Oct. 1, 1957 J. SILVERMAN 2,808,099

MACHINE FOR FOLDING ORNAMENTAL SHEET ABOUT A BASE

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FIG. 1.

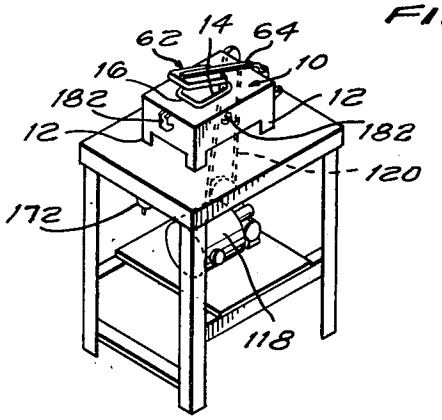


FIG. 4.

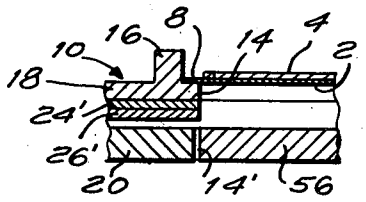
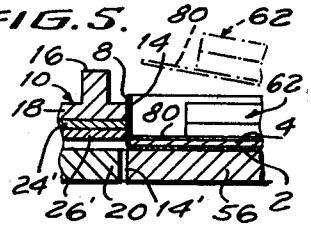


FIG. 5.



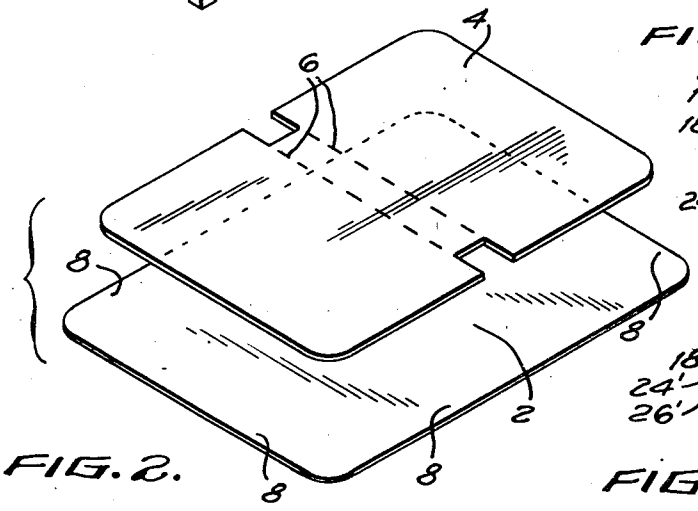


FIG. 2.

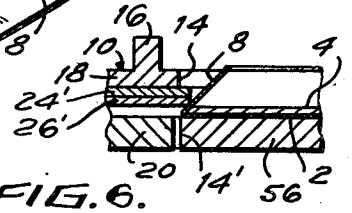


FIG. 6.

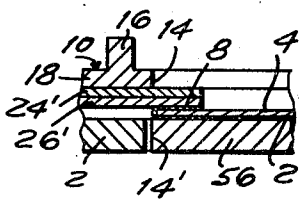


FIG. 7.

FIG. 3.

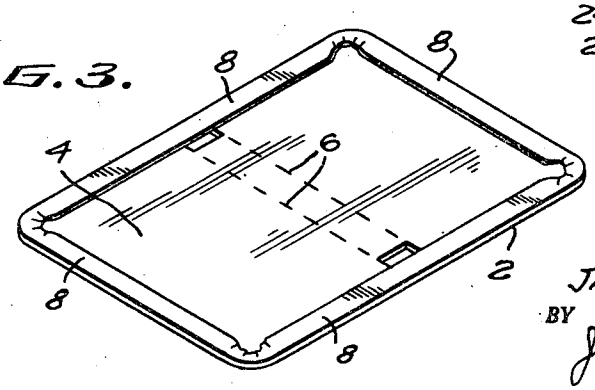


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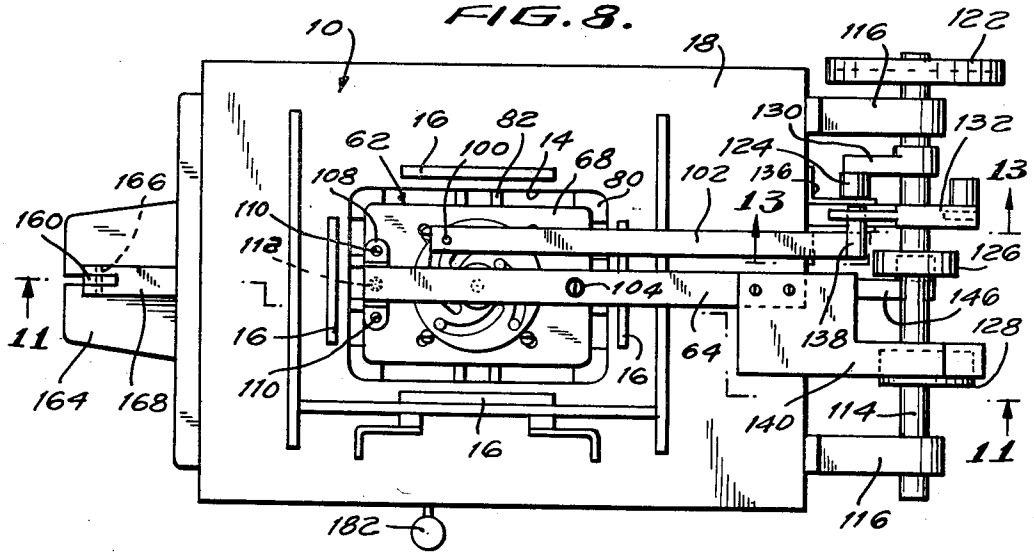
FIG. 8.



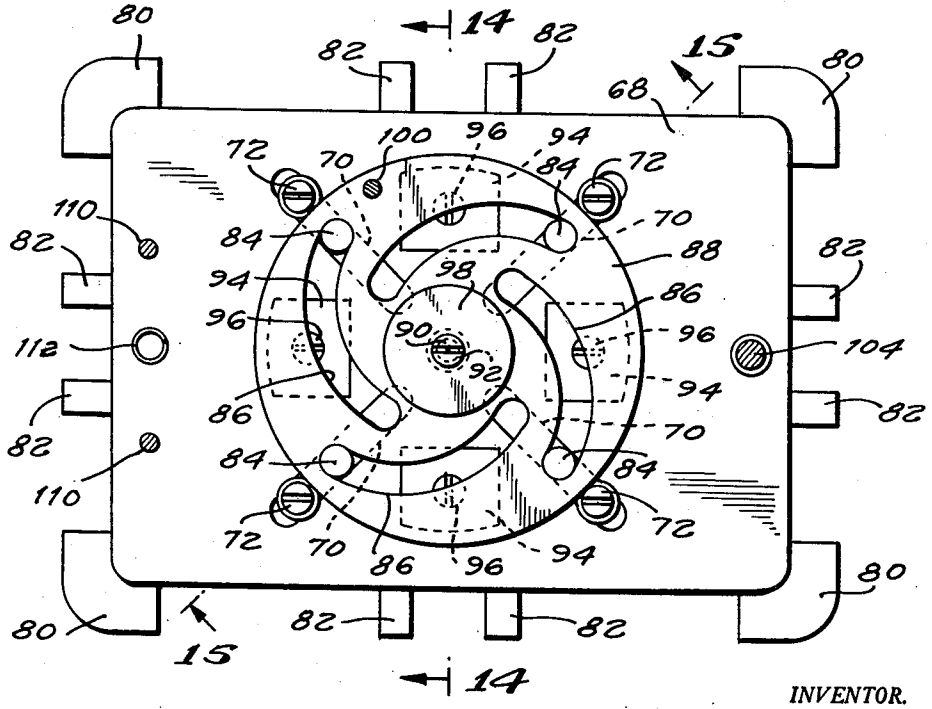


FIG. 9.

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MACHINE FOR FOLDING ORNAMENTAL SHEET ABOUT A BASE

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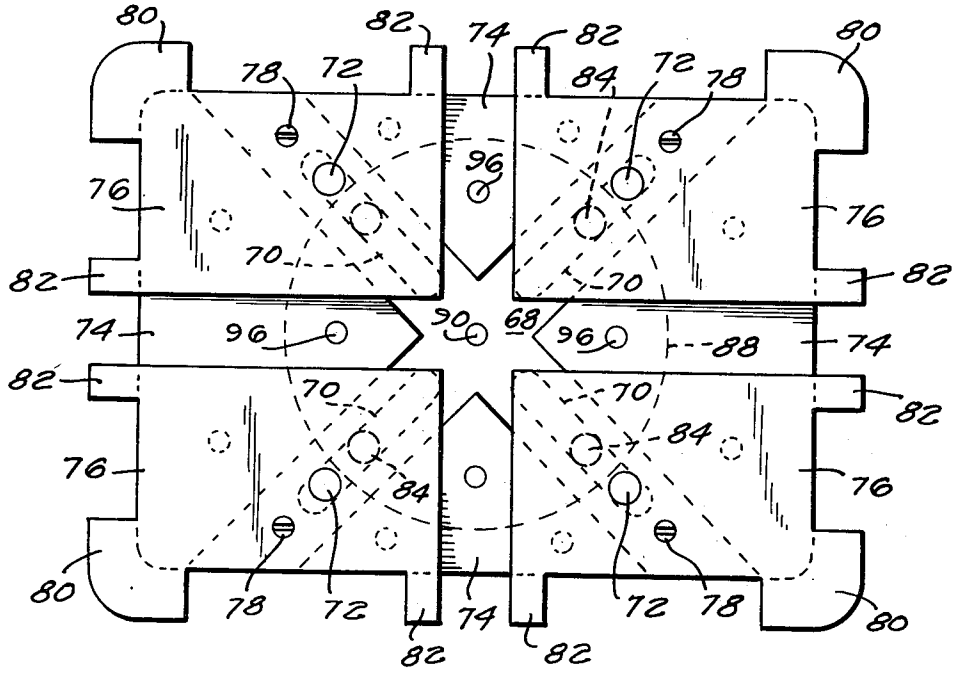
FIG. 10.



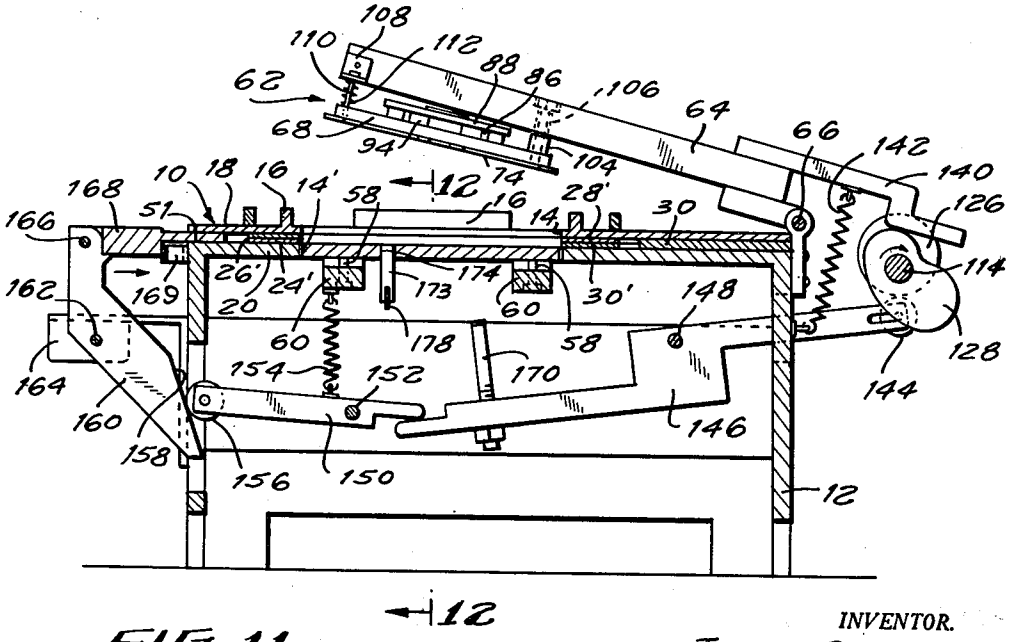


FIG. 11.

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MACHINE FOR FOLDING ORNAMENTAL SHEET ABOUT A BASE

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FIG. 12.

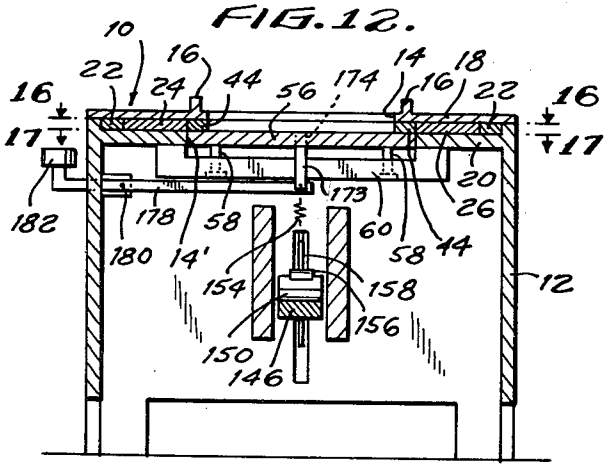


FIG. 13.

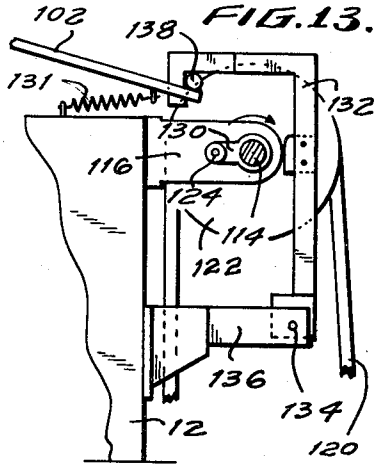


FIG. 14.

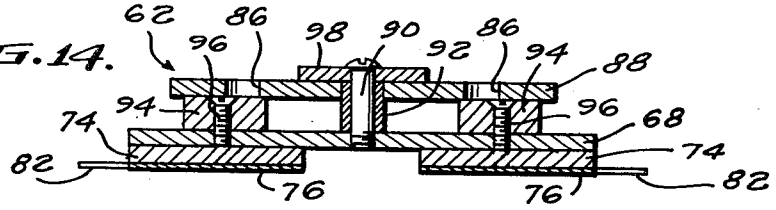


FIG. 15.

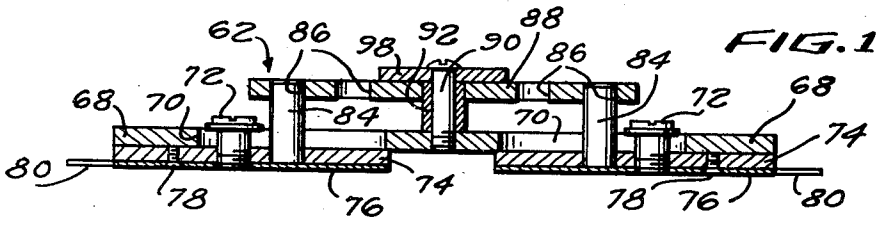


FIG. 18.

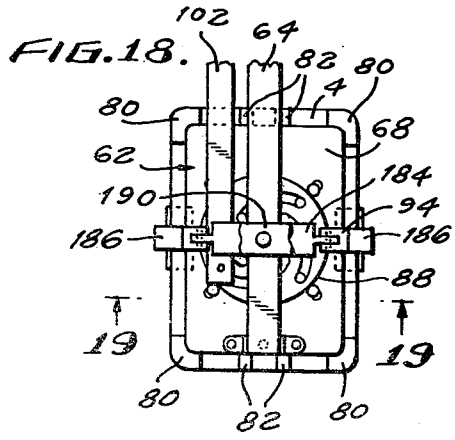
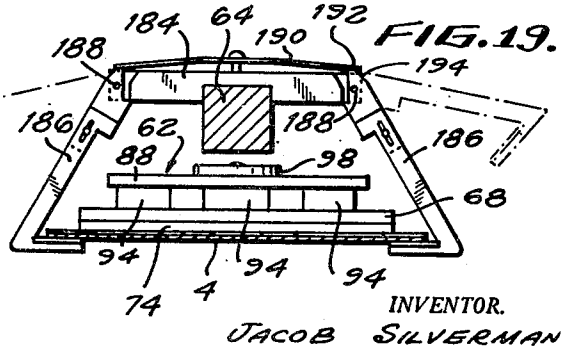


FIG. 19.



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MACHINE FOR FOLDING ORNAMENTAL SHEET ABOUT A BASE

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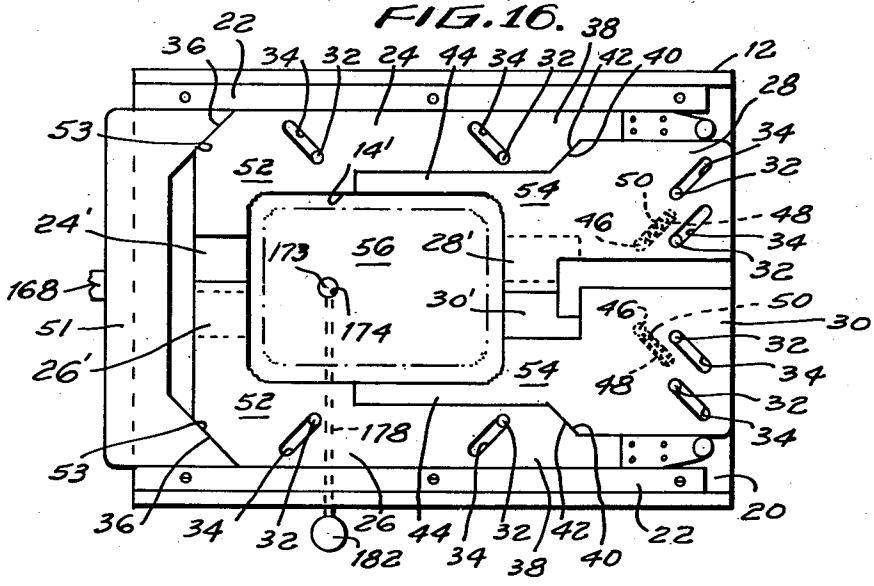
FIG. 16.



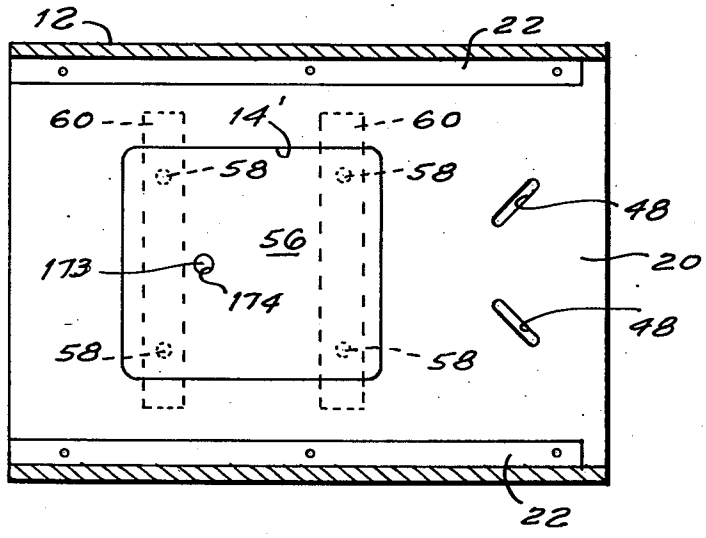


FIG. 17.

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United States Patent Office 2,808,099 Patented Oct. 1, 1957

2,808,099

MACHINE FOR FOLDING ORNAMENTAL SHEET ABOUT A BASE

Jacob Silverman, Brooklyn, N. Y.

Application December 21, 1954, Serial No. 476,641

13 Claims. (Cl. 154—41)

The present invention relates to a machine for automatically folding a sheet of material about a base, and is particularly adapted to cover one surface of a base sheet with an ornamental sheet and secure the two sheets together by folding the peripheral portions of the ornamental sheet around the edges of the base sheet and fastening those portions to the base sheet. The machine of the present invention finds one field of use in the ornamental covering of book bindings, but is susceptible of many other applications and uses.

The invention also pertains to such a machine which is motor driven and which will automatically carry out the various manipulative steps involved in timed sequence once the machine has been set in motion by any suitable actuating impulse.

Numerous problems are involved in folding an ornamental sheet about a base and securing the sheet and base together, and those problems loom particularly large in commercial quantity production. The two elements must be accurately positioned relative to one another before the folding operation takes place, the folding operation itself must not disturb that relative positioning, knotty problems are involved in producing a smooth, even fold-over at the corners of the base sheet, uniform tension on the ornamental sheet must be applied along the entire periphery of the base sheet if a uniform and pleasant appearing product is to be produced, and there must be no disarrangement of the sheets after folding and before securing takes place. The operations in question can be, and usually are, performed by hand, but this necessarily involves the use of skilled and therefore expensive labor, a lack of uniformity inherent in any manual operation, a high proportion of rejects and a fairly low rate of productivity. All of these factors add to the expense of the product or detract from its appearance and hence its ready saleability.

According to the present invention a machine has been produced which will avoid the above disadvantages and which solves the problems inherent in the operations involved in a manner which is eminently satisfactory. The machine in question is relatively inexpensive, is formed of a limited number of sturdy and postively acting parts, requires but a minimum of skill and experience on the part of its operator, and by reason of the fact that it is motor driven, requires the exertion of no effort on the part of the operator other than the feeding thereto of the materials to be manipulated and the actuation of a suitable control device for causing the machine to execute its cycle.

The machine comprises a table having a recess of a shape comparable to that of the base sheet about which the ornamental sheet is to be folded and to which the ornamental sheet is to be secured. The ornamental sheet is adapted to be placed upon the table over the recess, guide means preferably being provided in order to ensure accurate positioning thereof. The base sheet is then placed over the ornamental sheet and in registration with

the recess. The machine further comprises a form movable into and out of the recess, that form normally having a peripheral size and shape comparable to that of the base sheet but being collapsible to encompass a smaller area. When the form is moved into the recess it will carry the base sheet with it and the ornamental sheet will also be forced into the recess, the peripheral portions of the ornamental sheet extending beyond the base sheet being bent upwardly by the sides of the recess.

Folding elements are mounted within the table, are normally positioned beyond the periphery of the recess, and are moved into operative position extending partially into and across the recess after the form is fully within said recess. The folding elements function to bend the upstanding peripheral portions of the ornamental sheet over the outer portions of the upper surface of the base sheet. The folding operation is preferably performed simultaneously in all directions so that the relative positions of the base and ornamental sheets are not disturbed. The form is contracted either before, during or after the folding operation so that ultimately no part thereof is interposed between the base sheet and the peripheral portions of the ornamental sheet, thus permitting those sheet portions to be in contact with one another. One or more of the facing surfaces of those sheet portions will preferably have had adhesive applied thereto, so that the bringing of those sheet portions into face to face contact will serve to secure the sheets together. The form contracts sufficiently so that it clears the space between the folding elements, the form then being withdrawn from the recess while leaving the base and ornamental sheets within the recess.

In order to assist in the securing of the sheets together, the bottom wall of the recess may be movable upwardly so as to press the overlying sheet portions into firm contact, the folding elements restraining the sheets from upward movement. After a suitable period of time the bottom wall of the recess is released, the folding elements return to their initial position beyond the periphery of the recess, and the now united base and ornamental sheets may be removed from the recess as a unit.

In an alternative embodiment here specifically disclosed means are provided for initially mounting the base sheet directly on the form rather than on the table over the recess, means being provided for retaining it on the form until the form has moved it to the recess and has started to force it into the recess.

It will be appreciated that the movement of the base sheet into the recess will, by reason of the small amount of clearance between its edges and the edges of the recess, cause the ornamental sheet to be drawn taut over the lower surface of the base sheet, uniform tension being applied to the ornamental sheet around the entire periphery of the base sheet. Since the folding elements are preferably simultaneously operated, the folding of the peripheral portions of the ornamental sheet over and onto the outer portions of the upper surface of the base sheet will also be uniformly accomplished, and consequently the corners of the ornamental sheet will conform in a natural manner to the corners of the base sheet.

To the accomplishment of the above, and to such other objects as may hereinafter appear, the present invention relates to the structure and operation of a folding machine, as defined in the appended claims and as described in this specification taken together with the accompanying drawings in which:

Fig. 1 is a three-quarter perspective view of one embodiment of the present invention mounted on a table ready for use;

Fig. 2 is a three-quarter perspective exploded view showing the base sheet and the ornamental sheet;

Fig. 3 is a three-quarter perspective view of the two sheets united together by the machine;

Figs. 4, 5, 6 and 7 are fragmentary cross sectional views of the recess area of the machine showing various stages in the operation thereof;

Fig. 8 is a top plan view of the machine;

Fig. 9 is a top plan view, on an enlarged scale, of the form shown in its normal expanded condition;

Fig. 10 is a bottom plan view of the form;

Fig. 11 is a cross sectional view taken along the line **11—11** of Fig. 8;

Fig. 12 is a cross sectional view taken along the line **12—12** of Fig. 11;

Fig. 13 is a fragmentary cross sectional view taken along the line **13—13** of Fig. 8;

Fig. 14 is a cross sectional view taken along the line **14—14** of Fig. 9;

Fig. 15 is a cross sectional view taken along the line **15—15** of Fig. 9;

Fig. 16 is a top plan view taken along the line **16—16** of Fig. 12;

Fig. 17 is a cross sectional view taken along the line **17—17** of Fig. 12;

Fig. 18 is a top plan view, on a reduced scale, of a form modified to provide means for holding the base sheet thereon; and

Fig. 19 is a cross sectional view taken along the line **19—19** of Fig. 18.

The machine of the present invention is here specifically disclosed in a form designed to fold an ornamental sheet **2** of plastic, leather or fabric about a base sheet **4** of cardboard or the like, the united sheet assembly being designed for use as a flexible cover for a book the leaves of which are adapted to be bound within that cover after it has been folded along the broken lines **6**. As will be clearly apparent from Figs. 2 and 3, the general shape of the sheets **2** and **4** are similar, the sheet **2**, however, being longer and wider than the sheet **4** so that its peripheral portions, generally designated **8**, may be folded around the edges and pressed against the upper surface of the base sheet **4**. Adhesive, usually either of the pressure sensitive or combined heat and pressure sensitive type, is initially provided along the upper surfaces of the ornamental sheet peripheral portions **8** or the outer portions of the upper surface of the base sheet **4** against which the ornamental peripheral portions **8** are adapted to be pressed, or adhesive may be provided on both of these surfaces, in order that the two sheets may be secured together.

The machine itself comprises a table **10** which may be supported on legs **12** and which is provided with a recess **14** of a size and shape similar to that of the base sheet **4** but slightly larger than the base sheet **4** so as to provide a clearance between the sheet and the recess substantially equal to the thickness of the ornamental sheet **2**. It is preferred that guide flanges **16** extend up from the table **10** around the recess **14** and spaced therefrom a distance such as to serve as locating means within which the ornamental sheet **2** may be positioned so as to accurately center the sheet **2** with respect to the recess **14**.

The table **10** comprises an upper plate **18** and a lower plate **20** separated from one another by means of spacer elements **22**. In the space between the plates **18** and **20** four plates **24, 26, 28** and **30** are slidably mounted. Pins **32** extend down from the top plate **18** and are received within inclined slots **34** formed in the plates **24—30**, the slots **34** in the plates **24** and **26** being oppositely inclined with respect to the slots **34** in the plates **28** and **30**. Each laterally opposed pair of plates are provided with thinned portions **24', 26', 28'** and **30'** respectively which are slidable over a corresponding portion of another plate. As may be seen from Fig. 16, the left hand ends of the plates **24** and **26** are provided with inclined surfaces **36**. The plates **24** and **26** are provided with arms **38** extending to the right and having inclined surfaces **40** which bear

against correspondingly inclined surfaces **42** on the plates **28** and **30**, the latter plates having arms **44** extending inside the arms **38** of the plates **24** and **26**. Pins **46** extend downwardly from the plates **28** and **30** into inclined slots **48** formed in the bottom plate **20** of the cover **10**, springs **50** being received within the slots **48** and secured between the pins **46** of the bottom plate **20** in order to urge the plates **29** and **30** to their position shown in Fig. 16. By reason of the engagement between the inclined surfaces **40** and **42**, the plates **24** and **26** are correspondingly urged to their positions shown in Fig. 16. In those positions the corner portions **52** of the plates **24** and **26** and the corner portions **54** of the plates **28** and **30**, together with the plate edges extending therefrom, are either coincident with the periphery of the recess **14**, as specifically shown, or else are outwardly withdrawn therefrom. The plates **24—30**, and more accurately their respective corner portions **52** and **54** and the plate edges extending therefrom, define the folding elements which, when moved into and across the recess **14**, will perform the folding function hereinafter to be described.

When the plates **24—30** asume the position shown in Fig. 16 they are inoperative insofar as any folding operation is concerned. To perform a folding operation the plates must be moved so that their internal edges project at least partially into and across the recess **14**. Accordingly an actuating plate **51** is mounted between the upper and lower table plates **10** and **20**, the plate **51** projecting out beyond the front of the table **10** and having rear inclined surfaces **53** which engage with the surfaces **36** on the plates **24** and **26**. The springs **50** urge the plates **28** and **30** to the right and upwardly and outwardly respectively as viewed in Fig. 16, their movement being limited by the pin-slot combination **32, 34**. The plates **24** and **26**, because of the interengagement between the surfaces **40** and **42**, are correspondingly positioned, except that they are moved to the left rather than to the right. The actuating plate **51** is correspondingly moved to the left. When the folding elements are to be moved to operative position, the actuating plate **51** is forced to the right. The engagement between the surfaces **36** and **53** and the pin slot combinations **32—34** will cause the plates **24** and **26** to move to the right and downwardly and upwardly respectively, and the engagement between the inclined curved surfaces **40** and **42** and the pin-slot combinations **32, 34** will cause the plates **28** and **30** to move to the left and downwardly and upwardly respectively, all against the action of the springs **50**. With the plates **24—30** in this operative position their corner portions **52** and **54** respectively and the edges extending therefrom will project into the recess **14** (compare Figs. 5, 6 and 7) and thus will be capable of performing a folding action. Upon release of pressure on the actuating plate **51** the springs **50** will again take over and the plates **24—30** will return to their normal inoperative position shown in Fig. 16.

The bottom plate **20** is preferably provided with a recess **14'** substantially coincident with the recess **14** and that recess is filled by a plate **56** defining the bottom wall of the recess **14**, that plate **56** being restrained from downward movement by means of pins **58** extending upwardly from bars **60** extending thereunder, the plate **56** being movable upwardly when desired by mechanism subsequently to be described.

A form generally designated **62** is mounted on arm **64** which is mounted on the table **10** so as to be pivotal about the horizontal axis **66** (see Fig. 11) adjacent the rear end of the table **10**. The form comprises a base **68** provided with four radially extending slots **70**. Headed pins **72** extend through those slots and secure plates **74** to the underside of the base **68** so as to be slidable thereover, auxiliary plates **76** being secured to the plates **74** by means of screws **78**. The auxiliary plates **76** are fairly thin, are formed of some suitable structural material such as stainless steel, and extend out

beyond the periphery of the thicker plates 74, at least at the corner areas 80 and also preferably at other areas 82. The plates 74 are provided with additional pins 84 which extend upwardly therefrom through an appropriate radial slot 70 and into an appropriate curved slot 86 formed in a disk 88 rotatably mounted on the base 68 by means of stud 90 and bushing 92. The disk 88 is spaced above the base 68 by means of blocks 94 secured to the base 68 by means of screws 96, and a washer 98 held in place over the plate 88 by means of the stud 90 prevents it from moving upwardly relative thereto. The orientation of the arcuate slots 86 is such that as the disk 88 is rotated the pins 84 will be moved inwardly and outwardly along the slot 70, thus causing the plates 74, 76 to move betweeen the positions shown in Figs. 9, 10, 14 and 15, in which the plate portions 80 and 82 extend out beyond the base 68, and other positions, in which the plate portions 80 and 82 are withdrawn, preferably up to or beyond the periphery of the base 68. Appropriate clearances are provided between the plates 74, 76, as may clearly be seen from Figs. 10, 14 and 15, to permit this movement. The pins 72 slide beneath the disk 88. A pin 100 extends up from the disk 88 and is connected to link 102, movement of the link causing rotation of the disk 88 and hence moving the plates 74, 76 between their positions as above described.

It will be apparent, therefore, that the form 62 is in effect collapsible from the large size shown in the drawings to the small size in which the plates 74, 76 are withdrawn. As here disclosed the periphery of the form when in its large condition corresponds to the size and shape of the base plate 4, the periphery of the form when in its small condition being comprehended within the edges of the folded-over peripheral sections 8 of the ornamental sheet 2 (see Fig. 3) and also preferably being comprehended within the inner edges of the folding plates 24—30 when the latter are in their projected or operative position.

In order to provide for a proper operation, it is preferred that the form 62 be mounted on the arm 64 with a limited degree of freedom of movement. Therefore a pin 104 extends up from one end of the form 62 and is somewhat loosely received within an aperture 106 in the arm 64, and a bracket 108 is secured to the other end of the arm 64, pins 110 fast on the form 62 slidably extending therethrough, a spring 112 being active between the arm 64 and the form 62 so as to urge the latter downwardly with respect to the former.

While the various operative elements of the machine could be manipulated independently by hand through appropriate linkages, it is preferred, for simplicity and reliability of operation, that they be driven by a unified arrangement so that the sequence and duration of the various operations may be accurately controlled. To that end a shaft 114 is rotatably mounted between brackets 116 projecting from the rear of the table 10, that shaft being driven in any appropriate manner, as by means of a motor 118 and a belt 120 engageable with pulley 122 fast on shaft 114. The shaft is provided with a plurality of cams 124, 126 and 128 for actuating the various elements.

The cam 124 (see Figs. 8 and 13) is in the form of a roller carried by arm 130 and engageable, as the shaft 114 is rotated, with a hook 132 pivotally mounted at 134 on a bracket 136 mounted at the rear of the table 10, the hook 132 engaging around pin 138 secured to the link 102. The arm 130, by reason of the action of the spring 131, will normally assume a position toward the front of the machine, in which position the disk 88 will be rotated as shown in Fig. 9 so that the plate portions 80 and 82 are projected. This will pull the hook 132 to the position shown in Fig. 13. As the shaft 114 rotates engagement of the cam roller 124 with the hook 132 will cause the latter to pivot in a clockwise direction as viewed in Fig. 13, thus pulling the link 102 rearwardly, causing the disk 88 to rotate in a clockwise direction as viewed in Fig. 9 and therefore causing the form 62 to assume its contracted or small size position, the plates 74, 76 being slid toward one another.

The cam 128 (see Fig. 11) is engaged by an extension 140 of the arm 64, a spring 142 being active betweeen the extension 140 and the table 10 so as to maintain that engagement and so as to cause the arm 64 to pivot in a clockwise direction and withdraw the form 62 from the recess 14. As the shaft 114 rotates the shape of the cam 128 is such as to lift the extension 140 and thus cause the arm 64 to pivot in a counter-clockwise direction and move the form 62 into the recess 14.

The cam 126 is engaged by roller 144 secured to a rearwardly extending portion of lever 146 pivotally mounted beneath the table 10 at 148. The forwardly extending portion of lever 146 engages with lever 150 pivotally mounted beneath the table 10 at 152, a spring 154 being active between the lever 150 and the bar 60 secured to the table 10 so as to urge the lever 150 in a clockwise direction, thereby urging the lever 146 in a counter-clockwise direction and causing the roller 144 to remain engaged with the cam 126. A roller 156 is carried by the forwardly extending end of the lever 150 and engages the end surface 158 on a lever 160 pivotally mounted at 162 on a bracket 164 extending forwardly from the table 10. The upper end of the lever 160 is pivotally connected at 166 to pusher block 168 which in turn engages and is secured to the forwardly projecting end of the actuating plate 51. A leaf spring 169 urges the pusher block 168 and actuating plate forwardly. Hence rotation of the shaft 114 will cause the cam 126 to force the roller 144 downwardly, causing the levers 146 and 150 to pivot in clockwise and counterclockwise directions respectively, the lever 160 will be pivoted in a clockwise direction, the actuating plate 51 will be moved rearwardly, and the folding plates 24—30 will be moved to their operative position.

The left hand end of the lever 146 carries an upwardly projecting rod 170 which, after the lever 146 has been pivoted to a clockwise direction for an appropriate distance, will engage the underside of the plate 56 defining the bottom wall of the recess 14 so as to force that wall upwardly. The design of the machine is such that the plate 56 will not be engaged by the rod 170 until after the folding plates 24—30 have been moved inwardly to their operative positions.

The mode of functioning of the machine is as follows. An ornamental sheet 2 is placed on the table plate 18 over the recess 14, the precise position of the sheet 2 being defined by the flanges 16. A base sheet 4 is then placed in position over the ornamental sheet 2 so as to be centered relative thereto. (See fig. 4.) The operator will then, through any appropriate control device, such as the switch 172, start the motor 118, which will continue to operate until the cam shaft 114 has completed a full revolution, at which time any suitable mechanism may cause the motor 118 to stop operating. As the cam shaft 114 rotates its first operation will be the lowering of the arm 64 until the form 62, in expanded condition, is caused to enter the recess 14. In so doing the form 62 will force the base sheet 4 into the recess 14, and the peripheral portions 8 of the ornamental sheet 2 will be bent upwardly, extending along the peripheral edges of the base sheet 4 and the outer edges of the plate portions 80, 82 of the form 62, those plate portion edges preferably being coincident with the corresponding edges of the base sheet 4 (see Fig. 5). Because of the limited degree of clearance between the inner edges of the recess 14 and the outer edges of the base sheet 4 and the form portions 80, 82, the ornamental sheet 2 will be drawn uniformly taut over the entire lower surface of the base sheet 4.

Next the cam 126 will be effective to cause the folding plates 24—30 to move inwardly to their operative

position, thus folding the peripheral portions 8 of the ornamental sheet 2 over the upper surface of the base sheet 4. (See Figs. 6 and 7.) In order not to interfere with this folding action, the form 62 will be collapsed to its small condition through the action of the cam 124 on the hook 132 and the link 102. The precise point in time when the collapse of the form is effectuated is not particularly critical. It may occur prior to the actuation of the folding plates 24—30, it may occur simultaneously therewith, or it may occur after the folding operation has been completed. The latter alternative is not preferred, however, because interposition of the plate portions 80, 82 between the upper surface of the base sheet 4 and the peripheral portions 8 of the ornamental sheet 2 may adversely affect the adhesive previously applied to one or both of those sheet surfaces. In any event, once the form 62 has been collapsed, the cam 128 permits it to withdraw from the recess 14, after which the cam 124 restores it to its normal expanded condition. In order to prevent any possible interference between the folding plates 24—30 and the form 62 which might prevent withdrawal of the latter from the recess 14, it is preferred that the form 62, when in its small condition, should have a periphery completely within the edges of the folding plates 24—30, when the latter are in their operative position.

As the shaft 114 continues to rotate the lever 146 is further pivoted in a clockwise direction until, while the folding plates 24—30 are retained in their operative condition, the plate 56 defining the bottom wall of the recess 14 is moved upwardly. The sheets 2 and 4 are at least at their peripheral portions pressed between the plate 56 and the folding plates 24—30, thus ensuring a firm adhesion of the peripheral portions 8 of the ornamental sheet 2 to the base sheet 4. It will be understood that if a heat-sensitive adhesive is used, suitable heating elements could be applied to the plate 56.

The rotation of the shaft 114, after a predetermined period of time suitable for obtaining proper adhesion between the sheets 2 and 4, will release the plate 56 and permit the folding plates 24—30 to resume their normal inoperative position.

The unified sheets 2 and 4 may then be removed from the recess 14 in any appropriate manner. As here disclosed a finger 173 is slidably mounted in a recess 174 in the plate 76 and is connected at its lower end to lever 178 pivotally mounted beneath the table 10 at 180, extending out beyond the front of the table 10, and terminating in handle 182. Depression of the handle 182 will cause the finger 173 to be projected upwardly, thus ejecting the assembled blank from the recess 14.

The embodiments of Figs. 18 and 19 illustrate a specific modification of the form 62 by means of which the base sheet 4 may be initially secured to the form 62 instead of first being placed on the table 10, thereby ensuring accurate centering of the base sheet 4 relative to the ornamental sheet 2. The arm 64 is provided with a laterally extending piece 184, hooks 186 being pivotally mounted on opposite ends of the arm 184 at 188. A leaf spring 190 is secured to piece 184 and engages the upper ends of the hooks 186, those ends being provided with flats 192—194 engageable with the spring 190 when the hooks 186 are respectively in their inner positions shown in solid lines and their outer positions shown in broken lines. The hooks 186, when in their inner positions, are shaped to engage and hold the sheet 4 on the lower surface of the form 62. They project out beyond the form 62 an appreciable distance, and consequently when the form 62 is lowered, the hooks 186 will not enter the recess 14. Instead they will engage with the upper surface of the table plate 18 and will be forced through that engagement to their outer position shown in broken lines in Fig. 19, thus permitting the form 62 and the sheet 4 to enter the recess 14. The hooks 186 will remain in their outer position until the operator has placed a new sheet 4 on the form 62, after which the operator will manually move the hooks 186 back to their operative inner position as shown in the solid lines.

While but a single embodiment of the present invention has been here disclosed, it will be apparent that many variations may be made therein, all within the scope of the instant invention as defined in the following claims.

I claim:

1. A folding machine comprising a table having a recess, a form movable into and out of said recess, movable means on said form for changing the size thereof between large and small sizes, folding elements on said table capable of moving into and out of said recess laterally thereof, and actuating means operatively connected to said form, said movable means and said folding elements to actuate them to carry out the following steps in sequence: (1) move said form into said recess while said movable means is positioned to cause said form to assume said large size, (2) move said movable means so as to cause said form to assume said small size, (3) cause said folding elements to enter said recess, (4) cause said form, with said movable means positioned thereon to correspond to said small size, to leave said recess, and (5) withdraw said folding elements from said recess and move said movable means so as to cause said form to assume said large size.

2. A folding machine comprising a table having a recess, a form movable into and out of said recess, movable means on said form for changing the size thereof between large and small sizes, folding elements on said table capable of moving into and out of said recess laterally thereof, the bottom of said recess comprising a wall movable upwardly, and actuating means operatively connected to said form, said movable means, said folding elements and said wall to actuate them to carry out the following steps in sequence: (1) move said form into said recess while said movable means is positioned to cause said form to assume said large size, (2) move said movable means so as to cause said form to assume said small size, (3) cause said folding elements to enter said recess, (4) cause said form, with said movable means positioned thereon to correspond to said small size, to leave said recess and move said wall upwardly toward said folding elements, and (5) move said wall downwardly, withdraw said folding elements from said recess and move said movable means so as to cause said form to assume said large size.

3. A folding machine comprising a table having a recess with a bottom wall, folding elements mounted on said table so as to assume inoperative and operative positions respectively substantially withdrawn from said recess and extending into said recess a predetermined amount, a first means operatively connected to said folding elements for moving them, a form articulately operatively connected to said table, a second means operatively connected to said form for moving it between operative and inoperative positions in which said form is respectively in and withdrawn from said recess, said form having a peripheral size and shape sufficiently small so as to clear said folding elements when the latter are in their operative positions, means movably mounted on said form and movable between a retracted position to clear said folding elements when the latter are in their operative positions and an extended position beyond said form so as to produce a peripheral size and shape substantially comparable to the periphery of said recess, a third means operatively connected to said movable means to control its position relative to said form, and actuating means operatively connected to said first, second and third means to move them to carry out the following steps in sequence: (1) move said form to operative position while said movable means is in said extended position, (2) move said movable means to said retracted position, (3) move said folding elements to operative position, (4) move said form out of said operative position and

(5) move said folding elements to inoperative position and said movable means to said extended position.

4. In the machine of claim 3, the bottom wall of said recess being movable between upper and lower positions, a fourth means operatively connected to said bottom wall for moving it between said positions, said actuating means being operatively connected to said fourth means, and effective to move said bottom wall to its upper position after step (3) and to its lower position a period of time thereafter.

5. A folding machine comprising a table having a recess with a bottom wall, folding elements mounted on said table so as to assume inoperative and operative positions respectively substantially withdrawn from said recess and extending into said recess a predetermined amount, a first means operatively connected to said folding elements for moving them, a form articulately operatively connected to said table, a second means operatively connected to said form for moving it between operative and inoperative positions in which said form is respectively in and withdrawn from said recess, said form having a peripheral size and shape sufficiently small so as to clear said folding elements when the latter are in their operative positions, means movably mounted on said form and movable between a retracted position to clear said folding elements when the latter are in their operative positions and an extended position beyond said form so as to produce a peripheral size and shape substantially comparable to the periphery of said recess, a third means operatively connected to said movable means to control its position relative to said form, and unitary driving means operatively connected to said first, second and third means and effective on actuation thereof to move them to carry out the following steps in sequence: (1) move said form to operative position while said movable means is in said extended position, (2) move said movable means to said retracted position, (3) move said folding elements to operative position, (4) move said form out of said operative position and (5) move said folding elements to inoperative position and said movable means to said extended position.

6. In the machine of claim 5, the bottom wall of said recess being movable between upper and lower positions, a fourth means operatively connected to said bottom wall for moving it between said positions, said unitary driving means being operatively connected to said fourth means and effective on actuation thereof to move said bottom wall to its upper position after step (3) and to its lower position a period of time thereafter.

7. A folding machine comprising a table having a recess with a bottom wall, folding elements mounted on said table so as to assume inoperative and operative positions respectively substantially withdrawn from said recess and extending into said recess a predetermined amount, a first means operatively connected to said folding elements for moving them, a form articulately operatively connected to said table, a second means operatively connected to said form for moving it between operative and inoperative positions in which said form is respectively in and withdrawn from said recess, said form having a peripheral size and shape sufficiently small so as to clear said folding elements when the latter are in their operative positions, means movably mounted on said form and movable between a retracted position to clear said folding elements when the latter are in their operative positions and an extended position beyond said form so as to produce a peripheral size and shape substantially comparable to the periphery of said recess, a third means operatively connected to said movable means to control its position relative to said form, a cam shaft having cams thereon, each of said first, second and third means being operatively associated with one of said cams so as to be actuated to carry out the following steps in sequence: (1) move said form to operative position while said movable means is in said extended position, (2) move said movable means to said retracted position, (3) move said folding elements to operative position, (4) move said form out of said operative position and (5) move said folding elements to inoperative position and said movable means to said extended position.

8. In the machine of claim 7, the bottom wall of said recess being movable between upper and lower positions, a fourth means operatively connected to said bottom wall for moving it between said positions, and said cam shaft having a cam operatively associated with said fourth means and effective to move said bottom wall to its upper position after step (3) and to its lower position a period of time thereafter.

9. A folding machine comprising a table having a recess, the bottom wall of said recess being movable upwardly, folding elements slidably secured to said table so as to assume inoperative and operative positions respectively substantially withdrawn from and extending into said recess a predetermined amount, a first means operatively connected to said folding elements for moving them, said first means extending from said recess in a given direction toward one side of said table, an arm pivotally connected to said table on the other side of said recess from said one table side and having a part extending in the direction of the side of said table opposite said one side thereof, said arm extending over said recess, being movable up and down, and carrying a form positioned in and removed from said recess when said arm is respectively in its lower and upper position, elements on said form normally extending laterally out therefrom but movable to withdrawn position, a second means operatively connected to said elements for moving them, said second means extending toward said opposite table side, driving means operatively associated with said table and positioned on the other side of said recess from said one table side, means operatively connecting said driving means with said arm and said second means, a third means operatively connected between said driving means and said first means, said third means extending beneath said table and an element connected thereto for movement thereby and operatively engageable with said bottom wall for moving it upwardly during the cycle of operation of the machine.

10. In the machine of claim 9, in which said third means is operative to move said folding elements to operative position before moving said bottom wall upwardly.

11. The machine of claim 9, in which said third means comprises a plurality of articulately mounted interconnected levers one of which engages said first means to actuate the same and one of which carries said element movable upwardly in to engagement with said bottom wall to lift the latter.

12. In the machine of claim 11, in which said third means is operative to move said folding elements to operative position before moving said bottom wall upwardly.

13. A folding machine comprising a table having a recess, a form mounted on a support and movable into and out of said recess, holding elements articulately mounted on said form and movable between an operative position close to said form, in which said operative position they are adapted to secure a member to said form, and inoperative positions remote from said form, said holding elements when in operative position extending laterally beyond said form and being engageable with said table as said form is moved toward said recess and being movable by said table to inoperative position, releasing said member.

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