ADJUSTING MEANS FOR BUCKLE- 
FOLDING MACHINE
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The present invention relates to a folding machine and in 
particular to a folding machine of the type particularly adapted to folding sheets such as letters, and cus
tomarily utilized in an office.

The folding machine of the present invention is of the 
type in which sheets, e.g., letters, are fed into the machine 
and the machine includes an arrangement for folding the 
letters once or a plurality of times, selectively, with ad
justments for folding a sheet at different positions, for 
forming different kinds of folds, or for folding only certain 
parts of a sheet. A sheet may be folded in the following 
ways which are considered the usual kinds of folds, namely, standard fold, accordion fold, single fold and double fold.

The means for forming the folds in the sheets includes 
feeding means such as rollers for advancing the sheets 
through the machine, and stops located at certain posi
tions for limiting the movement of the sheets and causing 
them to buckle or be folded at certain steps in their pas
sage through the machine, whereupon they are advanced 
further through the machine in folded condition. These 
stops are adjustable to different locations for producing 
the different kinds of folds.

A broad and main object of the present invention is to 
provide a folding machine of the foregoing general char
acter in which means is provided for easily and quickly 
adjusting the stops referred to for controlling the kind 
of fold to be produced. The stops referred to, by the 
nature of the folding machine, are in generally opposite 
locations in the folding machine, relative to the fore 
and aft portions thereof and the direction of advancement 
of the sheets through the machine. These stops being spat
tially separated, it was required, in folding machines hereto
fore used, that the means for adjusting those stops be 
pinched with the stops in the folding machine which are 
adjacent to the stops. Serious disadvan
tages of this arrangement included the fact that all adjust
ing means and their corresponding indicating means were 
not observable by the operator while viewing from a 
single vantage point.

Another object of the present invention is to 
overcome the objection just stated, and more specifically 
to provide a remote control type of adjustment for one 
of the stops and to arrange the adjusting means for the 
several stops in closely disposed relation so that the op
erator may observe them in viewing the machine from a 
single vantage point, and with the advantage that adjust
ments may be made more quickly and easily.

Another object is to provide a remote control type of 
adjusting means of the kind just referred to which is of 
simple construction and which includes for the sake of 
convenience, a single side-positioned manipulating mem
ber, and stop means extending the full transverse dimen
sion of the machine, and having such novel construction 
that notwithstanding this arrangement, the stop means is 
always maintained in true position without any binding 
effect.

Due to the nature of folding machines of the general 
type which includes the present folding machine, the 
rollers for feeding the sheets through the machine are 
located generally at a central portion of the machine.
One of the stops for effecting a folding operation is mount
ed in a plate which has an entrance portion adjacent the 
feeding rollers but otherwise is generally exteriorly ex
posed. Another object, therefore, of the present inven
tion is to provide a novel construction in which the plate 
just referred to containing one of the stops is easily de
montable from the remainder of the machine whereby 
to facilitate access to the central portion of the machine 
and to facilitate removing any papers that should be jammed therein, which is a difficultly encountered in all 
folding machines although minimized and substantially 
eliminated in the machine of the present invention.

A further object is to provide a folding machine of 
the foregoing general character having intermittent or 
cyclic feed of sheets through the machine whereby to 
minimize and substantially eliminate jamming of the 
sheets in the machine.

A still further object, and a refinement included in the 
object just above stated, is to provide feeding means which 
is of the stripper type, i.e., the sheets which are placed 
on the feed table for the purpose of feeding them through 
the machine are released singly from the feed table, each 
before a successive sheet is released.

Another object is to provide a folding machine having 
feed means of the kind just referred to in which effec
tive pressure on the means for removing the sheets from 
the feed table may be varied so as to produce the required 
pressure for sheets of different character such, for exam
ple, as thin and thick sheets, smooth and rough sheets, 
etc.

Still another object is to provide a folding machine of 
the foregoing general character which is readily manipu
latable for automatic successive feeding of sheets and fold
ing them, or manual and individual feeding of the sheets 
and folding them, selectively, wherein a novel single con
trol member is utilized for controlling each operation.

Still another object is to provide a folding machine of 
the foregoing general character including novel adjust
ing means for one of the folding stops above referred to, 
to effect even folding of the sheets where uneven folding 
may otherwise result due to uneven shape of the sheets.

Another object is to provide, in a folding machine of 
the foregoing general character, novel conveying means 
for receiving the folded sheets and conveying them out 
of the machine onto a tray.

Still another object is to provide conveying means of 
the kind just referred to, which is actuated intermittently 
or cyclically in synchronism with the intermittent or cyclic 
operation of the feeding means whereby to facilitate even 
stacking of the folded sheets on a tray.

A further object is to provide novel means for resiliently 
retaining the folded sheets on the receiving means dur
ing their course of conveyance onto the tray, including 
resilient fingers and novel means for mounting them in 
the machine.

Another object is to provide a mechanical counter, and 
means for connecting it with the driving means of the 
machine in such a way as to operate the counter in syn
chronism with the cyclic operation of the machine, and 
additionally in which a single sheet is advanced through 
the machine in each cycle of operation whereby to en
able a mechanical counter to accurately indicate the num
ber of sheets advanced through the machine.

Other objects and advantages of the invention will ap
pear from the following detailed description taken in con
junction with the accompanying drawings in which:

FIG. 1 is a perspective view of a folding machine made 
to the present invention;
FIG. 2 is a front view of the folding machine taken 
the left of FIG. 1, but with certain parts re
moved or shown in section;
FIG. 3 is a top plan view of the machine but with cer
tain parts removed or shown in section;
FIG. 4 is a sectional view taken on line 4—4 of FIG. 5;
FIG. 5 is a fore-and-aft vertical sectional view of the 
machine, taken approximately on line 5—5 of FIG. 2;
FIG. 6 is a view from the right-hand side of the machine
(right side of FIG. 2), but with the side casing member removed;

FIG. 7 is a view from the left hand side of the machine (left side of FIG. 2), but with the side casing members removed.

FIG. 8 is a view taken approximately on line 8—8 of FIG. 9 but with the receiving tray shown in section;

FIG. 9 is a plan view of the conveyor means and receiving tray taken approximately on staggered line 9—9 of FIG. 5;

FIG. 10 is a view taken approximately in line 10—10 of FIG. 11;

FIG. 11 is a sectional view taken on staggered line 11—11 of FIG. 6;

FIG. 12 is a bottom view of the first fold plate and taken approximately on line 12—12 of FIG. 5;

FIG. 13 is a fragmentary view of certain control mechanisms shown at the left hand portion of FIG. 6;

FIG. 14 is a view similar to FIG. 13, but with certain elements in alternate positions;

FIG. 15 is also a view similar to FIG. 13, but with elements in other positions;

FIG. 16 is an enlarged detail perspective view of one of the members of FIGS. 13, 14, and 15;

FIG. 17 is a fragmentary detail view of one of the members shown in FIGS. 13, 14, and 15 but from the opposite side thereof, being taken approximately on line 17—17 of FIG. 3;

FIG. 18 is a semi-diagrammatic view of the members affecting the folding operations, showing a step at the beginning portion of the operation for folding a sheet in a standard form;

FIG. 19 is a view similar to FIG. 18 but showing a further step in making a standard fold;

FIG. 20 is a detail view of a sheet folded in a standard fold;

FIG. 21 is a view similar to FIG. 18, but showing an early step in a folding operation for making an accordion fold;

FIG. 22 is a view similar to FIG. 21, but showing a further step in making an accordion fold;

FIG. 23 is a detail view of a sheet folded in an accordion fold;

FIG. 24 is a view similar to FIG. 18, but showing an early step in a folding operation for making a single fold;

FIG. 25 is a view similar to FIG. 24, and showing a further step in making a single fold;

FIG. 26 is a detail view of a sheet folded in a single fold;

FIG. 27 is a view similar to FIG. 26 and showing an early step in a folding operation for making a double fold;

FIG. 28 is a view similar to FIG. 27, but showing a further step in making a double fold; and

FIG. 29 is a detail view of a sheet folded in a double fold.

Referring now in detail to the drawings, attention is directed first to FIG. 1 showing the folding machine of the present invention in overall view. The machine indicated in its entirety at 12 includes a main body 14, a feed table 16 upon which the sheets 18 to be folded are placed, and a receiving tray 20 upon which the folded sheets are deposited after passing through the machine and being folded. Also shown in FIG. 1 are a first fold plate 22 and a second fold plate 24 which function with other members of the machine to fold the sheets. The fold plates 22 and 24 are shown also and in better view in FIG. 5, this figure also showing a set of rollers 26 which serve to pass the sheets through the machine and in conjunction with the fold plates 22 and 24 to perform the folding operations thereon.

The machine proper or body 12 has a framework including right and left vertical side plates 28 and 30, respectively, spaced apart and secured together by necessary structural elements which need not be identified individu-

ally. These side plates in so far as the description of the function of the machine is concerned may be considered to constitute the framework of the machine, supporting other members in and between the side plates, as well as other members outwardly of the respective side plates. Casing members 29 and 31 are secured to the side plates for enclosing most of the operating parts mounted on the outer sides of the side plates.

The feed table 16, while it may be any of various constructions, preferably is of the kind disclosed in the copending application of the present assignee, Serial No. 795,699, filed February 26, 1959, now U.S. Patent No. 3,029,074, to which reference may be had for complete details of the structure thereof. Briefly, for present purposes, the table 16 includes a bottom supporting plate element 32 upon which the sheets 18 are placed and side flanges 34 (FIGS. 1, 2, 3, and 5). The plate element is provided with a surrounding depending flange 36, including a front element 38 (FIG. 5) having apertures for receiving pins 40 mounted in a transverse member 42 secured to the side plates of the machine and having a depending portion 44 in which the pins 40 are directly mounted and an upper depending portion 46 feeding the guiding sheets in passing through the machine, as will be described in detail hereinafter. The flange 36 also includes side elements 48 which are received between clips 50 mounted on the side plates, and those side plates. The feed table 16 is thus demountably supported in the frame of the machine by means of the pins 40 and clips 50, being placed in position by holding the feed table at an angle with the leading end (right end FIG. 5) lowermost to insert the pins 40 in the apertures and then lowering the outer and opposite end to insert the flange elements 48 in the spaces between the clips 50 and the corresponding side plates. The tray is removed by opposite and corresponding movements.

The sheets 18, as a stack, are buttied against a front post 52 which serves as a locating means for placing the stack on the tray. The sheets are also constrained against displacement from the feed table by a releasing means shown particularly in FIGS. 3 and 5 which includes fingers 54 which overlie and engage the top sheet. The feed table is of the “stripper” type in the operation of which the sheets are stripped and delivered from the stack individually and only one at a time. The specific method of accomplishing this will be referred to again hereinafter, and further details of the stripping and feeding operation may be found in the copending Springer application referred to hereinafore.

The means for feeding the sheets from the table shown generally at 56 is disclosed and claimed in the copending Springer application referred to above and as shown particularly in FIGS. 1, 2, 3 and 5, herein it includes a pair of feed wheels 58 mounted on a rotatable shaft 60. The feed wheels 58 rotate with the shaft 60 and thereby frictionally engage the top sheet of the stack of sheets, when the feed means is lowered into operative position, and feed the sheets from the stack. Associated with the shaft 60 and the feed wheels 58 is a rigid bar 62 which, together with the shaft 60, is mounted in arms 64 and 66 at opposite sides of the machine outwardly of the side plates. The bar 62 and shaft 60 together form a rigid assembly movable as a unit, the bar 62 serving as a hand grip for raising the shaft 60 and the feed wheels 58 thereof manually on one or both sides of the sheets on the feed table, and thus out of operative position.

In the feeding operation, the feed means 56 rests on the top of the stack of sheets 18 and lowers by gravity pursuant to depletion of the sheets. After the last sheet from the stack is fed through the machine, the feed wheels 58 fall into depressions 68, as depicted in the copending Springer application referred to above, and effect a shutting off operation, to be explained in detail hereinafter in conjunction with other operating members of the apparatus.
The set of rollers 26 includes individual rollers 26a, 26b, 26c, and 26d mounted in and between the side plates and arranged for rotation in the directions of the associated arrows for feeding the sheets through the machine. These rollers include two positively driven rollers, namely 26a and 26b, and two follower rollers 26c and 26d. The means for driving the driven rollers will be described hereinafter. The rollers 26 in themselves may be of any suitable construction having the desired friction surface for engaging the sheets to be passed therebetween, such as a rubber or rubber-like material mounted on shafts 70a, 70b, 70c, and 70d, respectively. The shafts 70a and 70c are mounted in bushings 106 and 107, respectively, which are located in the side plates while the shafts 70b and 70d pass through slots 72b and 72d in the side plates for movement toward and from the associated ones of the driven rollers. Springs 74 are arranged for biasing the latter shafts, and thus the rollers mounted thereon, toward the associated driven rollers, being compressed between the shafts and fixed elements in the side plates. The roller 26b is biased into a position in which it engages both the rollers 26a and 26c, while the roller 26d is biased into engagement only with the roller 26c.

The deflection elements 76 and 46 form a hopper-like guiding means having a wide entrance space for receiving the sheets 18 from the feed table 16 and converging toward the rollers 26 to a narrow space 84 forming an outlet opening directed toward and closely adjacent to the sight between the rollers 26a and 26b. Pursuant to a shaft 106 also located in the guides 105 in the feed table 16, it enters the space between the deflecting elements 76 and 46 and is fed through the space 84 to the sight between the two rollers mentioned and gripped by the latter rollers and passed further along to the succeeding pairs of rollers.

Drive means is provided for driving all of the driven members in the apparatus which include the feed means 56 and the rollers 26, as well as other instrumentality, namely, conveyor means 86 and a counter 88. The latter two instrumentality will be described in detail hereinafter but for the purpose of fully describing the drive means it is pointed out that the conveyor means 86 includes a driven shaft 90 (FIG. 5) which is mounted in and between the side plates of the machine and the counter 88 includes in its drive train a gear 92 (FIG. 7). The drive means includes any suitable source of motive power such as an electric motor 94 (FIGS. 2 and 5), having a drive shaft 96 connected with a shaft 98 suitably mounted in the frame of the machine and having a pulley 100 (FIG. 6) at its extended end outwardly of the associated side plate 28. Mounted on the pulley 100 is a belt 122 which is also trained over another pulley 104 mounted on a stub shaft 106 in the side frame 28. The drive shaft 96 is also secured with the clutch means 113 (FIGS. 3 and 7). The gear 116 meshes with the gear 92 referred to above, in the drive train for the counter 88, and it also meshes with another gear 120 mounted on a stub shaft 122 upon which is also mounted a gear 134 arranged for conjoint rotation with the gear 92.

The cam 113 cooperates with a clutch 126, these members being preferably of the type disclosed and claimed in the copending application of the present Springer
which is included in the conveyor means as mentioned above and shown best in FIG. 5. Upon rotation of the gear 132 (FIG. 7), drive wheel 130, and to the conveyor means 86, this drive is in the case of both instrumentality being intermittent, in accordance with the intermittent rotation of the clutch means 126. It may be here stated that all of the drive from the motor 94 to the clutch means 126 is constant.

As at the first step in the description of the apparatus and the operation, attention is directed to the fold plates 22 and 24, a detailed description of which follows presently. Briefly, the fold plates 22 and 24 are adapted for receiving or otherwise controlling the sheets in their passage through the machine by means of the rollers 26 for performing the folding operation. Referring first in detail to the fold plate 22, this plate includes a pair of plate elements 162 and 164 (FIGS. 4 and 5), both extending substantially throughout the area of the plate. These plate elements are spaced apart a slight distance, slightly greater than the thickness of the heaviest paper intended to be folded by the machine. These plate elements may be secured together in any suitable way such as by means of spacers 166 and screws 168 (FIG. 4). One of the plate elements may be provided with downturned flanges 170 at the sides for engagement with the inner surfaces of the side plates 28 and 30 and for providing the means for defining the fold plane in the side plates. The means for mounting the fold plate in the side plates includes inwardly projecting pins 172 secured in the side plates received in notches 174 formed in the inner edges of the side flanges. Cooperating with these pins and notches are latch means 176, two of which are provided, one shown in end view in FIG. 5 and both shown in FIG. 12. These latch means may be identical and a description of one will suffice for both. The latch means 176 includes a body member 178 in which is slidably mounted a plunger 189 projected through an aperture in the flange 170 and biased to outer position by a tension spring 182 connected between the plunger and a fixed portion of the latch. Extending inwardly from the plunger is a slide element 184 terminating in a finger-grip angle piece 186. These two finger grips 186 may be grasped by the thumb and finger and drawn toward each other inwardly for releasing the plungers 189 from their securing positions which are in apertures in the corresponding side plates 28 and 30, one of which is shown at 189 in FIG. 6. The fold plate 22 may be inserted in position by inserting the inner end (left hand FIG. 5) into the space between the side plates to a position in which the pins 172 are received in the notches 174 and then adjusting the outer end until the plungers 189, after having been drawn inwardly, are in line with the apertures 188 in the side plates, and then releasing these plungers to enable them to enter into the apertures. The plate is then demountably secured in place by the pin-notch connection 172-174 and the plug-aperature connection 188-189. The fold plate is removed from its position by similar and opposite movements.

The fold plate 22 has an entrance opening 190 at its inner end leading to the interior space 163 between the plate elements. When the fold plate is in its proper position, this entrance opening 190 is closely adjacent to the exit bight of the rollers 26a and 26b as well as the entrance bight of the rollers 26b and 26c. This entrance opening is appropriately shaped for accommodating the sheet being folded, in the present instance formed at least partially by an upturned portion 192 of the upper plate element 162. In FIG. 12, the sheet on leaving the entrance bight of the rollers 26a and 26b enters into the space 163 in the fold plate and the element that is directly engaged by this sheet is a stop element 194 which functions as described in detail hereinafter. This stop element 194 is in the form of an elongated strip or bar (FIG. 12) disposed between the plate elements and carried by an adjusting-locking means indicated in its entirety at 196, enabling manual adjustment of the stop element 194 longitudinally of the fold plate as well as locking the stop element in adjusted position. For accommodating the stop element 194 and the stop element 194, the fold plate 22 is provided with a plurality of elongated longitudinally extending slots including a central slot 198 cut in both of the plate elements and side slots 200 which may be cut in only one of the plate elements such as the lower plate element 164 for receiving projections 202 formed on the stop element 194. This stop element 194 extends the greater portion of the transverse dimension of the fold plate and is mounted on a pin 204 for swinging movement about the axis of that pin, the pin being included as an element of the assembly 196. The pin is directly mounted in a block 206 riding in the central slot 198. A thumbscrew 208 extends through an aperture in the block 206 (FIGS. 4 and 5) and threaded into a clip 210. The block 206 has side portions overlying and engaging the upper surface of the plate element 162 while the clip 210 has lateral portions engaging the under surface of the lower plate element 164 and upon tightening of the thumbscrew 208 the elements 206 and 210 are brought to bear on opposite sides of the plate for locking the assembly 196 in adjusted position. Upon releasing the pressure provided by this thumbscrew, the assembly can be adjusted longitudinally of the slot 198 for adjusting the stop 194 toward and from the entrance opening 190.

For the purpose of preventing the plate elements 162 and 164 from being compressed or moved together excessively, a shim 212 is included in the assembly 196 and interposed between the plate elements. Also, for the purpose of providing guiding functions, the block 206 is provided with a reduced portion 214 (FIG. 4) riding in the slot 198 in the upper plate element, and an element 216 rides in the groove in the lower plate element 164. The reduced portion 214 and the element 216 have substantial dimension longitudinally of the slot for maintaining the assembly in accurate position and against backlash in guiding. The block 206 and the elements 212 and 216 may be secured together by shouldered screws 217 having outer end portions extended loosely through apertures in the clip 210 for guiding the latter.

The element 216 is provided with an elongated extension 218 (FIG. 5) terminating in an upturned tab 220 receiving one end of a stem 222 of a thumbscrew 224, and serving as a reaction member for that thumbscrew. The other end of the stem 222 is threaded in a tapped transverse hole in a cylindrical stud 226 (FIG. 12) received in a circular enlargement 228 of a slot 230 in the stop element 194. The stud 226 is offset from the outer edge of the slot 198 in which the stop element 194 is supported, and upon threading the thumbscrew 224 in one direction or the other the stop element 194 is made to swing about the axis of the pin 204 to any of various positions including a perpendicular position or angular positions in either direction therefrom. In folding operations irregularities are often encountered, including inaccuracies of the sheets being folded, and to overcome uneven folding of the sheets due to such inaccuracies, adjustments may be made in the stop element 194 to the desired position.

An indicating finger 232 (FIG. 3) is mounted for swinging movement with the stop element 194 such as by mounting it on an end of the pin 204 extended through to the top of the assembly (FIG. 3). The indicating finger 232 is provided with an indicating mark 234 which cooperates with another mark 236 on a fixed portion of the assembly such as the block 206. Appropriate indications are thus provided, such for example as the perpendicular position of the stop element 194 being indicated by registration of the marks 234 and 236.

The block 206 is further provided with indicating markings 238 which cooperate with other indicating markings 240 on the upper surface of the fold plate. These indicating markings 240 may include the letters A, B, C, etc., as indicated at 248, or other markings indicated at 240,
which may be inch markings. The letter markings 240 may be utilized for indicating desired predetermined positions for effecting certain forms of folds, while the markings 240a may be utilized for determining absolute distances of the stop element 194 from the entrance opening 190 of the fold plate, and thus the rollers 26. As will be explained in detail hereinafter, the position of the stop element 194, as determined by the position of the assembly 196 determines, with other elements of the machine, the kind of fold to be made in the sheet.

The fold plate 22, as will be observed particularly from FIGS. 1 and 5, is disposed adjacent an upper portion of the face side of the fold plate 24 and its surface is exposed substantially entirely to the observation of the user. The assembly 196 utilized for adjusting the stop element is readily and easily accessible to the user or operator, and closely adjacent this assembly, is another adjusting means indicated broadly at 242 for making corresponding adjustments in the stop element of the second fold plate 24 which, as will be seen from FIGS. 1 to 5, is at a position remote from the first fold plate 22.

Referring to the detail construction of the second fold plate 24 (FIGS. 5 and 11), this plate is made up of upper and lower plate elements 244 and 246, respectively, extending across the space between the side plates 28 and 30. One of the plate elements, such as the lower one 246, is provided with side flanges 248 engaging the side plates and serving as a means for supporting the fold plate thereon, such securing means being represented by screws 250 (FIG. 5). The plate elements 244 and 246 are spaced apart by spacers 252 (FIG. 11) and secured together as by screws 254.

The plate elements 244 and 246 define a space 245 therebetween which is slightly greater than the thickness of the thickest folded sheet intended to be received therein. The fold plate has an entrance opening 247 disposed for receiving a sheet issuing from the rollers 265 and 26c in a manner described in detail hereinafter.

Mounted in the bottom fold plate 24 is an assembly indicated in its entirety at 256 (FIG. 5) and mounted for movement longitudinally of the fold plate. For this purpose the fold plate is provided with a plurality of central slots 257 and two side slots 259 (FIG. 2) extending the greater distance of the longitudinal dimension of the fold plate (FIG. 5). The assembly 256, in certain positions thereof, provides a stop for effecting a folding operation and, in another position, a deflector means for preventing entry of the sheets into the space 245. This assembly includes a rigid subassembly 252 made up of upper and lower plate elements 246 extending transversely across the plate, the strips being, respectively, above and below the plate, and having stop elements 264 mounted therebetween. These stop elements 264, shown in FIG. 11, include outer sleeves 266 serving as rollers and rotatably mounted on stems 268 having one end secured in for example the lower strip 262 and the upper end secured to the upper strip 260 as by screws 269. These stop elements 264 ride in the slots 257 in the fold plate, the rollers or sleeves 266 enabling free movement of those rollers within the slots for facilitating adjusting movements of the assembly in the plate, while aiding in maintaining the assembly 256 in accurate transverse position, perpendicularly of the slots.

The upper strip 260 has downturned end portions forming tabs 270 projected for free movement in the side slots 259, these tabs being utilized for pivotally mounting a deflector member 272. This deflector member 272 also is in the form of a strip extending transversely across the plate with downturned lugs or tabs 274 also projected freely in the slots 259 and engaging the tabs 270 where they are secured thereto by means such as pins 276 for limited swinging movement of the member 272 relative to the subassembly 256. The strip or member 272 has a downwardly inclined portion 278 at its inner end to which is secured a deflecting element 280 disposed at a predetermined angle, as explained below.

The deflector member 272 is arranged for lowering by gravity and rides on the upper surface of the fold plate in retracted position of the assembly 256, but is in position for dropping over the opening 247 of the fold plate when the assembly is moved to its advanced position as shown in FIGS. 24 and 25 for deflecting sheets from entering into the space 245.

The lower strip 262 has an extension projected through a slot 282 in the side plate 28 (FIGS. 6 and 11) where its outer end is connected to an actuating link 284, the characteristic shape of which is shown in FIG. 6. The link 284 at its opposite end is secured to an element 286 extended through a slot 288 in the side plate 28 and cooperating with the adjusting means 242 referred to above. The link 284 may be made up of a pair of spaced elements for convenience in fabricating, and strength and rigidity, but the points of connection between the link 284 and the elements 262 and 286 are rigid and transversely spaced to provide a rigid assembly between the element 286 and the assembly 256 in all positions of adjustment, and in the adjusting movements thereof. The link 284 is specially designed for positioning on the outer side of the adjacent side plate 28 in the midst of various other operating and moving parts to be covered by the adjacent casing member and forming a remote control member between the fold plate 24 and the adjusting means 242 which are at quite remotely spaced positions, the fold plate being in a relatively inaccessible position but providing the adjusting means 242 at a position adjacent an upper and fully exposed area in the folding machine, namely above the first fold plate and adjacent the adjusting assembly 196 for enabling these two adjusting means to be readily observed together, due to their close proximity, by the operator of the machine. The slots 282 and 288 (FIG. 6) are disposed at the angle of the second fold plate 24.

The adjusting means 242 (see particularly FIG. 11) is mounted in and cooperates with mounting means 290 which is in a form of a strip folded to U-shape and having flanges 292 engaging the inner surface of the side plate 28 and secured thereto. The strip 290 thus provides an upper element 294 and a lower element 296 spaced apart to freely receive the element 286. An elongated slot 298 is formed in these two elements, extending the greater portion of the length of the strip and of sufficient length to accommodate the degree of adjustment desired for the assembly 256. The adjusting means 242 includes a thumbscrew 300 having a stem 302 with a reduced portion 304 riding in the slot in the element 294. The stem is projected through an aperture in the element 286 and through another element 306 riding in the slot in the lower element 296. The stem finally is threaded in a tapped hole in a clip 308 engaging the under surface of the element 296. Upon tightening the thumbscrew 300 opposite pressures are brought to bear by the element 304 on the element 286, and by the clip 308 on the under surface of the element 296 for locking the adjusting means in adjusted position.

The elements 302, 286 and 306 are secured together in an assembly by means of screws 310 (FIG. 10). The reduced portion 304 and the element 306 which ride in the respective portions of the slot 298 are of substantial length longitudinally of that slot to provide a desired guiding effect and prevent any cocking or binding movements or actions of the element 286. This guiding action, together with the rollers of the assembly 256 (FIGS. 5 and 11) in the slots in the lower fold plate, together with the rigid and strong connections between the element 286, link 284 and strip 262, provides easy adjustment of the assembly 256 while maintaining the assembly 256 in accurate position transversely of the fold plate.

The element 302 of the adjusting means (FIG. 3) is provided with indicator markings 312 which cooperate...
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with other indicator markings 314 on a fixed portion of the machine such as the upper surface of the mounting means 290. These indicator markings may include letters 314a and other markings such as inch markings 314b for a purpose similar to that of the markings 240.

As will be observed in FIGS. 1, 2 and 3, the stop adjusting means 196 and 242, and the associated indicator markings 240 and 314 are disposed closely adjacent each other. The operator can make the necessary adjustments in the two adjusting means in a very simple and coordinated manner. From a single position in the use of the machine both adjusting means can be easily and clearly observed due to the remote control arrangement between the adjusting means 242 and the lower fold plate 24. All settings of the stops are made by means of only these two adjusting means. If desired, the upper surface of the fold plate 22 may be provided with imprinted instructions such as in area 316 with respect to the settings for the adjusting means for producing various folds in the sheets, to be described hereinafter.

Reference is now made to the conveyor means 86 (FIGS. 5, 8, and 9) which includes a plate 318 extending transversely across the machine having downturned flanges 320 and provided with slots 322 receiving pins 324 mounted in the side plates of the frame. Tension springs 326 are interconnected between the plate, such as by means of lugs 328 struck in from the flanges, and corresponding ones of the pins 324. The flanges are provided with extensions 330 having notches 333 receiving the reduced end portions 334 of a shaft 356 which can be lifted out of the notches by forcing the plate 318 relatively away from it (to the left FIG. 5) as by holding the shaft and moving the plate by the hand. This arrangement maintains an accurate and taut condition of the belts 338 on the conveyor means. These belts are driven over the shaft 356 and over the drive shaft 90 referred to above in surrounding relation to those two shafts and the plate 318. The shafts 90 and 336 are provided with reduced portions 340 (FIG. 9) for receiving the belts 338 and retaining the belts in the intended lateral spacing. The springs 326 bias the plate 318 and the shafts 356, together as a unit, away from the drive shaft 90, maintaining the belts 338 in taut position, it being understood that the shaft 90 remains fixed in location.

Cooperating with the belts 338 for the purpose of controlling the sheets as they are being conveyed by the conveyor means 86 are spring fingers 342 which yield downwardly in response to the downward pressure of sheets of paper being conveyed by the belts. Each of these fingers, all identical, includes an outer portion 344 overlying a substantial length of the upper run of the corresponding belt and its inner end is mounted in the frame of the machine. The mounting means for the inner ends of the fingers includes clip 346, each substantially U-shaped in plan view having a web 348 to which the spring finger is secured, and flanges 350 having apertures receiving a mounting rod 352 which is mounted in and between the side plates 28 and 30. Preferably, the rod is square or polygonal, the clip having similarly shaped apertures for preventing rocking or rotation of the clip about the axis of the rod. The upper extreme end portion of the spring finger is turned over at 354 and yieldingly engages a surface of the mounting rod 352. The clips are slidable along the rod and the end portions 354 through friction engagement with the rod yieldingly retain the fingers in adjusted positions along the rod.

For the purpose of preventing or dissipating static electricity from the sheets being deposited on the conveyor means, an element such as a strip of tinsel 356 is extended transversely across the space between the side plate above the conveyor means in position for the sheets to rub the tinsel means may be mounted in any suitable manner such as by means of lugs 358 secured to the rod 352 or by means of clips 360 (FIG. 9).

The receiving tray 20 identified above (FIG. 1) is shown in detail in FIGS. 5, 8 and 9. The tray includes a bottom panel 362 and an upturned flange 364 or a backstop at its outer end. The tray is provided with a notch 366 cut through both the bottom panel and the back flange 364 to enable the operator to insert the hand in the notch and grip the stack of folded sheets on the tray and lift them out in an upward direction. The tray is adapted to be positioned relative to the discharge end of the conveyor means 86, being slidable mounted for this purpose in clips or holders 368 secured to the inner surfaces of the side plates 28 and 30. As shown in FIG. 7, each clip includes a flat plate fitted against the surface of the respective side plate and a hook portion 370 in which is received a flange element 372 of a member 374 secured to the under surface of the tray. The flanges 372 are slidable in the hook portions 370 and enable the tray to be slid or adjusted in and out, the clips or brackets 368 being of sufficient length to support the tray, and sufficient friction is established to prevent undue displacement of the tray, considering the fact that the tray slopes downwardly and outwardly, this sloping position facilitating stacking of the fold sheets thereon. It will be understood that the tray is adapted to various positions depending upon the type of folding being performed, for positioning the rear flange 364 outwardly sufficiently to enable the sheets to engage the flange and yet clear the outer end of the conveyor means.

Reference is next made to the counter 88 (FIG. 5) and the drive means therefor (FIG. 7). The counter is a mechanical counter having indicating elements moved in advancing direction pursuant to operation of the drive means therefor which includes the gear 92 (FIG. 7) referred to above, which in turn is driven by the drive means of the machine through the gear 116. The ratio between the gears 116 and 92 is such that the counter is advanced one unit indication for each complete revolution of the gear 116. It will be recalled, from the description above, that the shaft 60 with the feed wheels 58 thereon (FIG. 2) is rotated once for each revolution of the gear 116 which rotates in unison with the cam 118, due to the actuation of the clutch means 120 at every time each revolution of the cam, as controlled by the low point 136 on the cam. Each time the shaft 60 and the feed wheels thereon make one revolution, one sheet from the feed table is fed through the machine, as described more fully hereinafter, and since this shaft 60 makes one revolution for each unit indication advancement of the counter, the counter acts as a trip counter and accurately counts the number of sheets folded. This kind of counter and the drive means thereof provides a distinct advantage over those kinds of machines in which the sheets are fed continuously, since in the latter kinds of machines, it has been found virtually impossible to provide a mechanical counter that accurately performs its intended function.

Attention is directed to FIGS. 13 to 17, inclusive, in connection with the following description of the control means having a novel arrangement for selectively setting up automatic or manual control. The arm 66 referred to above (FIG. 2) supporting one end of the shaft 60 and bar 62 of the feed means is shown at least partially in certain of these figures, and referring to FIG. 6 it will be seen that this arm is pivoted on the shaft 144 and thus pivoted coaxially with the arm 64 of the opposite end. The shaft 60 is rotatably supported in the swinging end of the main portion of this arm, and the arm has an upwardly extending ear 376 supporting the end of the bar 62. The arm 66 at its swinging end also has a dependent leg portion 379 having a notch 380 at an upper point thereof and a cutout portion 382 (FIGS. 6 and 13) forming a shoulder 344 facing in a generally downward direction and utilized for retaining the arm 66 in elevated position, as described below. Fixedly secured to the side plate 28 is a bracket 386 having an arm 388 for a purpose to be described later, and a generally downwardly
leg 390 on which is supported an electric switch 392 having an actuating finger 394.  
An actuating assembly is incorporated in the controls and includes a lever or arm member 396 (see also FIG. 16) pivoted on a stud 398 mounted in the side plate 28. This member includes an arm 400 on which is mounted a stud 402 and another arm 404 for forming an accurate slot 406 receiving a stud 408 mounted in the side plate. A hairpin spring 410 has a central portion supported on the stud 398 with its arm portions engaging the studs 402 and 408 and operative for biasing the member 396 to a position which will be referred to herein as a neutral position and as illustrated biases it clockwise as viewed in FIGS. 13, 15 and 16. The arm 404 of the member 396 has a lateral extension 412 on which is rigidly mounted a main arm 414. This arm 414 may for example, be of channel shape in cross section and has its web element engaging the extension 412 and rigidly secured thereto. The flanges of the arm have longitudinal slots 416 at their lower ends. At the upper end of the arm 414 is a secondary arm or lever member 418 pivoted on a pin 420 supported in the upper end of the flange elements of the arm 414. At an outer end of the secondary arm 418 is a hand grip button or lever 422 which extends to the exterior as seen in FIG. 1 for grasping by the hand and manipulating the control members. This secondary arm 418 also may be in the form of a channel in cross section and has a cutout portion forming a shoulder 424 (FIG. 14) which engages the upper edge of the web of the arm 414 and forms a stop limiting swinging movement of the arm 418 relative to the arm 414 in a corresponding direction, namely, counterclockwise. This shoulder 424 being offset relative to the axis of the pin 420 provides the limiting means referred to, and when this shoulder is in engagement with the upper edge of the web element of the arm 414, downward movement of the button 422 results in swinging the arms 418 and 414 rigidly together as a unit in the corresponding direction or counterclockwise. This movement results in similar movement of the member 396 about the axis of the stud 398.  
At the inner end of the secondary arm 418 is a pin 428 on which is pivoted a link 426 which has attached to it a pin 430 at its lower end received in the slots 416. The arm 418 can be swung, however, in a clockwise direction relative to the arm 414 as will be observed from a comparison of FIGS. 13 and 14. Assuming a starting neutral position shown in FIG. 13 in which the pin 430 is elevated above the lower end of the slots, swinging movement of the arm 418 in clockwise direction as by grasping the button 422 results in the link 426 being moved downwardly, the pin 430 riding downwardly in the slot 416 in this movement. A hairpin spring 432 (FIG. 17) is mounted on and carried by the arm 414 and arranged with its end portions reacting between a fixed element 434 on the arm and the inner swinging end of the arm 418 for providing friction for releasably retaining the arm 418 in its set position, such, for example, as the position in FIG. 14. The friction between the pin 430 and slots 416 also aids in retaining the arm 418 in set position. The stud 402 on the member 396 is adapted for engagement in the notch 380 in the leg 378, and also for engagement under the shoulder 384, in the control operations of the machine. Depression of the button 422 and resulting swinging movement of the arm 414 and member 396 in a counterclockwise direction about the pivot of the stud 398 results in the pin 430 engaging the actuating finger 394 and moving the lower end thereof in corresponding direction (to the right FIG. 13) and closing the switch, the switch being so oriented for that purpose, and the switch being opened when the arm 414 is in its opposite or initial position. In another operation the button 422 may be raised with consequent downward movement of the link 426 as explained, and this movement moves the pin 430 against the finger 394 of the switch and closes the switch while the arm 414 remains in its neutral position.  
Pivoted on the arm 388 referred to above is a link 436 to the other end of which is connected a tension spring 438, the opposite end of the spring being connected to a pin 450 carried by and located adjacent the outer swinging end of the arm 66. The link 436 adjacent its swinging end is provided with a slot 442 receiving a pin 444 in one arm of a bellcrank lever 446 which is pivoted on a stud 448 fixed in the side plate 28. The other arm of the bellcrank lever is provided with a pin 450 engageable in any one of a series of notches in an eccentric 452 mounted on stub shaft 454 rotatably mounted in a suitable bearing in the side plate 28 and having on its opposite end a control knob 456 (see also FIGS. 1 and 2). Rotation of the eccentric 452 results in swinging of the bellcrank lever 446 about the stud 448 in one direction or the other depending on the direction of rotation of the eccentric and the other arm of the bellcrank lever acting through the pin 444 and working in the slot 442 results in corresponding swinging of the link 436 about its pivot mounting. This swinging movement of the link 436 results in pressure exerted on the swinging end of the arm 66 and consequent pressure exerted on the feed wheels 58 which is transmitted to the sheets on the feed table. The swinging end of the link 436 is closely adjacent the axis of the arm 66, in the shaft 144, and consequently the pressure exerted on the feed means may be either positive or negative, depending on the position of the link 436, as adjusted, except in the uppermost position of the arm 66. Other features and advantages of this pressure control means are set out in the copending application of the present Springer Serial No. 795,747, filed February 26, 1959, now U.S. Patent No. 3,063,711, to which reference may be had for complete description.  
In order to set the folding machine in operation the control means here described is actuated. Assuming a neutral position, the feed means 56 is in elevated position in which the feed wheels 58 are out of engagement with the sheets on the feed table and the arm 66 is in its uppermost position. The pin 402 engages under the shoulder 384 in the leg 378 and retains the feed means in its upper position. Assuming it is desired to set the machine to automatic operation, the operator depresses the control button 422 which swings the arm 414 and member 396 in clockwise direction. This control movement permits two operations or functions; it closes the switch 392, and it withdraws the pin 402 from the shoulder 384. As a consequence of the latter function, the arm 66 and the feed means 56 drop by gravity until the feed wheels 58 engage the sheets on the feed table. The drive means is now in operation, due to closing the switch, and as the sheets are fed from the feed table, the feed means and arm 66 gradually lower, and the pin 402 rides on the outer surface 378a of the leg portion 378 until the stack of sheets is depleted, as a result of which the feed wheels drop into the depressions 68 (FIG. 5) and at this position of the feed means and leg 378, the pin 402 is in register with and moves into the notch 380. As a result, the arm 414 and member 396 swing to their neutral position permitting the switch 392 to open. This stops the operation of the machine. To reset the machine the operator grasps the rod 62 (FIG. 2) and lifts the feed means 56 to its upper position in which the pin 402 engages under the shoulder 384 and retains the feed means in its upper position. While the feed means is being lifted the switch 392 may again be closed due to the pin 402 riding on the surface 378a, but this interval is very short.  
The foregoing operational control is for automatic operation, but it is desired to perform a manual operation without automatic shutoff, the button 422 is merely raised. This rocks the arm 418 and de-
presses the link 426 which results in downward movement of the pin 430, as explained above, which closes the switch 392, the parts remaining in this position until manually restored to neutral position. The arm 66 and the member 56 remain in upper position due to the fact that the pin 402 remains in engagement with the shoulder 384, and so long as the button 422 remains in its thus raised position, the machine remains in operation. To stop the operation the operator merely moves the button 422 to its neutral position, without swinging the arm on member 396, which withdraws the pin 430 from the switch finger 394 and permits the switch to open. Upon setting the machine into operation as just noted, other specific functions are performed. Drive is transmitted to the gear 116 and cam 118 (FIG. 7) and the clutch means 126 is energized once in each revolution of the cam 118. This results in the shaft 60 and feed wheels 58 (FIG. 2) being rotated sufficiently to grip the top sheet of the stack on the feed table and feed it therefrom into the machine, (to the right FIG. 5), where its leading edge passes through the space 54 and into the bight between the rollers 26a and 26b. The rotation of the feed wheels 58 need not be sufficient to continue feeding the sheet from the stack, since after the sheet is gripped by the rollers 26a and 26b, these rollers continue drawing the sheet. The one-way clutch 151, however, enables the feed wheels 58 to be rotated by the sheet.

While the clutch means is energized once each revolution of the cam 118, the drive through the gears 120, 124, and 130 is constant, which results in constant rotation of the rollers 26a, and through the gears 131, 133 and 137 (FIG. 6), the roller 26c is also constantly driven, the other two rollers 26b and 26d being of course constantly driven also.

After the sheet is fed through the rollers 26a and 26b, it follows a course of folding which may be one of any of a number of kinds of folds as described hereinbelow, but for purposes of example, reference is here made to FIGS. 15, 19, and 20. The leading edge 18a of the sheet enters the entrance opening 190 and into the space 163 of the first fold plate 22 until it engages the stop element 194 which is set at a distance from the entrance opening less than the length of the sheet, which results in a buckling or fold 18c, and due to the direction of emergence of the sheet from the rollers 26a and 26b together with the closure of the fold plate 22, the buckle or fold 18c is deflected downwardly into the entrance bight of the rollers 26b and 26c. This fold then is gripped by those rollers and it forms a new leading edge, and upon emergence from these two rollers it enters through the entrance opening 247 into the space 245 of the lower fold plate 24. In this case also the stop elements 264 are disposed at a distance from the entrance opening 247, a distance less than the then length of the sheet. Upon engagement by the then leading edge 18c of the sheet with the stop elements, a new buckle or fold 18d is formed adjacent the entrance bight of the rollers 26c and 26d, and in this case also due to the direction of emergence of the sheet from the rollers together with the inclination of the bottom fold plate 24, the buckle or fold 18d is deflected in the direction of the last two rollers 26c and 26d. These two rollers then grip the fold 18d which forms a new leading edge and the sheet thus folded is passed between these rollers and onto the conveyor means 86.

The timing of the actuation of the feed wheels 58 together with the speed of rotation of the rollers 26c is such that the sheet is passed through the rollers and folded and maintained at all times ahead of the leading edge of the succeeding sheet so that no sheet can overlap the preceding one. This action is further assured by the stripper action of the feeding of the sheets from the feed table, i.e., only one sheet at a time can be fed from the table, and the feed wheels 58 are not again positively driven until each sheet has been drawn from the feed table and passed through the rollers to such a point that the next sheet cannot be advanced so as to overlap that one.

The conveyor means is energized during this operation as it will be understood that the shaft 144 from which it derives its drive is posterior to the clutch means 126 (FIG. 7) and operated only when the clutch means is energized. This intermittent operation of the conveyor means produces a distinct advantage, and by referring to FIG. 8, it will be seen that the folded sheets are dispensed by the conveyor means, after leaving the rollers, in distinct and generally uniform steps. As a consequence, the folded sheets are individually discharged from the conveyor means, and each, when it is deposited on the receiving tray 20, is enabled to fall into the proper position for forming a uniform and even stack. Each sheet as it is expelled from the last pair of rollers 26c and 26d (FIG. 5) is forced onto the conveyor means to a position beyond the point where the fingers 344 engage the belts such as a position in the neighborhood of the arrow 460. At this point the friction established by the fingers 344 produces the desired gripping effect and more effectively conveys the folded sheet along the conveyor.

Reference is now made to the different kinds of folds which the folding machine is capable of producing. Referring first to FIGS. 18 to 20, inclusive, which were referred to hereinabove, the folded sheet in FIG. 20 represents a standard fold. A stop element 194 in the fold plate 22 is set at a position as indicated in FIG. 18, namely, that in which the distance from the entrance opening 190 is approximately two-thirds the length of the sheet. Upon the fold or new leading edge 18c emerging from the second pair of rollers and entering into the space in the lower fold plate 24, the fold 18d or new leading edge is adjacent the trailing edge 18d, the distance from the stop elements 264 from the entrance opening 247 being approximately one-third of the length of the unfolded sheet. The positions of the stop elements 194 and 264 are determined by precalculation and are as indicated in the instructions printed on the first fold plate 24 which designates certain ones of the indicator markings 240 to be registered with the mark 238. A similar condition exists in connection with the markings 314 on the supporting means 290 for registration therewith by the marks 312.

FIGURES 21 to 23 relate to the accordion fold and in producing this fold the stop element 194 is set at a position a distance from the entrance opening 190 equal to approximately one-third the length of the unfolded sheet. The fold 18c forming the next leading edge is gripped by the rollers 26b and 26c and moved into the space 245. For forming the accordion fold the stop element 264 is disposed in the same position as in FIGS. 18 and 19, but in the present instance the first fold is made at a different location in the sheet and as a consequence the trailing third portion of the sheet is folded reversely over the middle portion, resulting in the reverse fold or accordion fold. Thus only a single adjustment—that of the stop 194—is required as between making the standard fold and the accordion fold.

FIGURES 24 to 26 relate to a single fold operation. For producing the single fold illustrated in FIG. 26, the stop element 194 in the first fold is set at a distance from the entrance opening 190 which is approximately one-half the length of the unfolded sheet, and the stop elements 264, or more broadly stated, the assembly 256 (FIG. 5) is moved up to its fully advanced position, in which the deflecting element 280 is enabled to drop over the entrance opening 247 and 264 of the second fold plate 24. Upon the sheet 18 engaging the stop element 194 a fold or new leading edge 18g is formed and forced into the entrance bight of the rollers 26b and 26c. This new leading edge is then brought to bear on the deflecting element 280 which is so positioned and inclined as to cause a deflecting action on the leading edge 18g which is then directed into the bight of the last pair of rollers 26c and
26d. The paper or sheet is then moved directly onto the conveyor means 86, with the trailing edge 18e being withdrawn from the first fold plate 22 and the trailing edge 18b being withdrawn from anterior to the first pair of rollers 26c and 26b.

To produce the fold illustrated in FIG. 29 which is referred to as a double fold there need be only a single setting on the fold plate from the setting represented in FIGS. 24 and 25. The stop element 194 remains positioned as in FIGS. 24 and 25, but the assembly 256 is retracted from its fully advanced position to a position represented in FIGS. 27 and 28, in which the stop elements 264 are disposed a distance from the entrance opening 247 of the bottom fold plate substantially equal to one half of the length of the sheet once folded. The fold or new leading edge 18g is directed into the space 245 and when it engages the stop elements 264 a new fold or leading edge 18h is formed and forced into the bight of the rollers 26c and 26d. The new fold or leading edge 18h is then approximately half way between the leading edge 18g and the edges 18a and 18b which are then trailing and positioned together in the final folded sheet.

Among the advantages of the folding machines are that because of the plurality of positively driven rollers (26a and 26c), possible jamming of the folding machine is eliminated, or greatly minimized, so that thinner sheets can be accommodated than has been practicable heretofore, because of the plurality of positively driven rollers together with the means for adjusting the pressure exerted by the feed means 58 on the sheets on the feed table.

The removability of the first fold plate 22 greatly facilitates the removal of any sheets that should become jammed in the rollers 26.

It will be understood that multiple folding operations can be performed on the sheets, i.e., a sheet once folded can be again passed through the machine for folding in a direction different from that of the first fold.

While we have disclosed herein a preferred form of the invention, it will be understood that changes may be made therein within the scope of the appended claims.

We claim:
1. A folding machine including a frame having spaced vertical side plates, a feed table for supporting a stack of sheets to be folded, means for feeding sheets from said feed table, a plurality of pairs of rollers mounted in and between said side plates and arranged in a longitudinal series and adapted to receive sheets from said feed table and to advance them from the first pair of rollers to successive ones, a first fold plate mounted in and between said side plates and having an entrance opening therein for engaging the first pair of rollers, said first fold plate being disposed adjacent the top of the side plates, stop means in said first fold plate adjustable therealong for varying the distance between the stop and the first pair of rollers, a second fold plate adjacent the rollers of a succeeding pair and having an entry opening for receiving a sheet from the rollers of that pair, a stop in said second fold plate adjustable therealong for varying the distance between the stop and the entry opening in the fold plate, said latter stop including elements distributed transversely along the corresponding fold plate, a single elongated element, link and stop in said second fold plate together forming a rigid unit whereby to adjust the stop in response to movement of the adjusting knob, means including elements reacting between said stop in the fold plate and that fold plate for retaining that stop accurately positioned transversely of its fold plate and enabling movement of the stop without binding or cocking, notwithstanding the sole connecting means between the stop and adjusting knob is disposed at one side of the corresponding fold plate, and a casing member secured on said one side plate enclosing said link.

2. A folding machine comprising a frame having spaced side plates, a feed table for supporting a stack of sheets to be folded, a series of pairs of rollers arranged for passage of the sheets therethrough in succession from one pair to the next, means for feeding sheets from the feed table to the rollers, a first fold plate including spaced plate elements and including depending side flanges, the spaced plate elements defining an entry opening to the space therebetween, pins in said side plates extending inwardly toward each other, said side flanges having notches at their forward ends adjacent said entry opening for receiving said pins for supporting the respective portion of the fold plate, other pins in said fold plate retractor projecting outwardly and extending into apertures in said side plates, means for manually retracting said other pins whereby to enable withdrawing of the fold plate, said fold plate having a longitudinal slot therein, a stop between said plate elements extending generally transversely of the fold plate, said adjusting knob means on and intermediate the edges of said stop and extending through said slot and including elements releasably engageable with portions of the fold plate for releasably securing the stop in adjusted positions, a second fold plate disposed for receiving sheets issuing from a successive pair of rollers, stop means in said second fold plate adjustable toward and from the corresponding pair of rollers, said fold plate being operative in conjunction with said rollers for folding sheets advanced through the rollers.

3. The combination set out in claim 2, in which the stop in said first fold plate is adjustable angularly about a single axis adjacent said adjusting knob and extending perpendicularly through the fold plate.

4. The combination set out in claim 3, in which said stop and adjusting means form an assembly movable as a unit in said slot, and a thumb screw is mounted in said unit and connected between said unit and a fixed portion of the unit on a point on the stop offset from said axis, said thumb screw being operative in response to adjustment thereof for adjusting said stop means about said axis.

5. Fold plate means including a plate having spaced plate elements defining an entry opening to the space therebetween at one end and having a slot extending through the plate elements and extending longitudinally of the plate, a stop generally in the form of a strip between said plate elements and extending transversely across the plate, a single block mounted in said plate, said stop being pivotally mounted intermediate said block and the block being slidable in said slot for adjusting said stop longitudinally of the plate, means for manually and releasably securing the block in adjusted positions longitudinally of the plate, a thumb screw mounted in said block and reacting between the block and said stop at a point on the latter offset from the axis of said pivot extension whereby adjustment of said thumb screw effects angular adjustment of said stop about its pivot axis.

6. A folding machine comprising a feed table for supporting a stack of sheets to be folded, a series of pairs of rollers arranged for passage of the sheets therethrough in succession from one pair to the next, means for feeding sheets from the feed table to the rollers, a fold plate associated with each of at least two pairs of rollers and operative in conjunction with the rollers for folding the sheets as they are passed through the rollers, one of said fold plates including a stop constituting the element thereof directly engaged by the sheets for effecting a folding operation, said stop including a member extending transversely across the fold plate and having projections spaced transversely of the fold plate extending through longitudinal slots therein, said stop being movable longitudinally of the fold plate toward and from the associated pair of rollers, means secured to the stop only at one end thereof and at one side of the fold plate and having a hand grip
for manually moving the stop longitudinally of the fold plate through actuation of said hand grip, said projections and slots being conjointly operative for maintaining the stop accurately positioned transversely of the fold plate.

7. The combination set out in claim 6, in which the plate includes spaced plate elements defining a space therebetween for receiving the sheets being folded, and the projections disposed in said slots are in the form of rollers.

8. The combination set out in claim 7, in which the stop includes a transversely extending strip on each of opposite surfaces of the fold plate and the rollers forming the projections are supported at opposite ends by said strips.

9. A folding machine comprising a feed table for supporting a stack of sheets to be folded, a series of pairs of rollers arranged for passage of the sheets therethrough in succession from one pair to the next, means for feeding sheets from the feed table to the rollers, a first fold plate associated with a first pair of rollers and a second fold plate associated with a succeeding pair of rollers, the fold plates being operative in conjunction with the rollers for folding sheets passed through the rollers, each fold plate having a stop directly engageable by the sheets for effecting the folding operation, the first fold plate being adjacent an upper part of the machine, means mounted on said first fold plate for adjusting the stop thereon, the second fold plate being disposed at an inner part of the machine, the stop in said second fold plate including an elongated strip extending transversely of the fold plate and having a projection at one side of the fold plate, adjustments having an extension slot, a link at one side of said second fold plate rigidly interconnecting said projections and extension, said adjusting means and link constituting the sole manipulative means for adjusting the stop in said second fold plate, means rigidly guiding the projection, extension and link against binding or cocking movements, and said second fold plate having guiding engagement with the stop therein at a plurality of points transversely of the fold plate operative for retaining the stop in accurately aligned position transversely of the fold plate.

10. The combination set out in claim 9, in which the adjusting means is provided with clamping means, and guide means is provided for the clamp means and operative for aiding in retaining said projection, extension and link in accurate position, said clamp means being adapted for releasably clamping with said guide means and, acting through said projection, extension and link, releasably retaining the stop in adjusted positions.

11. A folding machine comprising a feed table for supporting a stack of sheets to be folded, a series of pairs of rollers arranged for passage of the sheets therethrough in succession from one pair to the next, means for feeding sheets from the feed table to the rollers, a first fold plate associated with a first pair of said rollers and including a stop adjustable toward and from the associated pair of rollers engageable by a sheet passing through the rollers and operative for effecting a folding operation, a second fold plate associated with a second pair of rollers and including spaced plate elements defining a space therebetween having an entrance opening adjacent the associated pair of rollers, said space being adapted for receiving sheets passing through the rollers, a stop assembly in said second fold plate including stop elements in the space between said plate elements directly engageable by sheets being folded, said stop assembly being adjustable toward and from said entrance opening, said stop assembly also including a deflector element carried thereby and having limited movability relative to said stop elements whereby it is enabled to fall by gravity over said entrance opening when the stop assembly is in an advanced position toward the entrance opening for preventing the entrance of sheets into said space and deflecting them therefrom and being cammed upwardly to a position bearing on the outer surface of the stop plate in response to the stop assembly being moved away from said advanced position.

12. A fold plate assembly for use in a folding machine comprising a plate including a pair of spaced plate elements defining a space therebetween and having an entrance opening to that space at one end of the plate for receiving a sheet to be folded, a stop assembly mounted on the plate including elongated strips on opposite exterior surfaces of the plate and rollers secured to and between said strips and guidingly received in longitudinal slots in the plate, said rollers forming stops for engagement by sheets entering into said space for a folding operation, a deflector in said stop assembly including an elongated strip overlying said other strips and pivoted on an axis parallel with said other strips, said stop assembly being adjustable along and guided by said slots longitudinally of the plate between an advanced position adjacent said entrance opening and a position retracted therefrom, said deflector member having an extended portion adapted to fall by gravity over the entrance opening of the fold plate when the stop assembly is in its advanced position and being cammed about its pivot in response to the entrance opening and bearing on an upper exterior surface of the fold plate in response to movement of the stop assembly away from its advanced position.

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