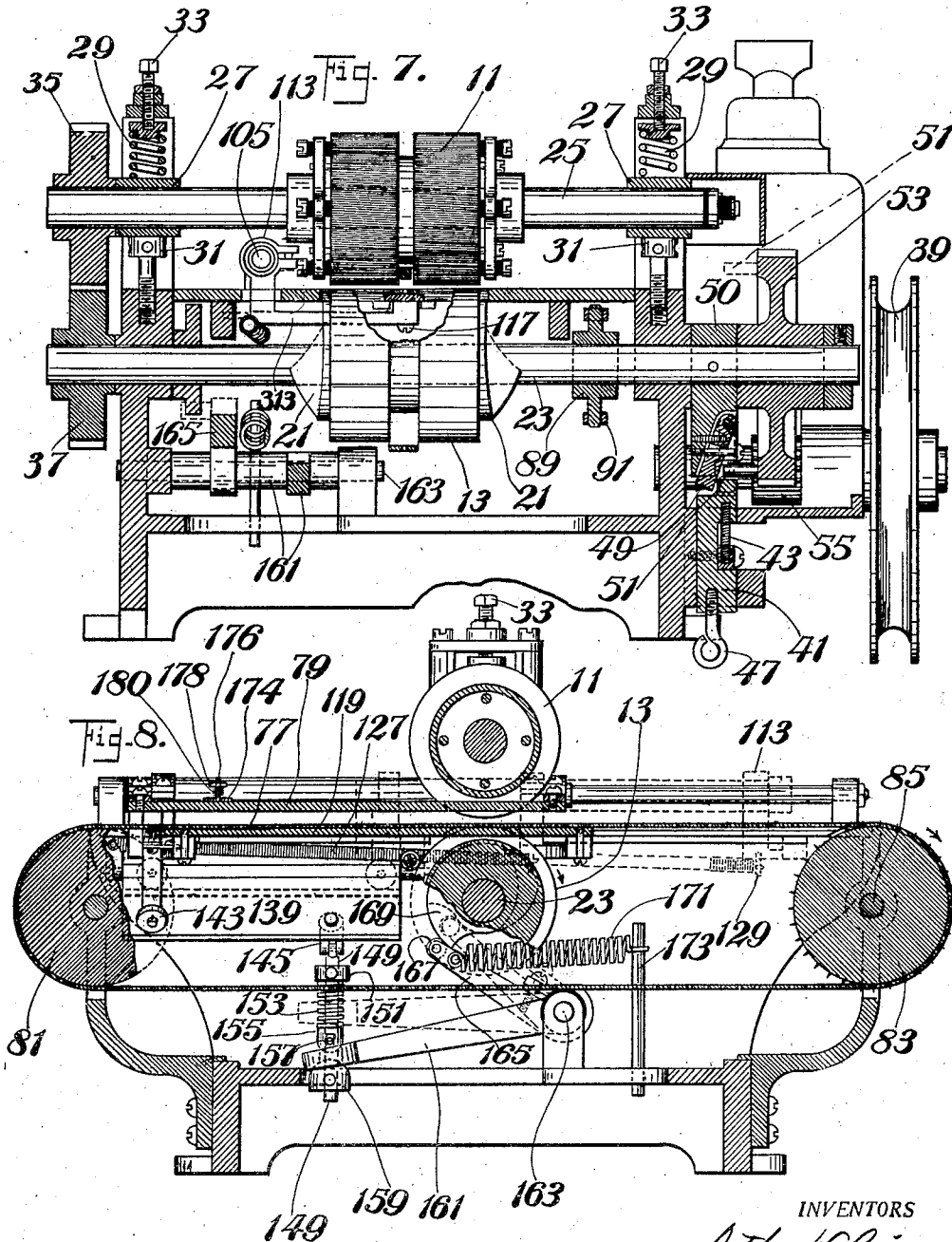
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FOLDING MACHINE

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4 Sheets-Sheet 3



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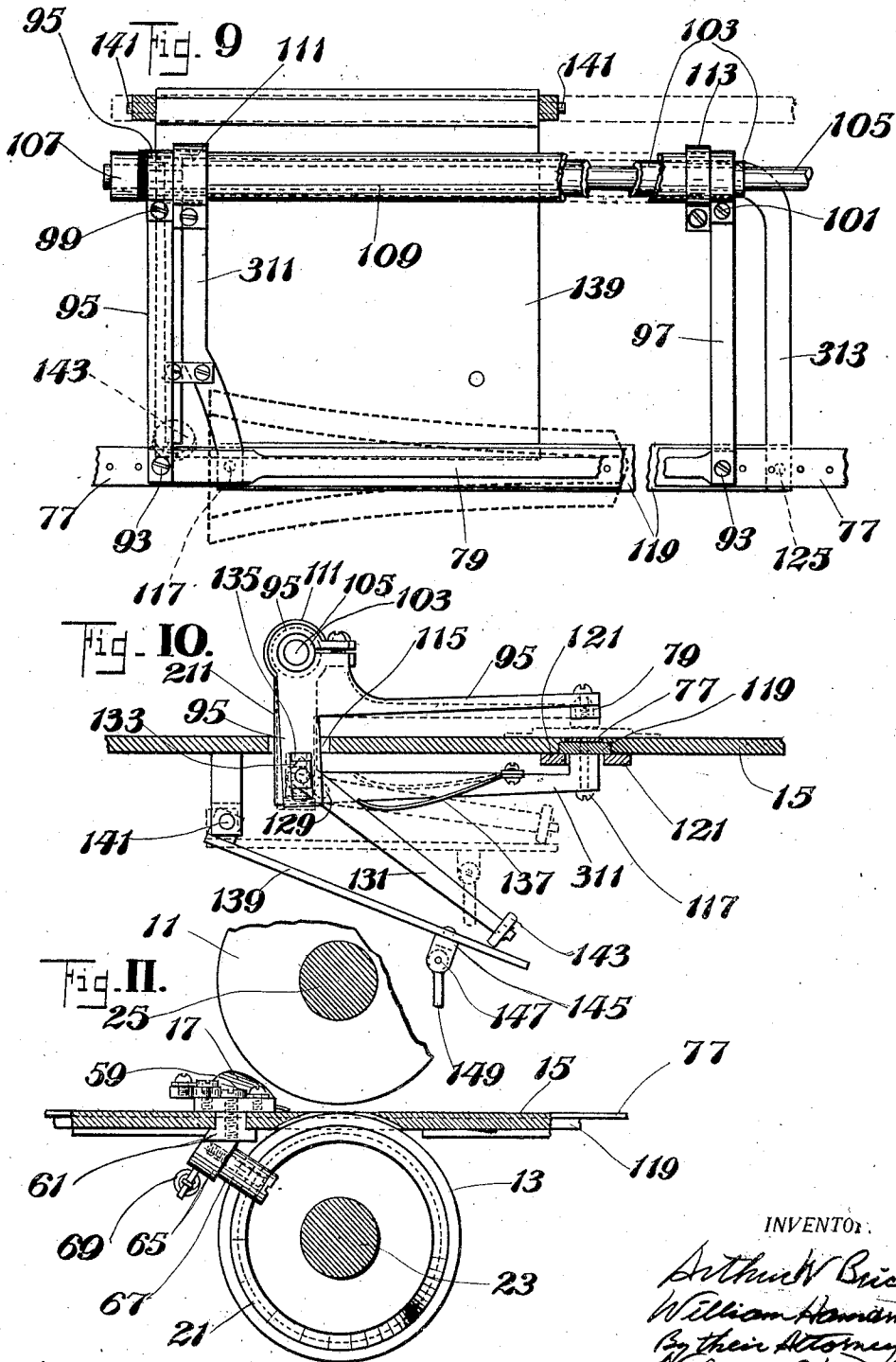
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4 Sheets-Sheet 4



UNITED STATES PATENT OFFICE.

ARTHUR W. BRICE, OF ROCHESTER, AND WILLIAM HAMANN, OF IRONDEQUOIT, NEW YORK, ASSIGNORS TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

FOLDING MACHINE.

Application filed November 29, 1920. Serial No. 427,065.

To all whom it may concern:

Be it known that we, ARTHUR W. BRICE and WILLIAM HAMANN, citizens of the United States, residing at Rochester and Irondequoit, in the county of Monroe and State of New York, have invented certain Improvements in Folding Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to folding machines and is herein illustrated as embodied in a machine for folding the opposite edges of back stays of the general type disclosed in application Serial No. 413,957, filed in the name of Boulton.

In machines of this type the stay is fed lengthwise between folders, to fold-pressing mechanism, the relative positions of the folders with respect to each other being varied in timed relation to the operation of the feeding means, so that the folders maintain uniform engagement at all times with the opposite edges of the stay. It is very desirable first that the stay be presented accurately to the folders and pressing mechanism, and second that the middle portion of the stay be held flat during the folding of the edges. In order to accomplish these results with unfailing accuracy, one feature of the present invention comprises in a machine of the class described, a pair of clamping members which seize the work and move with it between the folders. With this construction the stay, once it has been properly placed between the clamping members by the operator and the machine started, is held firmly and fed properly between the folders.

In the machine of the Boulton application there is associated with each folder a creaser in the form of a piece of wire over which the edges of the stay are bent by the folders. Further features of the present invention relate to improved means for mounting the creasers and in means for actuating them. In the illustrative machine the creasers are mounted in holders which are adjustable with respect to the folders so as to permit varying the widths of the folds produced; and in order to ensure that the folds at the leading portion of the stay shall

be of a width uniform with the width of the remaining portions, the creasers normally project beyond those ends of the folders which are adjacent to the bite of the fold-pressing rolls and are withdrawn automatically after the first portions of the folds have been completed.

These and other features of the invention including certain details of construction and combinations of parts will be described as embodied in an illustrative machine and pointed out in the appended claims.

Referring now to the accompanying drawings,—

Fig. 1 is a plan of a machine in which the present invention is embodied;

Fig. 2 is an end view of a back-stay as it appears before the stay is folded;

Fig. 3 is a plan of a partly folded back-stay;

Fig. 4 is a front elevation of the machine;

Fig. 5 is a plan showing more particularly the movable folders and their mounting;

Fig. 6 is a front view of substantially the same parts which are shown in Fig. 5;

Fig. 7 is a vertical transverse section of the machine through the axes of the roll shafts, the shafts themselves, the driving pulley, the rolls and certain other parts being shown in elevation;

Fig. 8 is a vertical longitudinal section of the machine through the middle of the rolls;

Fig. 9 is a detail in plan of the device for clamping the work to the feed belt;

Fig. 10 is an end elevation of substantially the same parts shown in Fig. 9 as viewed from the left, and

Fig. 11 an end elevation of the rolls and the mechanism for moving the folders apart.

The present machine, like that of Boulton, is designed to fold simultaneously the opposite edges of a piece of work such as a back-stay 100. Fig. 3 shows such a stay with the opposite edges of its upper, narrower portion folded, the dotted lines indicating the shape of this portion before the folding took place. It will be understood that before being folded the stay is skived along its opposite edges as best shown in Fig. 2. Like the Boulton machine, the present machine is provided with upper and lower rolls 11 and 13 which feed the stay

and press the folds, the lower roll extending up through a slot in a table 15 and the upper roll being located directly above and arranged to co-operate with the lower roll.

5 In front of the bite of the rolls are two folders 17 in the shape of plows which are movable to and fro in a path which is parallel to the axes of the rolls, such movements causing separation and approach of the folders.

10 The stay is fed with its upper or narrower end foremost, and as it is fed the folders are caused to separate in such manner that they follow the edges of the stay, this movement of separation being caused

15 to take place by cams 21 carried on the ends of the lower roll and consequently in timed relation to the feed movement. The curves of the cams correspond to the curves of the opposite edges of the stay; and for every

20 different pattern of stay, cams of suitable shape are provided. The lower roll 13 (Fig. 7) is fast to a shaft 23 which is rotatable in fixed bearings carried by the frame of the machine. The upper roll 11 is carried by a

25 shaft 25 which is rotatable in vertically movable blocks 27 mounted in suitable guideways in the frame of the machine, said blocks being urged downwardly by springs 29 against adjustable stops 31, the tension of the springs being capable of being varied by turning screw bolts 33. Fast

30 to adjacent ends of the shafts 23, 25 are gears 35, 37 the teeth of which are long enough to permit a certain amount of separation of the rolls due to the presence between them of a stay, the construction permitting stays of different thicknesses to be operated upon. The rolls are normally at

35 rest, but rotation may be imparted to them at any time from a continuously driven pulley 39 through a one-revolution clutch which may be caused to connect the pulley with the shaft 23 of the lower roll. This

40 clutch is operated by first pulling down and then releasing a trip member 41 which is urged upwardly at all times by a spring 43 and has at its lower end an eye 47 to receive the upper end of a treadle rod. When

45 the trip member 41 is pulled down a spring-pressed dog 49, carried by a block 50 which is fast to the shaft 23, is swung to the right and engaged by one or the other of pins 51 carried by a gear 53 which is loose on the

50 shaft 23 and is continuously rotated by a pinion 55 fast to a rotatable stud shaft to which the pulley 39 is also fast. At the end of one revolution of the shaft 23, the trip 41, which by that time has again resumed the position shown, engages the dog 49 and

55 swings it to the left into the position shown. The details of this clutch will not be further described since the details of its construction form no part of the present invention, and any suitable one-revolution clutch

60 may be used.

65

The folders 17 (see Figs. 5 and 6) are mounted on plates 57 adjustably fastened to slides 61 by screws 59, which pass through slots in the plates and are threaded into the slides. These slides are of an inverted T- 70 shape in cross-section with the stems of the Ts extending up through slots 63 in the table 15. Fast to or integral with the lower portions of the slides 61 are ears 65 carrying downwardly and rearwardly extending studs on which are mounted rolls 67 adapted to run on the cams 21 of the lower roll 13. A spring 69 connects the ears 65 and holds the rolls against the cams so that, as the roll is rotated, the folders are gradually spread apart and then allowed to move toward each other into the positions shown.

With the construction thus far described, the general mode of the operation of the machine is as follows. A stay is placed upon the table 15 in the position shown in dotted lines in Fig. 1 and the treadle (not shown) which is attached to the eye 47 depressed and then released. The stay is grasped and moved forward by mechanism which has not yet been referred to and is presently seized by the rolls and continued in its forward movement. During such movement the opposite skived edges of the stay are engaged by the folders, which are moved apart by the cams 21 to such an extent and at such a rate that they act uniformly upon the edges of the stay at all points to fold said edges, the rolls 11 and 13 pressing the folded edges as well as drawing the stay between the folders. At the end of one revolution of the rolls, the stay has been folded, and the parts of the machine come to rest in position to receive and operate upon another stay. In order that heat as well as pressure may be applied to the folded edges of the stay, there is mounted in the upper roll a heat unit (not shown) which is connected by leads running through a passageway in the shaft 25 and by suitable brushes and conductors with a supply conductor 71, a switch 73 and a rheostat 75 being provided for controlling the strength and flow of the current. The unit and the connections have not been shown since the details of their constructions form no part of the present invention. The purpose of this electrical apparatus is to heat the upper roll, and any suitable heating means, such for example as a gas flame, may be used if desired. As thus far described the machine and its mode of operation are or may be similar to those described in the application of Boulton which has been identified above.

In the Boulton machine there is provided a work-presenting member which descends upon the stay after the stay has been placed upon the table 15, as indicated in Fig. 1, and pushes the stay forward until its leading end has been seized by the rolls. In the 120

present machine the stay is clamped to a moving belt 77 by a clamping-bar 79, said bar and belt holding the stay firmly clamped between them during the greater part of the whole feeding movement. The belt is a perforated metal one running around a smooth idle pulley 81 located at the front of the machine and a driving pulley 83 located at the rear of the machine. The last-named pulley has pins adapted to enter the perforations in the belt and is fast to one end of a short shaft 85 to the other end of which is fast a sprocket 87. Around this sprocket and around a second sprocket 89, which is fast to the shaft 23 of the lower roll, runs a chain 91 so that, when the shaft 23 is rotating, the upper run of the belt 77 is moving from the front toward the rear of the machine. The upper run of the belt 77 runs in a slot in the table 15 with its upper surface substantially flush with the surface of the table. The clamping-bar 79 is always above the belt; and in order to provide a passageway for the two where they would otherwise be gripped by the rolls, said rolls are provided with registering grooves, as best shown in Fig. 7, which extend around the rolls about midway of their lengths.

The clamping-bar 79 is normally in raised position when the machine is at rest so as to permit a stay to be placed beneath it. As soon, however, as the one-revolution clutch is thrown in, this bar is brought down to clamp the stay to the belt and moves with the stay and belt until it is released, whereupon it rises and returns to its initial position. Referring now more particularly to Figs. 9 and 10 with occasional references to Figs. 1 and 4, the clamping-bar 79 is fastened by screws 93 to the outer or free ends of two arms 95, 97, the hubs at the other ends of said arms being fastened by pinch screws 99, 101 to a sleeve 103 which is loosely mounted on a rod 105. This rod extends from front to rear of the machine at one side of the rolls 11, 13, and is spaced above the table, being held fast in stationary brackets 107. Loosely mounted upon the sleeve 103 between the hubs of the arms 95, 97 is a sleeve 109, and clamped by pinch-screws to the ends of this sleeve are the hubs 111, 113 of two right-angled arms. The forward arm (see Fig. 10) has a vertical portion 211 and a horizontal portion 311, the vertical portion extending down through a slot 115 in the table and the horizontal arm extending under the table to a locality beneath the belt 77. The outer end of the horizontal portion 311 has a boss which is fastened by a screw 117 to a slide-bar 119, said slide-bar being mounted in a guideway formed in the under side of the table and held in place by plates 121 which underlie the guideway and are fastened to the under

side of the table. The rear right-angled arm, of which the hub 113 and horizontal portion 313 are shown in Fig. 9 is substantially like the forward arm and is fastened at 125 to the rear end of the slide-bar 119. It will thus be seen that the right-angled arms, the horizontal portions of which are indicated at 311 and 313, the slide bar 119 and the outer sleeve 109 form a sort of frame which may slide back and forth from front to rear of the machine in the line of feed, but is held from any angular movement about the axis of the rod 105 by reason of the mounting of the slide-bar 119. It will be noted, on the other hand, that while the frame consisting of the clamping-bar 79, the arms 95, 97 and the inner sleeve 103 is also capable of moving back and forth in the line of feed, it is also angularly movable about the axis of the rod 105, such angular movement causing the clamping-bar 79 to be raised and lowered. The two frames are urged at all times toward the front of the machine by a tension spring 127 (Fig. 8) which is fast at its forward end to a stationary part of the machine and at its rear end to a pin 129 driven into the lower side of the horizontal portion 313 of the rear right-angled arm. The movement of the two frames toward the rear of the machine is caused by the belt 77 during the time that the clamping-bar 79 is pressing the stay against the upper run of the belt; and as soon as the clamping-bar releases the stay, the spring 127 moves the frames back to their normal position of rest.

Referring more particularly to Fig. 10, the mechanism by which the clamping-bar is swung downwardly to press the stay upon the belt 77 and is later swung upwardly to release the stay will now be described. Pivoted at 129 to the horizontal portion 311 of the forward right-angled arm is a lever 131 which carries pivoted at its upper end a swivel block 133, said block extending into a slot 135 formed in a downwardly extending portion of the forward arm 95 which, with the rearward arm 97, carries the clamping-bar 79. A leaf-spring 137, fast at one end to the horizontal portion 311 of the forward right-angled-arm, bears at its opposite end against the lever 131 and tends at all times to cause it to swing downwardly and thereby, through the swivel-block 133, to swing the arm 95 upwardly in a counter-clockwise direction so as to raise the clamping-bar 79 and hold it raised. In order to swing the arm 95 in a clockwise direction so as to bring the clamping-bar 79 down upon the stay, there is provided a plate 139 pivoted at 141 to the frame of the machine and contacting with a roll 143 which is mounted on the lower end of the lever 139. In the operation of the machine this plate is first pushed upwardly about its pivot thereby swinging

the lever 131 upwardly in opposition to the leaf-spring 137 and bringing the clamping-bar 79 down upon the stay. This position of parts, which is indicated in dotted lines in Fig. 10 is maintained while the moving belt 77 is carrying the stay and the two frames toward the rear of the machine, the roll 143 running on the plate 139 which then serves as a sort of track. After this movement of the frames, stay and belt has continued until the stay has been fed for about three-quarters of its length between the folders, the plate is swung down into the full-line position. The leaf-spring 137 then swings the lever 131 downwardly with the plate, thereby raising the clamping-bar 79 so that it is no longer connected in any way with the moving belt 77. The spring 127 (Fig. 8), which has been stretched during the movement of the frames toward the rear of the machine, is now free to return the frames to their normal position at the front of the machine.

Referring now more particularly to Fig. 8 in connection with Fig. 10, the mechanism for raising and lowering the plate 139 about its pivot 141 will be described. A lug 145 on the under side of the plate is pivoted at 147 to a rod 149. Fast to the upper part of the rod (Fig. 8) is a collar 151; and surrounding the rod is a coiled spring 153 which is stronger than the leaf-spring 137. This coiled spring rests upon a second collar 155 which is slotted to receive the ends of a pin 157 driven through the rod. The slot extends through the lower end of the collar 155, this pin and slot connection being for convenience in assembling the two collars and the spring on the rod. At the lower end of the rod is fast a third collar 159, the adjacent ends of the collars 155, 159 being rounded to fit more or less in an eye in the outer end of an arm 161, the hub of which is loose on a rod 163. This hub (see Fig. 7) is elongated to form a sleeve; and clamped upon this sleeve is an arm 165, the two arms 161, 165 being thus rigidly connected and capable of angular movement about the axis of the rod 163. At the outer end of the arm 165 is a roll 167 which is held at all times against a cam 169 on the shaft 23 of the lower roll by a heavy tension spring 171 which is fast at one end to a pin carried by the arm 165 and at the other end to an upright rod 173 carried by the frame of the machine. The positions of the cam 169 the arms 165, 161, the plate 139 and roll 143 are shown in full lines in Fig. 8 in the position of parts in which the machine comes to rest and in dotted lines in the positions occupied shortly after the rotation of the shaft 23 has begun. It should be noted that the cam 169 is so shaped and that its angular position on the shaft is such that, very shortly after the shaft 23 has begun to rotate in the direction

indicated by the arrow, the arm 165 is swung by the spring 171 in a clockwise direction whereby the plate 139 is swung upwardly and the clamping-bar 79 brought down upon the stay to clamp it to the moving belt 77. For a considerable extent the active face of the cam 169 is concentric with the axis of the shaft 23, and during the time that this portion of the cam is passing the roll 167, the clamping-bar 79 is moving toward the rear of the machine with the stay clamped to the belt. Thereafter the active face of the cam 169 is shaped to permit the arm 165 to be swung in a counter-clockwise direction thereby lowering the plate 139 and permitting the leaf-spring 137 (Fig. 10) to swing the lever 131 downwardly and raise the clamping-bar. The spring 127 (Fig. 8), as has been explained, then pulls the clamping-bar with its sliding frames back to the front of the machine where said bar remains in raised position after the rolls 11 and 13 have completed the feeding of the stay and the machine has come to rest. In this connection it will be stated that the parts of the belt-driving mechanism are so proportioned that the velocity of the belt 77 is equal to the peripheral velocity of the feed rolls, this being essential since, during a portion of its feed movement, the stay is being fed both by the belt and by the rolls.

The present machine is particularly adapted for work upon back-stays which are commonly wider at one end than at the other, such a stay being shown in dotted lines in Fig. 1. In order to ensure that the wider end of the stay shall be held flat, there is mounted upon the clamping-bar 79 a presser 174. This presser is shaped to fit over the bar 79 (see Fig. 1) and is provided with horizontally extending wings which bear upon the stay. The presser is perforated (see Fig. 8) to receive a pin 176 which is driven into the bar 79, the upper end of the pin being threaded to receive a thumb-nut 178, a light spring 180 being located between the thumb-nut and presser.

In the Boulton machine there is shown associated with each folder a creaser in the form of a wire to define the line of the fold, the margins of the stay being simultaneously bent over these wires to form the folds preparatory to the pressing of the folds by the rolls. These wires in the Boulton machine are stationary with respect to their respective folders and do not project from folders toward the bite of the rolls. It is desirable for the following reasons that they should so project during the first part of the folding operation. The folders (see Fig. 5) are necessarily located at some distance in front of the bite of the rolls, and it has been found that unless the creasers project beyond the folders toward the rolls during the first part of the folding opera-

tion the portions of the folds first pressed are liable to be wider than the remaining portions, with the result that the leading or upper end of the finished stay is too narrow. If however, the creasers are permitted to continue to project during the remainder of the folding operation, in which the folders are moved away from each other, the finished folds at the wider end of the stay are liable to be too narrow. Accordingly the present machine is provided with creasers which normally project from the folders when the machine is at rest, remain in their projected positions during the first part of the folding and pressing operations and are subsequently withdrawn, said creasers being also adjustable to vary the width of the fold.

Referring now more particularly to Figs. 5 and 6, there is adjustably mounted on each folder-carrying plate 57 by means of a screw 175 a holder 177 having a tubular guide through which a creaser 179 is slidable. Each creaser is in the form of a piece of spring wire curved as shown and having that end which is toward the front of the machine bent upwardly and passing through an eye formed at the end of a pin 181 which extends loosely into a tubular socket formed at the inner end of a spring arm 182 which is fastened by a screw 187 to a bell-crank lever 183, said bell-crank being pivoted to the plate 57 at 185. Pins 189 carried by the bell-crank levers 183 are connected by tension springs 191 with stationary pins 193 driven into the plate 57. The springs 191 tend at all times to swing the bell-crank levers 183 about their pivots 185 and thereby to swing the adjacent inner ends of the spring-arms 182 toward the rear of the machine, such swinging movement being controlled by cam plates 195 having cam faces inclined outwardly and toward the rear of the machine, said faces normally contacting with lugs formed at the outer ends of the levers 183. The plates 195 are slotted, as shown, and held in adjusted position by screws 197 the stems of which pass through the slots and are threaded into the table 15. In order to facilitate proper placing of a stay upon the table 15, as well as to aid in guiding the stay during its passage through the machine, two edge gages 199 having slotted stems are adjustably held on the plates 57 by screws 201. By referring to Fig. 1 it will be seen that in order to aid in the proper placing of the stay upon the table 151 there is also provided a rear gage 203 adjustably fastened to the table 15 by a screw 205 and a side gage 207 adjustably fastened to the table by a screw 209.

Turning again to Fig. 5, the operation of the creasers 179 will now be described. The stay, whose opposite edges are to be folded, is paced upon the table 15 above the belt 77

and beneath the clamping-bar 79 with the edge gages 199 in contact with the opposite edges at the forward portion of the stay and the rear and side gages 203, 209 (Fig. 1) in contact with the rear end and rear left corner of the stay. The treadle is now depressed to throw in the one-revolution clutch, whereupon the belt 77 begins to move, the clamping-bar 79 clamps the stay to the belt, and the stay is moved between the folders. The cams 21 are so shaped in the illustrated machine that the folders 17 remain substantially stationary for a time, since the opposite side edges of the stay at the forward portion thereof are substantially parallel; and during the time that the forward portion of the stay is passing between the folders, the creasers 179 remain projected beyond the rear ends of the folders 17 as shown in Fig. 5. As soon, however, as the folders start to separate, the lugs on the bell-crank levers 183 ride up the inclined cam-faces of the plates 195 and withdraw the creasers 179 so that they no longer project beyond the rear ends of the folders. Thereafter, during the further separation of the folders, the lugs run on the straight faces 213 of the cam plates 195 which are so located as to maintain the ends of the creasers 179 about flush with the ends of the folders. The arms 182 are made of spring steel to facilitate assembling of the pins 181 and creasers 179 and to lessen the tendency of the creasers to bind in the sockets formed in the holders 177 as the creasers are moved back and forth in the sockets.

Although the invention has been described as embodied in a particular machine, it should be understood that the invention is not limited in the scope of its application to the particular machine which has been shown and described.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. A machine for progressively folding the opposite edges of a piece of work, having in combination, folders for engaging the opposite edges, clamping members for engaging the work, one of said members being bodily movable toward the other to clamp the work, and means for moving the clamping members in a path to carry the work between the folders.

2. A machine for progressively folding opposite edges of a piece of work, having in combination, folders arranged to engage the edges, a driven member arranged to travel between the folders, and means including an element bodily movable toward said member for clamping the work to the member.

3. A machine for progressively folding opposite edges of a piece of work, having in combination, folders arranged to engage the

edges, a pair of members movable from a position in front of the folders in a path to present the work to the folders, and means for causing relatively bodily movement of approach of said members to clamp the work between them and to move toward the folders.

4. A machine for progressively folding opposite edges of a piece of work, having in combination, folders arranged to engage the edges, a belt upon which the work may be placed in front of the folders, means for causing the belt to travel in a path to present the work to the folders, and a clamp for compelling the work to travel with the belt.

5. A machine for progressively folding opposite edges of a piece of work, having in combination, folders arranged to engage the edges, a belt upon which the work may be placed in front of the folders, means for causing the belt to travel in a path to present the work to the folders, a clamp, and means for operating the clamp first to hold the work against the belt for an interval and then to release it.

6. A machine for progressively folding opposite edges of a piece of work, having in combination, folders arranged to engage the edges and form folds therein, means for pressing the folds, a pair of co-operating members, and means for causing one of the members to move bodily toward the other to grip the work and for then causing the members to move in unison to carry the work between the folders.

7. A machine for progressively folding opposite edges of a piece of work, having in combination, folders arranged to engage the opposite edges and form folds therein, fold-pressing mechanism located in the rear of the folds, and means for advancing the work to the folders and pressing mechanism, said means comprising a driven belt and means for clamping the work to the belt and for thereafter releasing it.

8. A machine for progressively folding opposite edges of a piece of work, having in combination, folders for engaging the opposite edges, a pair of work-feeding and fold-pressing rolls located in the rear of the folders, and means for feeding the work to the folders and rolls, said means comprising a moving belt and means for clamping the work to the belt and for thereafter releasing it.

9. A machine for progressively folding opposite edges of a piece of work having, in combination, folders arranged to engage the opposite edges and form folds therein, fold-pressing mechanism located in the rear of the folders, and means for advancing the work to the folders, said means comprising clamping members and means operating first to cause relatively bodily movement of ap-

proach of the members to clamp the work, then to carry the work forward and then to cause relative bodily movement of separation of the members to release the work and return to initial position.

10. A machine for operating upon a piece of work along paths which vary in their relation to each other, having in combination, tools for engaging the work, means for feeding the work past the tools, and means for varying the relation of the tools with respect to each other in timed relation to the operation of the feeding means, said feeding means including a belt, and means for clamping the work to the belt.

11. A machine for operating upon a piece of work opposite edges of which vary in their relation to each other, having in combination, folders for engaging the opposite edges, means for feeding the work past the folders to fold the edges progressively, and means for varying the relative positions of the folders with respect to each other during the feeding movement, said feeding means including a belt and means for clamping the work to the belt.

12. A machine for progressively folding opposite edges of a piece of work, having in combination, folders for engaging the opposite edges and forming folds therein, fold-pressing mechanism located in the rear of the folders, an endless conveyor for feeding the work to the folders and pressing mechanism, and means for varying the relative positions of the folders with respect to each other during the folding operation.

13. A machine for progressively folding opposite edges of a piece of work, having in combination, folders for engaging the opposite edges, means located in the rear of the folders for drawing the work past the folders, an endless conveyor for presenting the work to the folder and drawing means, and means for varying the relative positions of the folders with respect to each other during the folding operation.

14. A machine for progressively folding opposite edges of a piece of work, having in combination, folders arranged to engage the edges, combined work-feeding and fold-pressing mechanism located in the rear of the folders, work-presenting mechanism located in front of the folders, said last-named mechanism comprising a pair of clamping members adapted to clamp the work between them and then move toward the folders, and treadle controlled means for imparting a cycle of operation to the folders and the two mechanisms and then bringing them to rest in position to receive a second piece of work.

15. A machine for progressively folding opposite edges of a piece of work, having in combination, folders for engaging the edges, a pair of work-feeding and fold-

pressing rolls located in the rear of the folders, each roll having a circumferential groove formed therein, a belt extending through a portion of the groove in one roll, a clamping bar extending through an adjacent portion of the groove in the other roll and adapted to co-operate with the belt in presenting a piece of work between the folders to the rolls, and means for operating the rolls, folders, belt and clamping member.

16. Work-feeding mechanism comprising a belt upon which a piece of work may be placed, a clamping-bar normally spaced above the belt, a rod along which the clamping-bar is slidable and about the axis of which the bar is angularly movable, a lever movement of which causes angular movement of the bar, a roll mounted on the lever, a plate in contact with the roll, and means for moving the plate into a given position and maintaining it in that position whereby the bar is moved angularly to clamp the work to the belt and is then moved bodily with the belt.

17. A machine of the class described, having in combination, a folder, a creaser associated with the folder, means for producing relative movement between the folder and creaser and the work to form the fold, the creaser normally projecting beyond one wall of the folder, and means for withdrawing the creaser during the folding operation.

18. A machine for progressively folding opposite edges of a piece of work, having in combination, folders for engaging the opposite edges, means for feeding the work between the folders, creasers associated with the folders and normally projecting beyond them in the direction of the feed movement, and means for withdrawing the creasers during the folding operation.

19. A machine for progressively folding opposite edges of a piece of work, having in combination, folders for engaging the edges, means for feeding the work past the folders, means for varying the relative positions of the folders with respect to each other during the passage of the work between them, creasers associated with the folders, and means for varying the relative positions of the creasers with respect to the folders during the folding operation.

20. A machine for progressively folding opposite edges of a piece of work, having in combination, folders for engaging the edges, means for feeding the work past the folders, means for varying the relative positions of the folders with respect to each other during the passage of the work between them, creasers associated with the folders and normally projecting beyond the folders in the direction of the feed movement, and means for withdrawing the creas-

ers prior to the termination of the folding operation.

21. A machine for progressively folding opposite edges of a piece of work, having in combination, folders for engaging the opposite edges, means for feeding the work past the folders and for varying the relative positions of the folders with respect to each other in timed relation to the operation of the feeding means, creasers associated with the folders and normally projecting beyond the folders in the direction of the feed movement, means for presenting the work to the folders, and means operating after such presentation for withdrawing the creasers.

22. A machine for progressively folding opposite edges of a piece of work, having in combination, folders for engaging the opposite edges, a creaser associated with each folder, means for feeding the work between the folders to cause the folders to bend the opposite edges of the work about the creasers and thereby form the folds, and means whereby the positions of the creasers with relation to their respective folders may be adjusted to vary the widths of the folds produced.

23. A machine for progressively folding opposite edges of a piece of work, having in combination, a table for supporting the work, means for feeding the work over the table, folders between which the work is fed, slide members upon which the folders are adjustably mounted, creasers, one for each folder, and holders for the creasers also adjustably mounted on the slide members.

24. A machine for progressively folding opposite edges of a piece of work, having in combination, a table for supporting the work, means for feeding the work over the table, folders between which the work is fed, slide members upon which the folders are adjustably mounted, creasers, one for each folder, actuating members for the creasers movably mounted upon the slide members, means for moving the slide members during the feeding movement, and means responsive to the movement of the slide members for moving the creaser-actuating members.

25. Work feeding mechanism comprising a belt upon which a piece of work may be placed, a clamping bar normally spaced above the belt, a rod along which the bar is slidable and about which the bar is angularly movable, means for driving the belt, and means operating first to swing the bar downwardly whereby the work is clamped to the belt and the clamping bar moved along the rod, and then to swing the clamping bar upwardly to release the work.

26. Work feeding mechanism comprising an endless conveyor upon which a piece of work may be placed, a clamping member

normally spaced above the conveyor and capable of movement toward the conveyor and in the direction in which the conveyor moves, and means operating first to move the member into position to clamp the work to the conveyor whereupon the work and the clamping member move with the conveyor, and thereafter to release the clamping member and return it to its normal position.

27. A machine for progressively operating upon a piece of work, the opposite edges of which vary in their relation to each other having, in combination, folders for engaging the opposite edges, clamping members for engaging the work, treadle-controlled power-operated means for moving the clamping members in a path to carry the work between the folders, and means for causing the folders to follow the contours of the edges.

28. A machine for progressively operating upon a piece of work the opposite edges of which vary in their relation to each other having, in combination, folders arranged to engage the edges, a driven member arranged to travel between the folders, treadle-controlled power-operated means for clamping the work to the member and for actuating the member, and means for causing the folders to follow the contours of the edges.

29. A machine for progressively operating upon a piece of work the opposite edges of which vary in their relation to each other having, in combination, folders arranged to

engage the edges, a pair of members movable from a position in front of the folders in a path to present the work to the folders, treadle-controlled power-operated means for causing said members to clamp the work between them and to move toward the folders, and means for causing the folders to follow the contours of the edges.

30. A machine for progressively folding the opposite edges of a piece of work having, in combination, two stationary folders arranged to engage simultaneously opposite points on opposite edges of the work, clamping members for engaging the work, and means for moving the clamping members in a path to carry the work between the folders whereby the opposite edges of the work are folded simultaneously.

31. A machine for folding progressively the opposite edges of a piece of work having, in combination, folders for engaging opposite edges of the work, an endless conveyor upon which the work is placed, a clamping member capable of movement with the conveyor but normally spaced from it and unconnected with it, means for moving the clamping member toward the conveyor to clamp the work to the conveyor and to cause the clamp and work to be moved by the conveyor, and means for there- after moving the clamp to release the work.

In testimony whereof we have signed our names to this specification.

ARTHUR W. BRICE.
WILLIAM HAMANN.