Oct. 31, 1961 C. F. DESLAURIERS ET AL 3,006,276

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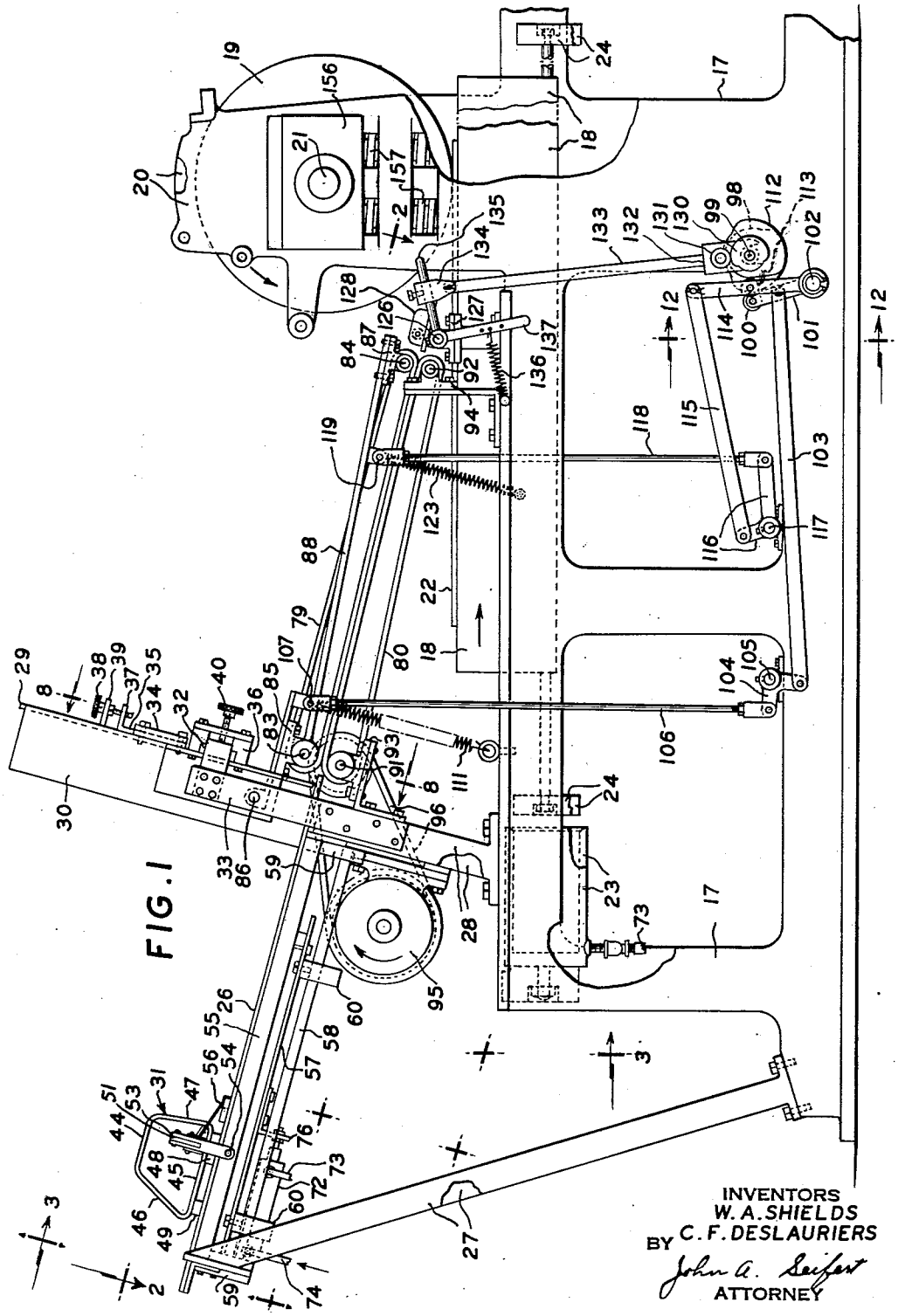


FIG. 1

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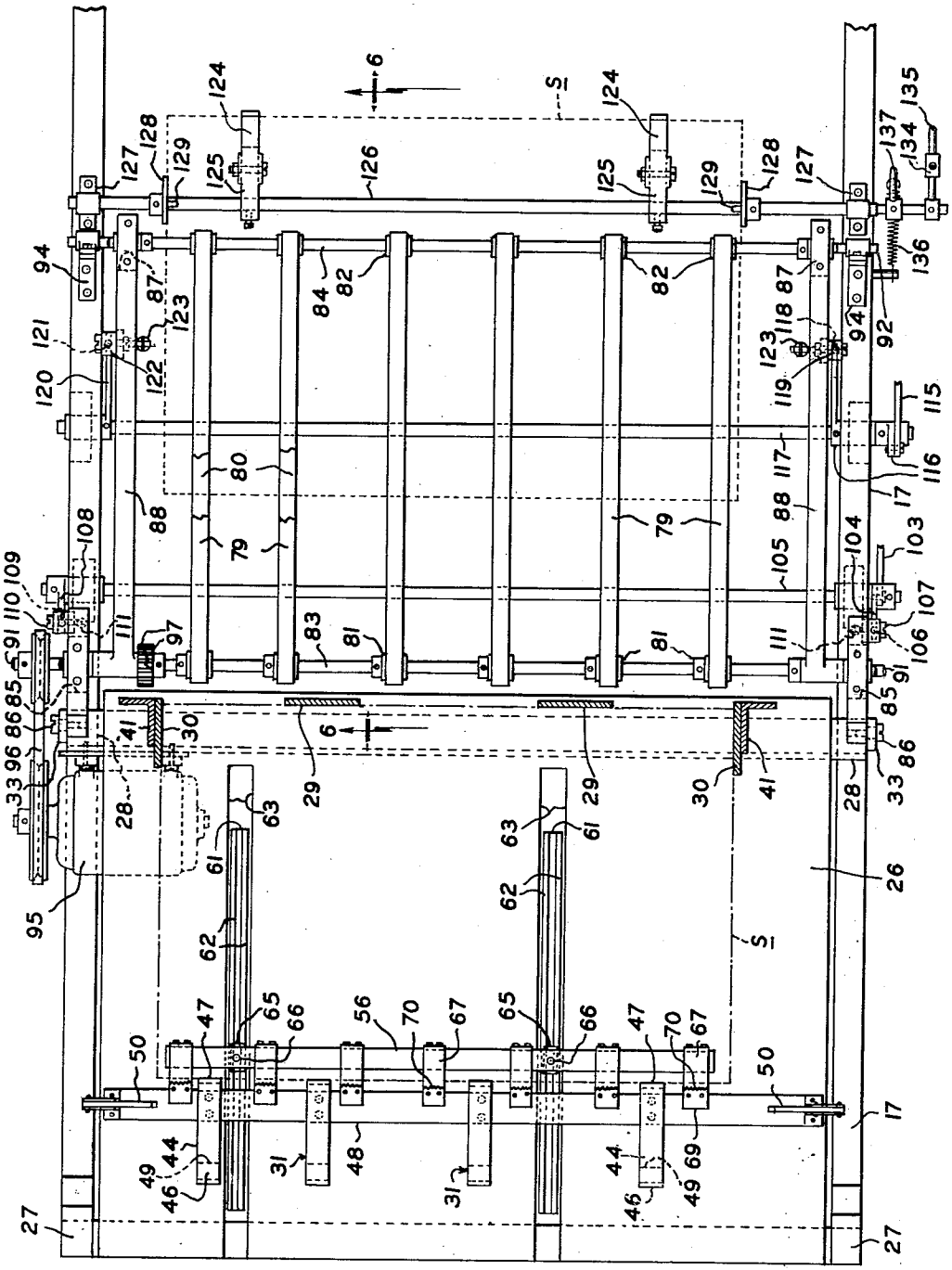


FIG. 2

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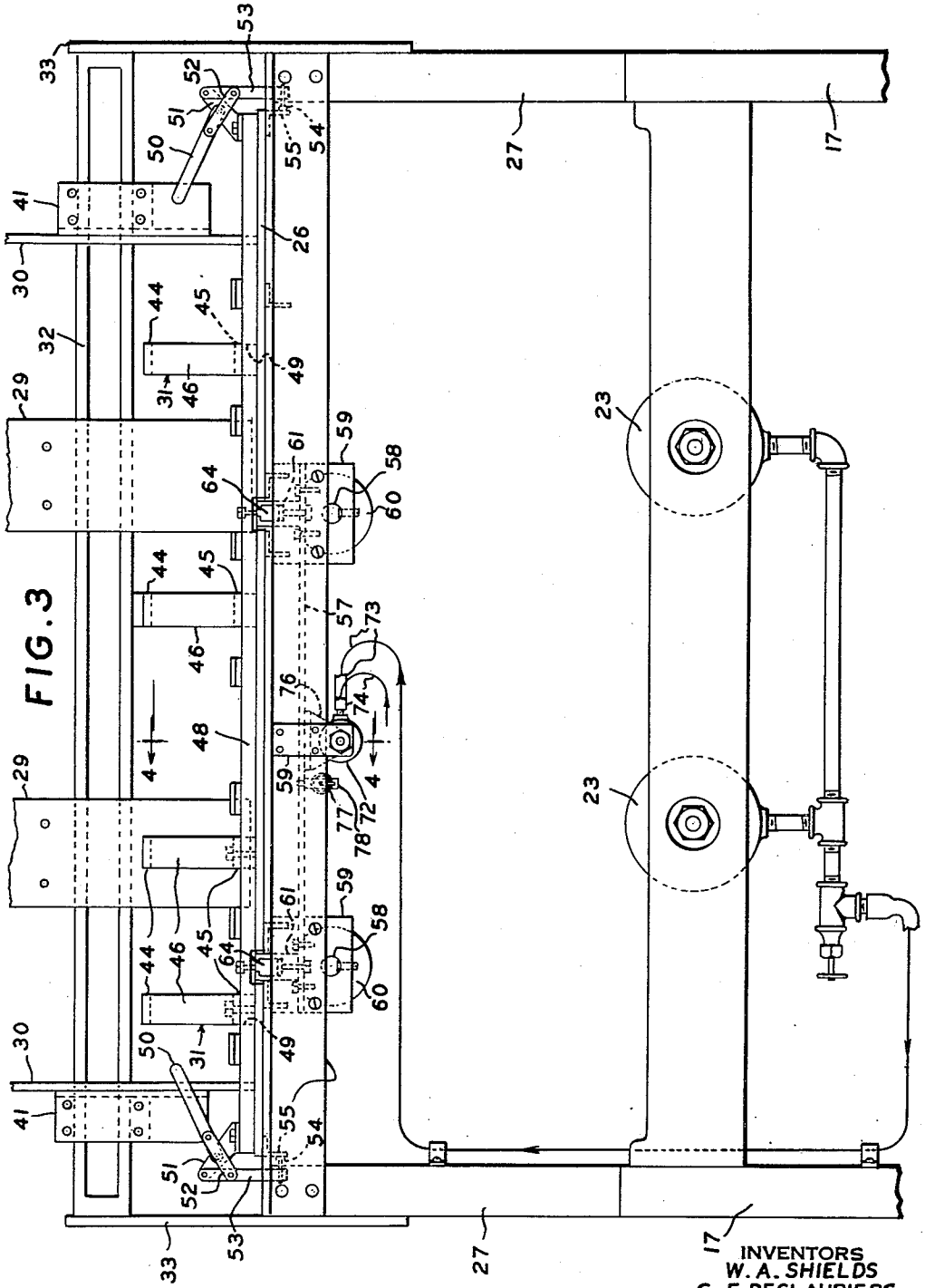



FIG. 3

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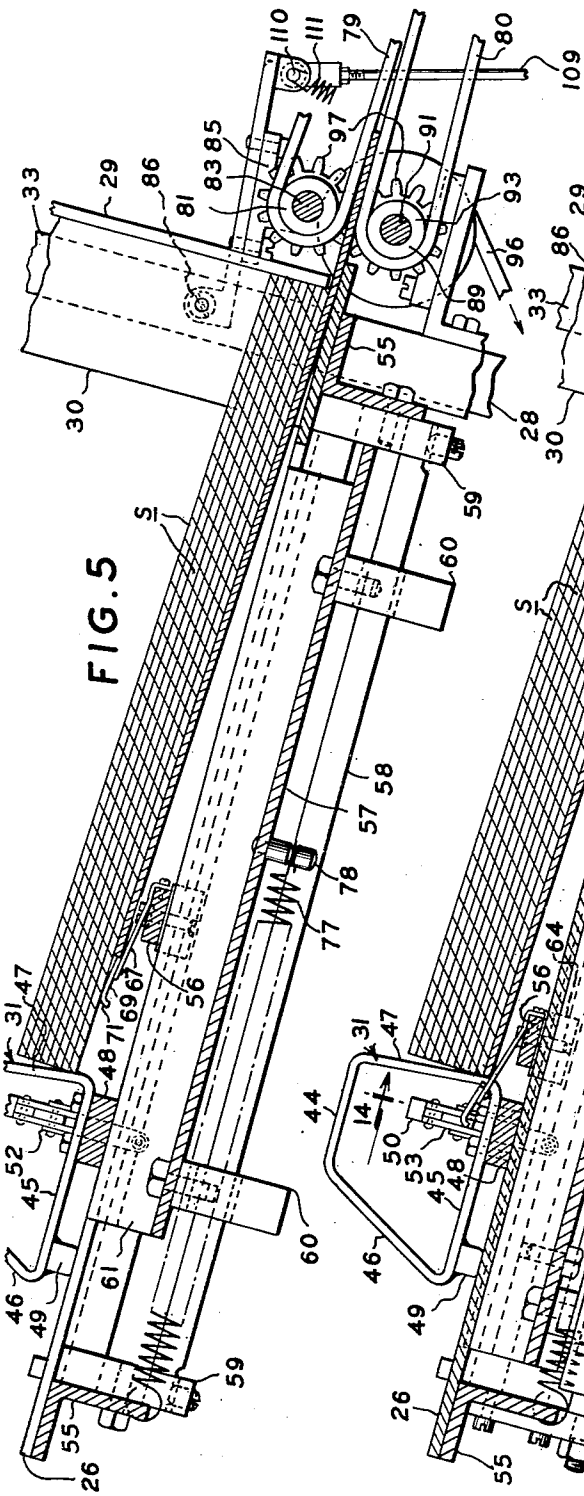


FIG. 5



FIG. 4

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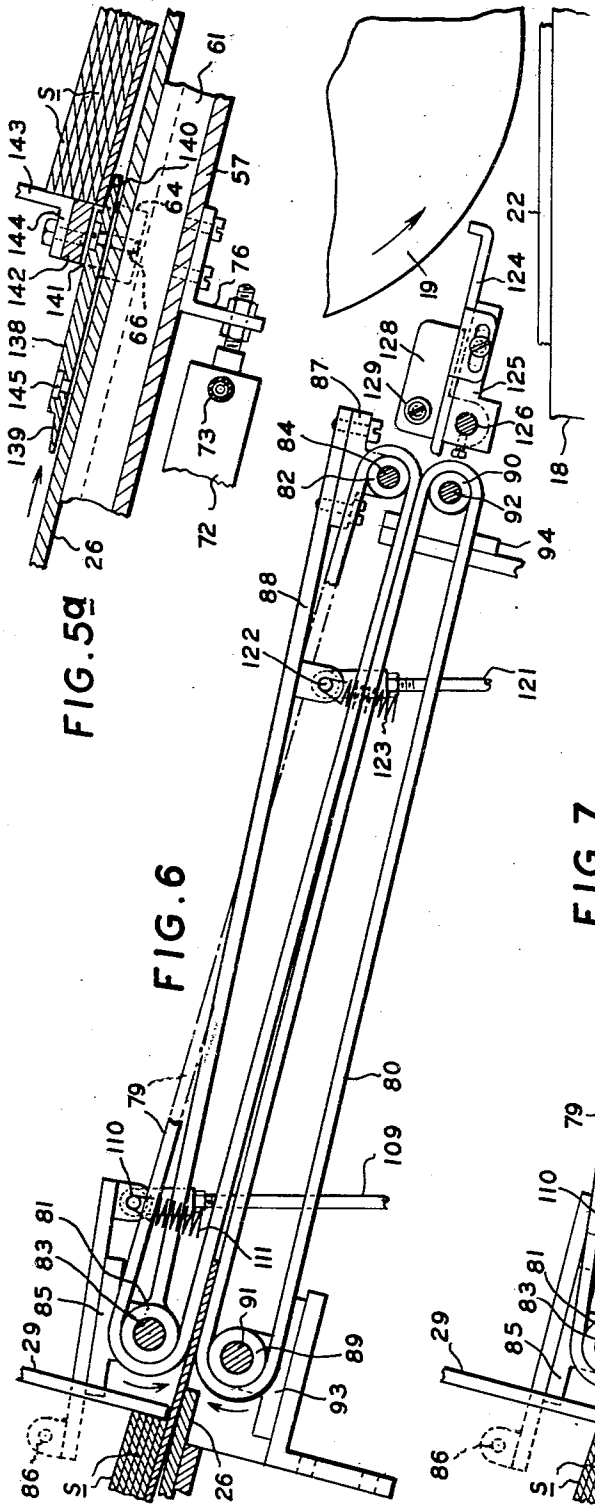


FIG. 5a



FIG. 6

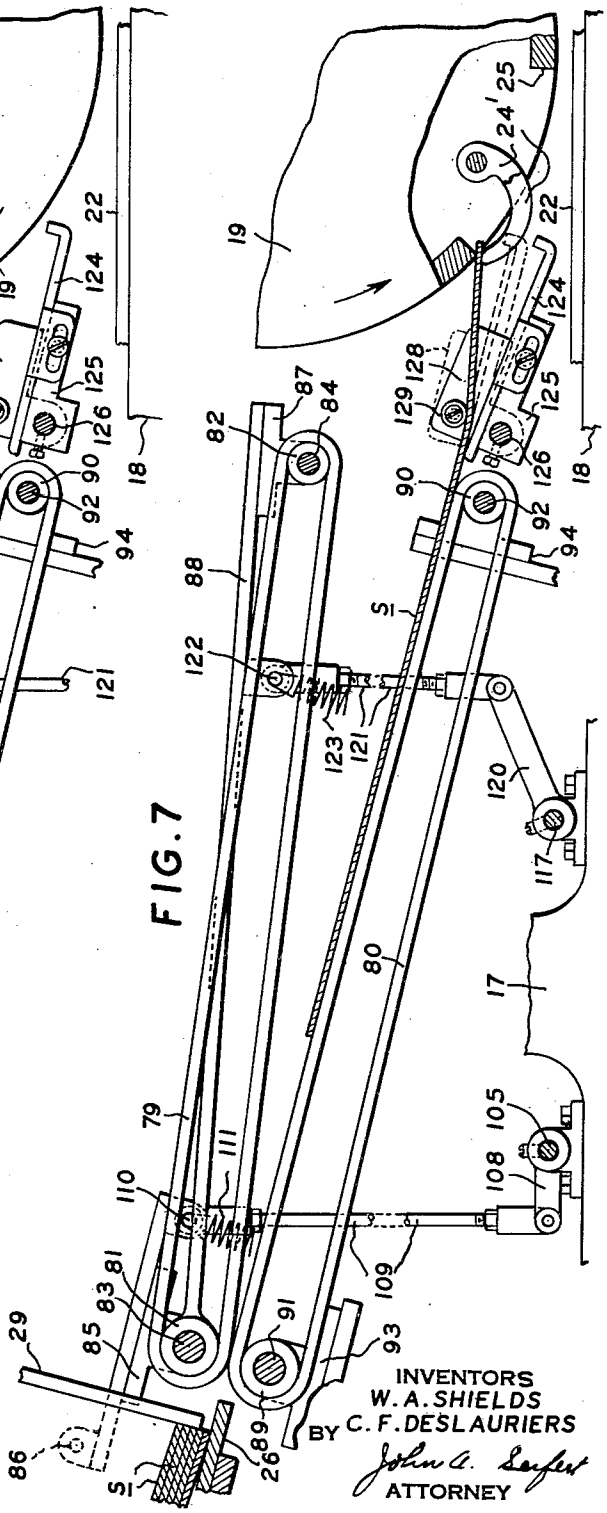


FIG. 7

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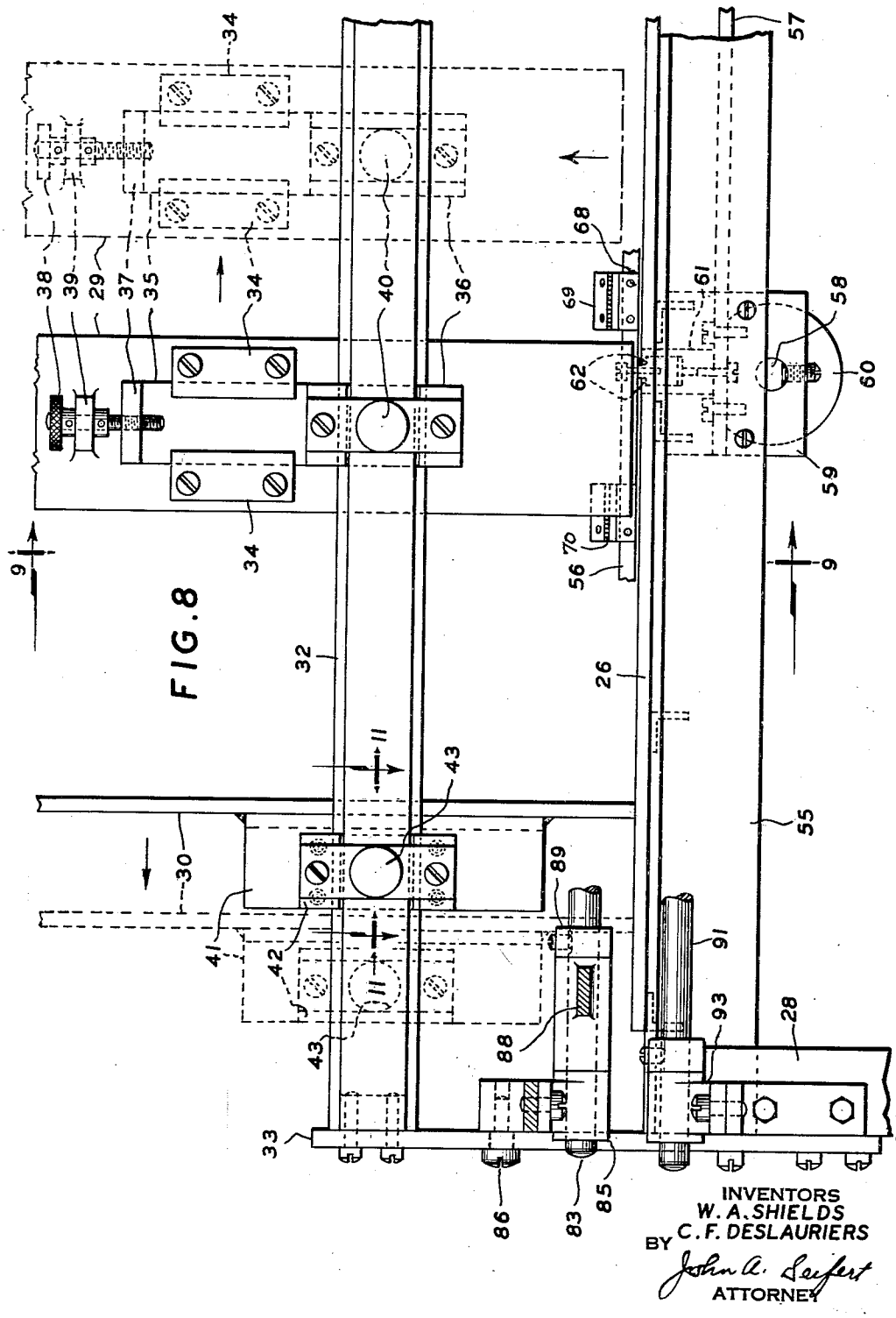



FIG. 8

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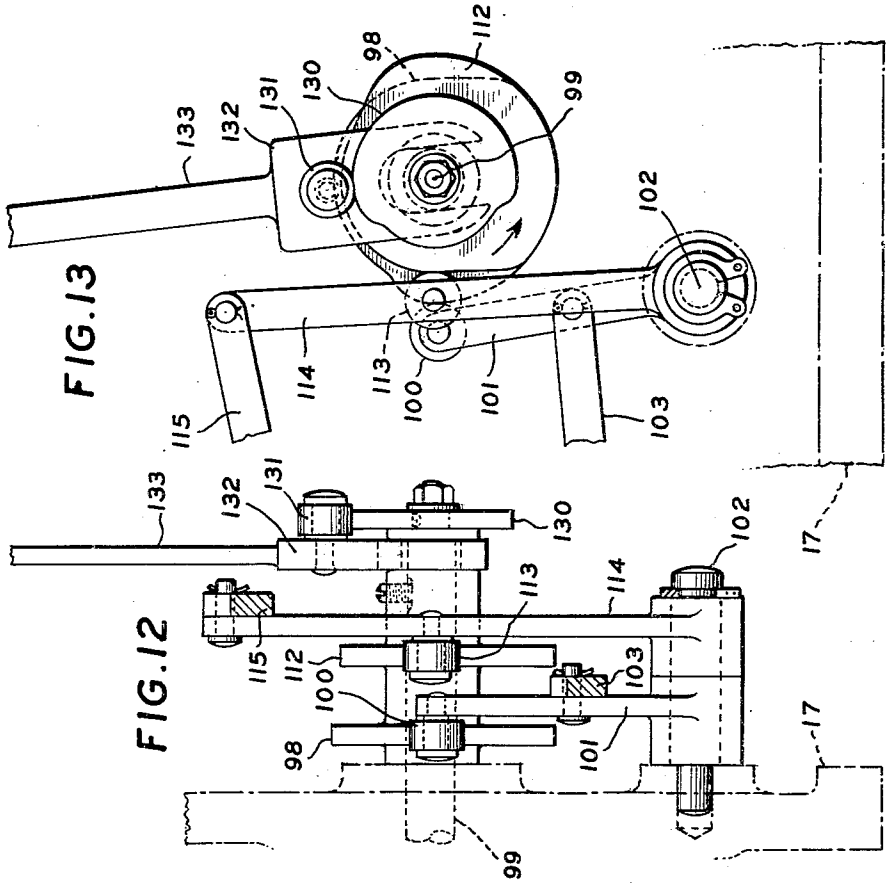



FIG. 13




FIG. 12

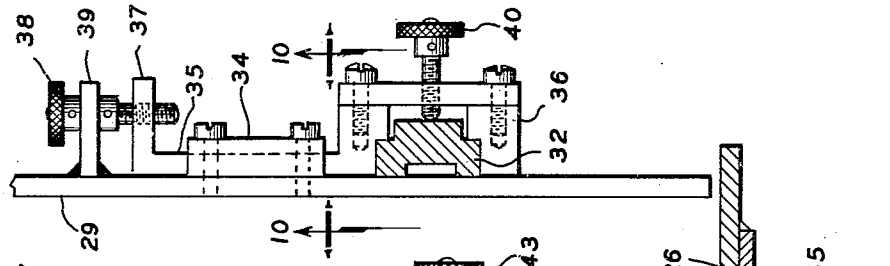



FIG. 9

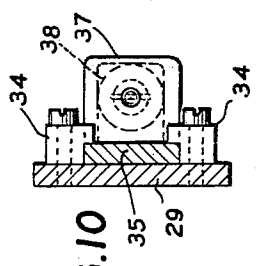



FIG. 10

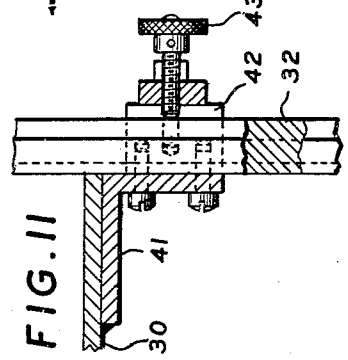
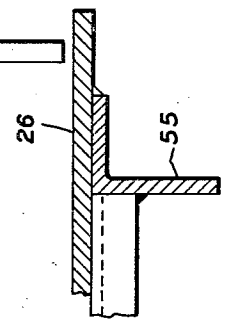



FIG. 11




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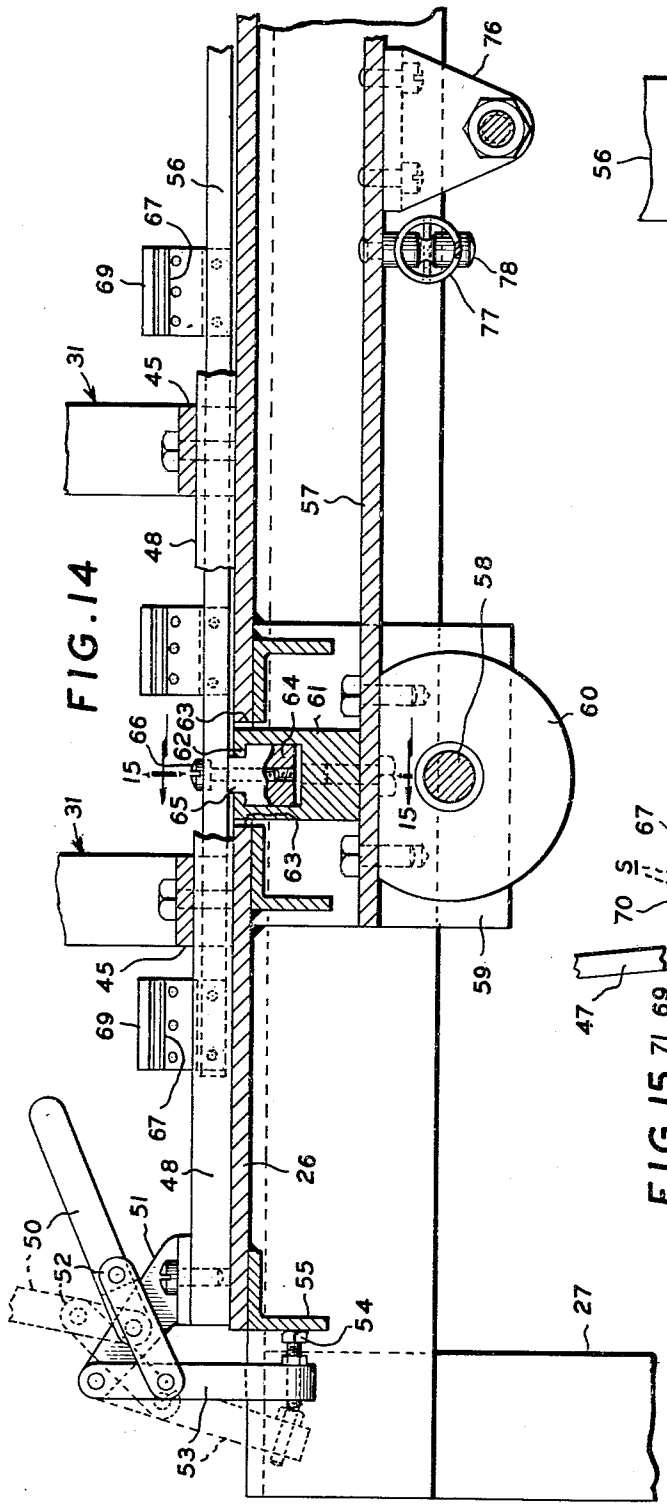


FIG. 14

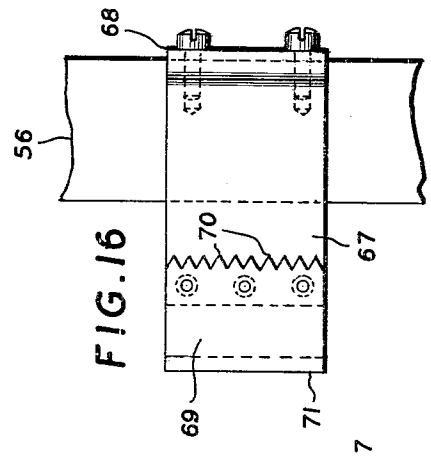


FIG. 16

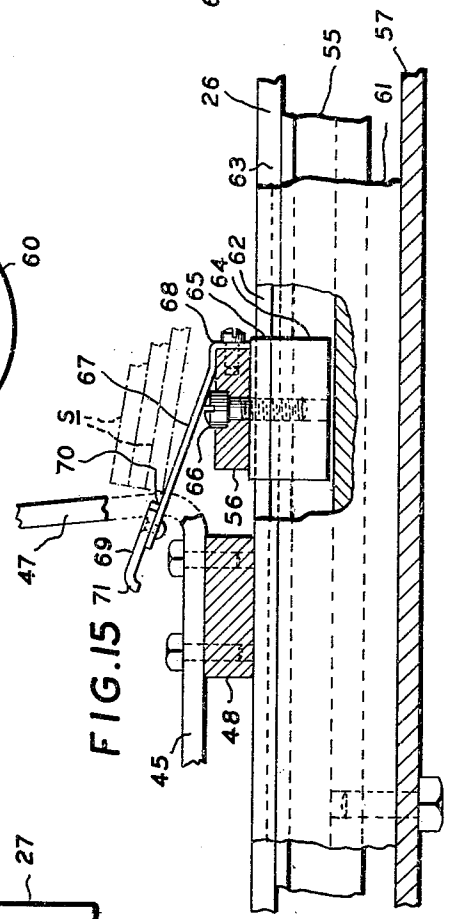


FIG. 15

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FIG. 17

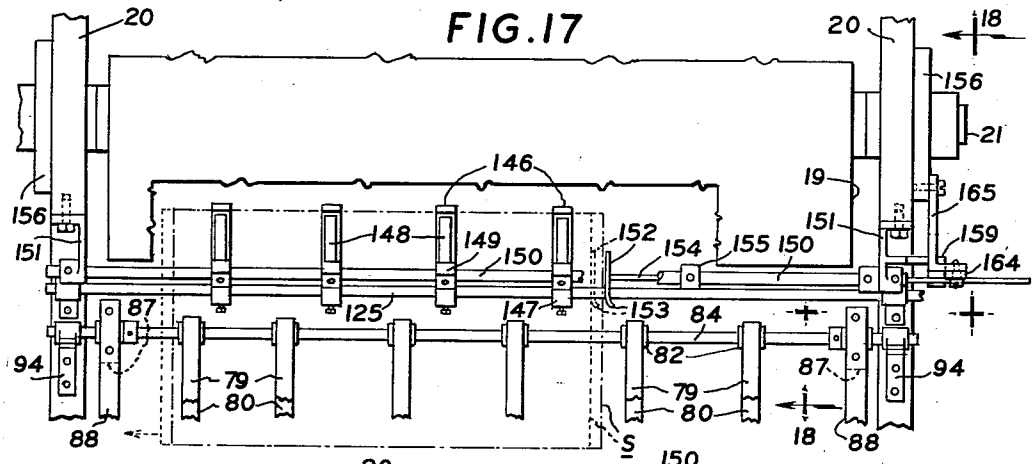



FIG. 18

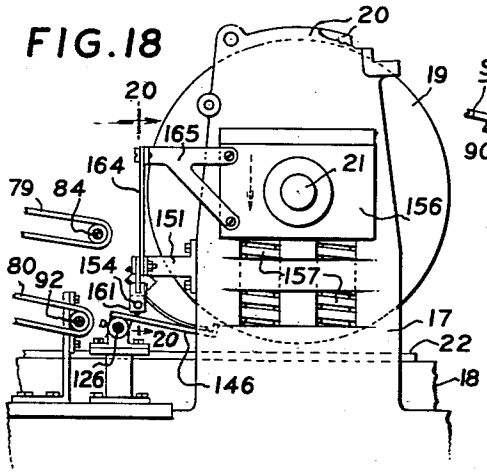



FIG. 19

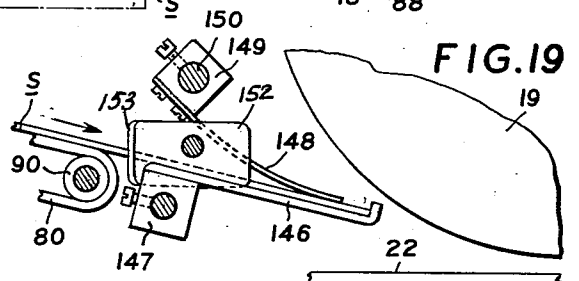



FIG. 20

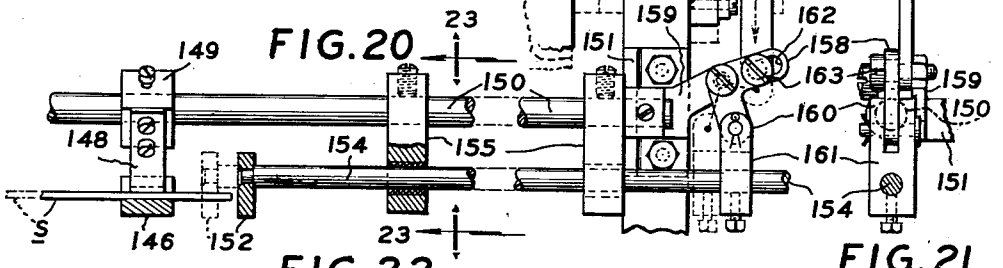



FIG. 21

FIG. 22

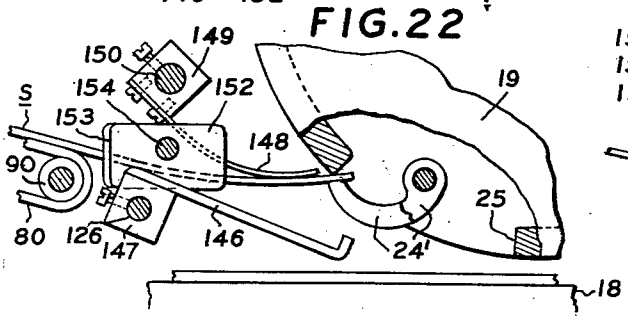
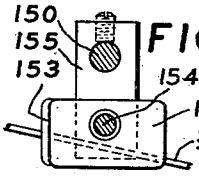



FIG. 23




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United States Patent Office 3,006,276 Patented Oct. 31, 1961



3,006,276

# PAPER FEEDERS FOR PRESSES

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Filed Feb. 29, 1960, Ser. No. 11,774
12 Claims. (Cl. 101—279)

This invention relates to paper feeders for presses and particularly to feeding corrugated paperboard to a press having a reciprocating bed arranged with a die and/or printing form and a roller rotating above and cooperating with the bed die to score and cut and/or print the paperboard fed to the roller.

It is an object of the invention to provide a feeder which adjusts itself to the paper sheets which vary not only in size, weight and thickness but vary from each other in that many sheets are curled and warped.

It is another object of the invention to automatically operate the feeder by the reciprocatory movement of the press bed which facilitates adjusting the press and feeder with a full paper hopper without causing the feeding of a sheet and facilitates freeing of a jammed sheet.

It is another object of the invention to reduce the number of moving parts whereby the feeder cannot be easily damaged.

It is another object of the invention to provide a kicker bar which will not be damaged if rear guide members of the paper hopper are set too close to the kicker bar.

It is another object of the invention to provide a kicker bar which does not require skilled personnel to adjust the press to a specific position before adjusting the kicker bar to feed a desired size of paper sheets.

It is a further object of the invention to provide the feeder with flexible delivering members automatically adjusted to desired positions during the delivering of a sheet from the kicker bar to the press roller whereby the proper feeding of curled or warped sheets is assured.

A further object of the invention is to provide guide members for the paper hopper which are readily adjusted and secured in adjusted positions.

Another further object of the invention is to provide stop members arranged with resilient fingers and a side register buffer mechanism for adapting the feeder to accurately feed paper sheets of less width than the maximum width handled by the feeder.

Other objects and advantages of the invention will be set forth in the detailed description of the invention.

In the drawings accompanying and forming a part of this application:

FIGURE 1 is a side view of our paper feeder mounted on a press;

FIGURE 2 is a plan view of the paper feeder looking from the line **2—2** of FIGURE 1 in the direction of the arrows;

FIGURE 3 is a rear view of the feeder looking from the line **3—3** of FIGURE 1 in the direction of the arrows;

FIGURE 4 is a sectional view, on an enlarged scale, taken on the line **4—4** of FIGURE 3 looking in the direction of the arrows and showing a stack of paper sheets supported in a hopper with the kicker bar in its rearmost position;

FIGURE 5 is a view similar to FIGURE 4 showing the kicker bar in an advanced feeding position;

FIGURE 5*a* is a fragmentary sectional view of a modified form of kicker bar and rear guide members;

FIGURE 6 is a sectional view, on an enlarged scale, taken on the line **6—6** of FIGURE 2 looking in the direction of the arrows and showing the flexible delivering members positioned to receive a paper sheet from the kicker bar;



FIGURE 7 is a view similar to FIGURE 6 showing the flexible delivering members positioned to deliver the paper sheet to the press roller;

FIGURE 8 is a front view, on an enlarged scale, looking in the direction of the arrows from the line **8—8** of FIGURE 1 to show the adjustable mounting of front and side guide members of the hopper;

FIGURE 9 is a sectional view taken on the line **9—9** of FIGURE 8 looking in the direction of the arrows to show the adjustable mounting of a front guide member;

FIGURE 10 is a sectional view taken on the line **10—10** of FIGURE 9 looking in the direction of the arrows to show the vertical adjustable mounting of the front guide member;

FIGURE 11 is a sectional view taken on the line **11—11** of FIGURE 8 looking in the direction of the arrows to show the adjustable mounting of a side guide member;

FIGURE 12 is a rear view, on an enlarged scale, looking from the line **12—12** of FIGURE 1 in the direction of the arrows to show adjusting means for the flexible delivering members and for paper stop members positioned at the delivery end of the flexible delivering members;

FIGURE 13 is a side view of the adjusting means shown in FIGURE 12;

FIGURE 14 is a sectional view, on an enlarged scale, taken on the line **14—14** of FIGURE 4 looking in the direction of the arrows to show an adjustable mounting of the kicker bar and means to retain a rear guide member of the hopper in adjusted position with one side of the hopper, kicker bar and rear guide member broken away;

FIGURE 15 is a sectional view taken on the line **15—15** of FIGURE 14 looking in the direction of the arrows to show the adjustable mounting of the kicker bar;

FIGURE 16 is a top view of a resilient finger mounted on the kicker bar for engaging the lowermost paper sheet in a stack of paper sheets in the hopper;

FIGURE 17 is a fragmentary plan view of the delivery end portions of the flexible delivering members and the press roller showing the paper stop members arranged with resilient fingers and a side register buffer mechanism to adapt the feeder for small size paper sheets;

FIGURE 18 is a side view of the buffer mechanism looking from the line **18—18** of FIGURE 17 in the direction of the arrows;

FIGURE 19 is a fragmentary side view, on an enlarged scale, of a paper stop member and a resilient finger relative to the press roller;

FIGURE 20 is a rear view, on an enlarged scale, of the buffer mechanism looking from the line **20—20** of FIGURE 19 in the direction of the arrows;

FIGURE 21 is a side view of the buffer mechanism looking at the right hand side of FIGURE 20;

FIGURE 22 is a view similar to FIGURE 19 showing the paper sheet being engaged by the press roller fingers and the flexing of the resilient finger by said engagement; and

FIGURE 23 is a cross sectional view of the buffer mechanism taken on the line **23—23** of FIGURE 20 looking in the direction of the arrows.

The invention is illustrated in association with a press used for scoring and cutting sheets of corrugated paperboard in a predetermined arrangement to form a carton or box and in some instances printing on said corrugated paperboard simultaneously with the scoring and cutting operation. Only the paper feeding end portion of the press is shown and includes a frame **17** reciprocally supporting a bed **18** on a horizontal plane below a roller **19** rotatably supported between vertically spaced standards **20** of the frame **17** by a power driven shaft **21** extending

transversely of the bed **18**, as shown in FIGURE 1. The bed **18** is arranged to carry a die form **22** to be reciprocated below the roller **19** in contact with a corrugated paperboard sheet being moved by the roller. The mechanisms for reciprocating the bed and rotating the roller have been omitted as they do not form a part of the invention. The reciprocatory movement of the bed **18** is cushioned by a pair of aircushion cylinders **23** mounted on each end of the frame **17** and a corresponding pair of pistons **24** carried by the opposite ends of the bed **18** to enter the corresponding cylinders **23** as the bed approaches said cylinders. There are shown only the pair of aircushion cylinders **23** at the rear of the frame **17** which cushion the retrograde movement of the bed **18**. A corrugated paperboard sheet is moved by the roller **19** by the rotation of the roller and by having the forward end portion of said sheet gripped by a row of spaced fingers **24'**, FIGURES 7 and 22, pivoted within the roller and extended through an opening **25** in the roller to grip the sheet against an edge of said opening **25**.

The embodiment of the invention includes a hopper for supporting a stack of corrugated paperboard comprising a bed **26** supported from the frame **17** by a pair of braces **27** fixed at the bottom to a base of the frame **17** and fixed at the top to the rear end of the bed **26** and a pair of braces **28** fixed at the bottom to the top of the frame **17** and at the top to the front end of the bed **26**. The braces **27** and **28** extend from the frame **17** at diverging angles and the upper ends of the braces **28** terminate in a lower horizontal plane than the upper ends of the braces **27** so that the hopper bed **26** will decline from the braces **27** to the braces **28** at an angle to the press bed **18**, as shown in FIGURE 1. The corrugated paperboard sheets, as shown at *s* in FIGURES 4, 5, 5*a*, 6 and 7, are retained in vertical alignment on the hopper bed **26** by front guide members **29**, side guide members **30** and rear guide members **31**. The front guide members **29** and the side guide members **30** are adjustably supported by a slide-bar **32** supported at the ends from the braces **28** by standards **33** with the slide-bar extending transversely above the front end of the hopper bed. The front guide members **29** are in the form of two vertical strips, each strip having a pair of spaced guideway members **34** fixed thereto for the sliding engagement of a bracket **35** having the lower portion slidably mounted on the slide-bar **32**, as at **36**, and a lateral extension **37** at the upper end of the bracket **35**. The front guide member **29** is adjustably connected to the bracket **35** by an adjustment screw **38** rotatably supported in a lateral extension **39** of the front guide member and engaged in a screw-threaded opening in the lateral extension **37** whereby turning the screw **38** in one direction will raise the front guide member **29** and the turning of the screw **38** in the opposite direction will lower the front guide member **29**. The bracket **35** is retained in adjusted position on the slide-bar **32** by an abutment screw **40** adjustably mounted in the sliding portion **36** to abut the slide-bar **32**, as shown in FIGURES 8 and 9. The front guide members **29** are adjusted by the screws **38** to position the lower edges of the front guide members **29** a distance above the hopper bed **26** slightly greater than the thicknesses of the sheets of corrugated paperboard supported by the hopper bed **26** to permit feeding of the lowermost sheet from the hopper bed **26**. The sliding adjustment of the brackets **35** on the slide-bar **32** permits the proper guiding of sheets of corrugated paperboard of different widths.

The side guide members **30** are in the form of two vertical strips, each strip having an angle member **41** attached to said strip and to a slider **42** slidable on the slide-bar **32** and having an abutment screw **43** to abut the slide-bar and retain the slider **42** and the side guide member **30** in adjusted position. The sliding adjustment of the sliders **42** will move the side guide members toward and away from each other to accommodate corrugated paperboard of different widths.

The rear guide members **31** are in the form of quadrilaterals having parallel top and bottom portions **44**, **45**, respectively, and rear and front portions **46**, **47**, respectively, converging from the bottom portion **45** with the rear portion **46** extending from the bottom portion **45** at a more acute angle than the front portion **47**, as shown in FIGURES 1, 4 and 5. In the present illustration of the invention, there are shown four guide members **31** but the number can be varied depending on the size of the feeder and the type of paper being fed. The guide members **31** are spaced along a bar **48** with said guide members fixed to the bar at the bottom portions **45** adjacent to the front portions **47** and the rear portions of the guide members **31** supported by a foot **49** attached to each bottom portion **45** adjacent to each rear portion **46**, as shown in FIGURES 1, 3, 4 and 5. The bar **48** and feet **49** are slidably supported on the hopper bed **26** with the opposite ends of the bar terminating at the opposite sides of the bed **26**. The bar **48** is adjusted toward and away from the front and side guide members **29** and **30**, respectively, to accommodate sheets *s* of different lengths. Due to the inclination of the front portions **47** of the guide members **31**, the rear edges of the lowermost sheets are engaged by said portions **47** with the rear edges of the uppermost sheets gradually spaced from said portions **47** with the front edges of the sheets above the lowermost sheet abutting the front guide members **29**, as shown in FIGURES 4 and 5, so that the sheets will extend in a plane converging with the plane of the hopper bed **26** at the rear of the front guide members **29** for a purpose to be described hereinafter. The lowermost sheet will be in register with the space between the hopper bed and the bottom edges of the front guide members **29**. The rear guide member bar **48** is retained in adjusted position by clamping members comprising a hand lever **50** pivoted on a bracket **51** fixed to each end of the bar **48** and the lever **50** connected by a pair of links **52** to an arm **53** pivoted on the bracket **51** and having an adjustable abutment **54** to engage a side member of a supporting frame **55** of the hopper bed **26**, as shown in FIGURES 1, 2, 3 and 14.

During the reciprocation of the press bed **18** toward the press roller **19**, the lowermost sheet *s* on the hopper bed **26** is fed below the front guide members **29** by a kicker bar **56** supported to reciprocate in a plane parallel to and above the hopper bed **26** by a plate **57** slidably mounted below the hopper bed **26** by rod bearings **58** mounted at the opposite ends in supporting members **59** fixed to the front and rear members of the frame **55**, as shown in FIGURES 1, 3, 4, 5, 8, 14 and 15. The plate **57** is supported on the bearings **58** by journals **60** fixed to the bottom of the plate **57** and slidable on the bearings **58**. The kicker bar **56** is adjustably supported on the plate **57** by a pair of channeled guideways **61** fixed to the top of the plate **57** and having opposed flanges **62** at the top of the channel. The top portion of each guideway **61** extends in a slot **63** of a pair of parallel slots extending from the rear edge and spaced from the front edge of the hopper bed, as shown in FIGURE 2. A clamping member **64** is slidable in each guideway **61** and is provided with a vertical projection **65** to extend between and above the flanges **62**. The kicker bar **56** is releasably connected to each vertical projection **65** by a screw **66** rotatable in the kicker bar and screw-threaded in each clamping member **64** whereby the loosening of the screws **66** will permit adjustment of the clamping members **64** and kicker bar **56** in the guide members **61** and the tightening of the screws **66** will draw the clamping members **64** against the flanges **62** and draw the projections **65** against the kicker bar **56**, as shown in FIGURE 14.

The kicker bar **56** is provided with spaced fingers **67** of resilient material, such as spring steel, each finger having one end bent to right angle shape and secured to the front of the kicker bar **56**, as shown at **68** in FIGURES 15 and 16, with the major portion of the finger

bent at an obtuse angle to the right angled portion **68** and extended rearwardly over the kicker bar **56**. The free end of each finger **67** is provided with an abutment member **69** fixed to the upper surface of the finger with the forward edge of the abutment member serrated, as at **70** in FIGURE 16, and the rear edge portion curved downwardly, as at **71** in FIGURE 15, to facilitate the retrograde movement of the kicker bar **56** below the stack of sheets *s* on the hopper bed **26**. The diverging position of the stack of sheets *s* will also facilitate the retrograde movement of the kicker bar **56**. The serrated edges **70** of the resilient fingers **67** will assure the firm engagement of the rear edge of the lowermost sheet *s* on the hopper bed **26**, as shown in FIGURES 4 and 5.

The kicker bar **56** is reciprocated by the movement of the press bed **18** through the air pressure in the aircushion cylinders **23**. This is accomplished by a two-way air cylinder **72** mounted on the rear portion of the frame **55** and the front end of the cylinder **72** is connected by a hose **73** in air communication with the aircushion cylinders **23** mounted at the rear end of the frame **17**, as shown in FIGURES 1 and 3, and the rear end of the cylinder **72** is connected by a hose **74** in air communication with the aircushion cylinders **23** mounted at the front of the frame **17**. A piston **75**, FIGURE 4, is carried by a bracket **76** fixed to the bottom of the plate **57** and the piston **75** is mounted in the two-way air cylinder **72** whereby the forward movement of the press bed **18** toward the press roller **19** will create air pressure in the cylinders **23** at the front of the frame **17** and force said air pressure into the rear end of the two-way air cylinder **72** which will force the piston **75** to the front of the two-way air cylinder **72** and actuate the kicker bar **56** toward the front and side guide members **29** and **30**, respectively, to engage the abutment members **69** with the rear edge of the lowermost sheet and move said sheet under the front guide members **29**. The retrograde movement of the press bed **18** away from the press roller **19** will create air pressure in the aircushion cylinders **23** at the rear of the press frame **17** and cause the delivery of said air pressure to the front end of the two-way air cylinder **72** and the actuation of the piston **75** to the rear of the two-way air cylinder and of the kicker bar **56** toward the rear guide members **31** to position the abutment members **69** behind the rear edge of the lowermost sheet in the stack. The kicker bar **56** is urged toward the rear guide member bar **48** by a spring **77** anchored at one end to the rear portion of the frame **55** and the opposite end of the spring **77** is connected to a post **78** extended from the bottom of the plate **57**, as shown in FIGURES 4, 5 and 14. The reciprocatory movements of the plate **57** are limited by said plate abutting the supporting members **59**, as shown in FIGURES 4 and 5.

FIGURE *5a* shows a modified form of kicker bar and rear guide members. Said modified kicker bar comprises a bar **138** of greater width than the bar **56** but of approximately the length of the kicker bar **56**, as shown in FIGURE 2. The bar **138** is provided with the bevelled-faced recesses **139** and **140** in the opposite edge portions, the recess **139** being deeper than the recess **140** to accommodate paper sheets of greater thickness. The bar **138** is adjustably connected to the plate **57** by the guideways **61**, the clamping members **64** and the screws **66** in the same manner as the kicker bar **56**. The modified rear guide members comprise a U-shaped bar having leg portions **141** resting on the opposite side portions of the hopper bed **26** with a connecting portion **142** extending in a plane above the path of movement of the kicker bar **138**. The rear guide bar **141, 142** is provided with vertical guide members **143** having laterally extending ears **144** secured to equidistantly spaced portions of the bar portion **142** to engage the rear edges of the paper sheets *s* and abut the front edges of the paper sheets against the front guide members **29**. The rear guide bar **141, 142** is retained in adjusted position on the hopper bed **26** in the same manner as the rear guide bar **48** by the clamping members **50—54** mounted on the leg portions **141** of said rear guide bar **141, 142**. To feed paper sheets of greater thickness than that shown in FIGURE *5a*, the screws **66** are removed from the kicker bar **138** and the clamping members **64** and the position of the kicker bar **138** is reversed to position the recess **139** to engage the rear edge portion of the lowermost paper sheet *s* on the hopper bed **26**. After reversing the kicker bar **138**, the screws **66** are replaced in openings **145** in the kicker bar **138** adjacent to the recess **139**.

The forward edge portion of the lowermost sheet *s* after it passes below the front guide members **29** is engaged by means to deliver said sheet to a position to be engaged by the fingers **24'** of the press roller **19**. Said means comprises two series of endless belts **79** and **80**, the series of belts **79** being superposed to the series of belts **80**. The upper series of belts **79** are supported by rollers **81** and **82** secured to spaced portions of the shafts **83** and **84**, respectively. The opposite ends of the shaft **83** are rotatable in bearings **85** pivotally mounted on the standards **33**, as shown at **86** in FIGURES 1, 2, 4 and 5. The opposite ends of the shaft **84** are rotatably supported in bearings **87** fixed on one end of arms **88** having the opposite ends rotatable on the shaft **83** adjacent to the bearings **85**. The lower series of belts **80** are supported by rollers **89** and **90** secured to spaced portions of shafts **91** and **92**, respectively. The opposite ends of the shaft **91** are rotatable in bearings **93** supported on the braces **28**. The opposite ends of the shaft **92** are rotatable in bearings **94** supported by the press frame **17**. By the pivotal mountings of the rollers **81** and **82**, the opposite end portions of the upper series of belts **79** are individually adjustable toward and away from the corresponding end portions of the lower series of belts **80**. The rollers **81, 82, 89** and **90** are equidistantly spaced from each other on the respective shafts **83, 84, 91** and **92**. The rollers **81** and **89** are of the same diameter, and the rollers **82** and **90** are of the same diameter and smaller than the diameters of the rollers **81** and **89** so that the upper and lower stretches of each series of belts **79** and **80** converge from the rollers **81** and **89** to the rollers **82** and **90**, as shown in FIGURES 1, 6 and 7.

During the entire feeding operation, the belts **79** and **80** are continuously actuated to travel in the same direction by an electric motor **95** mounted on one of the braces **28**, as shown in FIGURES 1 and 2, and connected by a belt **96** to one end of the shaft **91** so that the lower series of belts **80** are driven directly from the motor **95**. The shaft **91** is operatively connected to the shaft **83** by meshing gears **97** fixed on said shafts **91** and **83** and having their teeth more deeply cut than usual to assure engagement with one another in all adjusted positions of the shaft **83**, as shown in FIGURES 4 and 5. As shown by the arrows in FIGURE 6, the shafts **83** and **91** are rotated in opposite directions so that the lower stretches of the belts **79** will travel in the same direction as the upper stretches of the belts **80**.

The shaft **83** is adjusted toward and away from the shaft **91** by a cam disk **98** secured on a shaft **99** rotatably supported in the press frame **17** and rotated by the mechanisms of the press, not shown. A cam follower **100** is rotatable on one end of an arm **101** pivoted on a stud **102** extended from the press frame **17**, so that the follower **100** will engage the cam disk **98**, as shown in FIGURES 1, 12, and 13. An intermediate portion of the arm **101** is pivotally connected to one end of a link **103** having the opposite end pivotally connected to a double-arm crank **104** secured on one end of a shaft **105** rotatably supported on opposite side members of the press frame **17** so that the shaft **105** is extended transversely of the frame **17**. The crank **104** is pivotally connected to one end of a rod **106** having the opposite end pivotally

connected to one of the bearings **85**, as shown at **107** in FIGURES 1 and 2. The opposite end of the shaft **105** is arranged with a single arm crank **108** pivoted to the lower end of a rod **109** having its upper end pivoted to the other bearing **85**, as shown at **110** in FIGURES 2, 4, 5, 6 and 7. The follower **100** is urged into engagement with the disk **98** by springs **111** anchored to the press frame **17** and connected to the connections **107** and **110**. The shaft **84** is adjusted toward and away from the shaft **92** by a cam disk **112** secured to the shaft **99** and engaged by a follower **113** rotatable on an intermediate portion of an arm **114** rotatable at one end on the stud **102** and the opposite end of said arm **114** pivoted to one end of a link **115** having the opposite end pivoted to one arm of a double-arm crank **116** secured to one end of a shaft **117** rotatably supported at both end portions on the press frame **17**. The other arm of the crank **116** is pivotally connected to one end of a rod **118** having the other end pivotally connected at **119** to one of the arms **88** adjacent to one of the bearings **87**. The other end of the shaft **117** is provided with a single arm crank **120** pivotally connected to a rod **121** pivotally connected to the other arm **88** adjacent to the other bearing **87**, as shown at **122** in FIGURES 6 and 7. The follower **113** is urged into engagement with the disk **112** by springs **123** anchored to the press frame **17** and connected to the connections **119** and **122**.

The cam disks **98** and **112** are arranged as shown in FIGURES 1, 12 and 13, whereby the high portion of the cam disk **98** will engage the follower **100** and raise the rollers **81** from the rollers **89** to position the adjacent portions of the lower stretches of the belts **79** in spaced relation to the corresponding portions of the upper stretches of the belts **80** to receive the forward edge portion of the lowermost sheet *s* being advanced below the front guide members **29** by the finger abutments **69**, or either of the recesses **139** or **140**, as shown in FIGURE 6. When said sheet *s* has been advanced by the belts **79**, **80** to a point where the forward edge portion of the sheet *s* approaches the press roller **19**, the high portion of the cam disk **112** will engage the follower **113** raising the rollers **82** from the rollers **90** whereby the lower stretches of the belts **79** will be out of contact with the sheet *s*, as shown in FIGURE 7. The raising of the opposite portions of the belts **79** facilitates the handling of curled and warped sheets *s*. The raising of the rollers **82** also facilitates the engagement of the forward edge portion of the sheet *s* by the fingers **24'** of the press roller **19**. When the high portion of the cam disk **98** engages the follower **100**, the low portion of the cam disk **112** will engage the follower **113**, and when the high portion of the cam disk **112** engages the follower **113**, the low portion of the cam disk **98** will engage the follower **100**. As shown in FIGURES 6, 7 and 13, the high portion of the cam disk **112** is of greater extent than the high portion of the cam disk **98** so that the rollers **82** will be raised to a greater distance and for a longer period of time than the rollers **81**.

The forward portion of the sheet *s* is held in the declining angle of the hopper bed **26** and the upper stretches of the lower belts **80** to be engaged by the fingers **24'** of the press roller **19**. This is accomplished by a pair of stop members **124**, each member adjustably mounted on a bracket **125** adjustable on a shaft **126** rotatably supported at the opposite ends in bearings **127** mounted on the press frame **17**, as shown in FIGURES 1 and 2. Side guides **128** are secured on the shaft **126** and a transverse guide roller **129** is supported by the side guides **128**, as shown in FIGURES 6 and 7, to center the sheet relative to the press roller **19**. The stop members **124** and the side guides **128** are adjusted to extend in the plane of the hopper bed **26** and the upper stretches of the lower belts **80** when the rollers **82** are positioned adjacent to the rollers **90** and the stop members **124** and side guides **128** are adjusted to extend at a declining angle from the plane of the hopper bed **26** and the upper stretches of the lower belts **80** when the rollers **82** are spaced from the rollers **90**. This is accomplished by a cam disk **130** secured on the shaft **99** and engaged by a follower **131** rotatable on a forked end **132** of a rod **133** having the opposite end pivoted to a sleeve **134** adjustably mounted on a rod **135** secured to the shaft **126**. The forked end **132** straddles the shaft **99**, as shown in FIGURES 1, 12 and 13. The follower **131** is urged into engagement with the disk **130** by a spring **136** anchored to the press frame **17** and connected to a projection **137** fixed to the shaft **126**. The shaft **99** is rotated in synchronism with the rotation of the press roller **19** so that the cams **98**, **112**, **130** adjust the rollers **81**, **82** and the stop members **124** in unison with the positioning of the fingers **24'** into engagement with the forward edge portion of the sheet *s*.

To accommodate paper sheets *s* of less width than the width of the feeder as shown in FIGURES 17 to 23, inclusive, there are provided stop members **146** similar to the stop members **124** but said stop members **146** are fixed to or integral with brackets **147** adjustably mounted on the shaft **126**, so that the stop members **146** are adjusted in the same manner as the stop members **124** by the cam disk **130** and follower **131**. The sheet *s* is frictionally retained on the stop members **147** by resilient fingers **148**, such as spring steel, carried by brackets **149** adjustably mounted on a shaft **150** secured at the opposite ends in brackets **151** mounted on the standards **20**. The brackets **147** and **149** are adjusted on the shafts **126** and **150**, respectively, so that the resilient fingers **148** will extend longitudinally of the stop members **146** with the paper sheet *s* fed between the stop members **146** and the resilient fingers **148**, as shown in FIGURE 19. Each pair of stop member and resilient finger is adjusted along the shafts in spaced relation to adjacent pairs of stop members and resilient fingers, the spaces between the pairs of stop members and resilient fingers depending on the width of the paper sheets being fed. When the fingers **24'** of the press roller **19** engage the paper sheet *s*, the fingers **148** will be flexed, as shown in FIGURE 22. For the purpose of illustration, there are shown four stop members **146** and resilient fingers **148** which are adjusted on the shafts **126** and **150**, respectively, to engage a paper sheet having a width of approximately two-thirds of the maximum width handled by the feeder shown. In FIGURES 1, 2, 6 and 7, there are shown only two stop members **124**, and it is understood that the number of stop members **124** may be increased according to the type of paper sheets being handled. To maintain the paper sheet centrally of the stop members **146** and the resilient fingers **148**, there is provided a side register buffer mechanism comprising a plate **152** having the rear edge portion curved outwardly, as at **153**, to facilitate the forward movement of the paper sheet *s*. Said plate **152** is secured to a rod **154** slidably supported in bearings **155** adjustably suspended from the shaft **150**. The plate **152** is reciprocated toward and away from a side edge of the paper sheet to properly position said paper sheet between the stop members **146** and the resilient fingers **148** by the vertical movement of the press roller **19**. The press roller **19** is moved in a vertical plane toward the press bed **18** during the forward movement of said press bed to apply pressure to the paper sheet traveling with the press bed and roller for scoring and cutting said paper sheet. To accomplish this, the opposite ends of the roller shaft **21** are rotatably supported in bearings **156** slidably supported in the standards **20** and yieldingly urged to their uppermost position by springs **157**, as shown in FIGURES 1 and 18. Downward movement is imparted to the bearings **156** and the press roller **19** by mechanism associated with the press mechanism for reciprocating the bed **18** and does not form a part of this invention. The downward movement of the press roller **19** moves the plate **152** of the buffer mechanism toward the paper sheet *s* through a bell-crank **158** pivotally mounted on an exten-

sion **159** of one of the brackets **151** on the press standards **20** and having an arm pivotally connected to a bifurcated portion **160** of a sleeve **161** adjustably mounted on the rod **154**. The other arm of the bell-crank **158** is arranged with a slot **162** for the adjustable mounting of a pivot **163** carried by one end of a link **164** pivotally supported at the opposite end on a bracket **165** mounted on one of the sliding bearings **156**. The movement of the plate **152** of the buffer mechanism caused by the downward movement of the press roller **19** will adjust the paper sheet *s* laterally between the stop members **146** and the resilient fingers **148**, as shown in dotted lines in FIGURES 17 and 20. The resiliency of the fingers **148** permits the paper sheet to slide between the stop members **146** and the fingers **148**. The retrograde movement of the press bed **18** will raise the press roller **19** and move the plate **152** from its dotted line position to its full line position, as shown in FIGURES 17 and 20.

Having thus described our invention, we claim:

1. In a paper feeder for a press having a reciprocating bed and a rotating roller above the bed, a hopper having a bed supporting a stack of paper sheets at one end of the press bed, kicker bar slidably mounted below the plane of the hopper bed and extending transversely above said hopper bed, the opposite transverse edge portions of the kicker bar being recessed with one transverse edge portion recessed to a greater depth than the other recessed edge portion for feeding paper sheets of different thicknesses, means to reciprocate the kicker bar actuated by the reciprocation of the press bed, the kicker bar being removably mounted on the reciprocating means to position the proper recessed edge portion for engagement with the lowermost paper sheet on the hopper bed, and means to receive the lowermost paper sheet from the recessed edge portion and move said sheet to a position to be engaged by the press roller.

2. In a paper feeder for a press having a reciprocating bed, a rotating roller above the press bed, air-cushion cylinders fixedly spaced from the opposite ends of the reciprocatory movement of the press bed, pistons carried by the press bed to extend into the air-cushion cylinders and cushion the reciprocatory movement of the press bed, a hopper supporting a stack of paper sheets at one end of the press bed, a kicker bar slidably mounted to have movement longitudinally of the hopper and adapted to move the lowermost paper sheet from the stack, a two-way air cylinder having one end connected in air communication with the air-cushion cylinders at one end of the reciprocatory movement of the press bed and the other end of the two-way air cylinder connected in air communication with the air-cushion cylinders at the opposite end of the reciprocatory movement of the press bed, a piston operatively mounted in the two-way air cylinder and connected to the kicker bar whereby the reciprocatory movement of the press bed reciprocates the kicker bar in the same direction, and means to receive the lowermost paper sheet from the kicker bar and move said sheet to a position to be engaged by the press roller.

3. In a paper feeder for a press having a reciprocatory bed and a rotating roller above the bed, a hopper for supporting a stack of paper sheets adjacent to one end of the press bed, a kicker bar slidably mounted and adapted to move the lowermost paper sheet from the stack toward the press bed, means to reciprocate the kicker bar toward and away from the press bed actuated by the reciprocation of the press bed, two series of continuously travelling spaced endless belts extending from the hopper to the press roller, one series superposed to the other series and the opposite portions of the upper series of belts being adjustable toward and away from the lower series of belts, and means to adjust the portions of the upper series of belts adjacent to the hopper away from the lower series of belts and adjust the portions of the upper series of belts adjacent to the press roller toward the lower series of belts when the kicker bar is reciprocated toward the press bed to receive the lowermost paper sheet from the kicker bar and feed said sheet toward the press roller and adjust the portions of the upper series of belts adjacent to the press roller away from the lower series of belts and adjust the portions of the upper series of belts adjacent the hopper toward the lower series of belts when the leading edge of the lowermost paper sheet between the series of belts approach the press roller to facilitate engagement of the leading edge of said paper sheet by the press roller.

4. In a paper feeder as claimed in claim 3, means to continuously impart travel to the lower series of belts, and means to transmit the continuous travel of the lower series of belts to the upper series of belts in all of the adjusted positions of the upper series of belts.

5. A paper feeder as claimed in claim 3, wherein the hopper is arranged with a bed extending in the plane of travel of the upper stretches of the lower series of belts.

6. A paper feeder as claimed in claim 3, wherein the upper and lower stretches of both the upper and lower series of belts converge toward each other from the hopper to the press roller.

7. In a paper feeder as claimed in claim 3, stop members adjustably mounted between the lower series of belts and the press roller, and means to adjust the stop members to extend in the line of travel of the upper stretches of the lower series of belts and position the lowermost paper sheet relative to the press roller when the portions of the upper series of belts adjacent the press roller are adjusted toward the lower series of belts and adjust the stop members out of the line of travel of the upper stretches of the lower series of belts when the portions of the upper series of belts adjacent the press roller are adjusted from the lower series of belts for admitting the lowermost paper sheet to be engaged by the press roller.

8. A paper feeder as claimed in claim 7, wherein the means to adjust the opposite portions of the upper series of belts and the means to adjust the stop members comprise separate cam disks rotated at the same rate of speed.

9. In a paper feeder for a press having a reciprocating bed and a rotating roller adjustably mounted above the press bed and moved in a vertical plane toward the press bed during the forward movement of the press bed and moved away from the press bed during the retrograde movement of the press bed, a hopper for supporting a stack of paper sheets adjacent to one end of the press bed, a kicker bar slidably mounted and adapted to move the lowermost paper sheet from the stack toward the press bed, means to reciprocate the kicker bar toward and away from the press bed actuated by the reciprocation of the press bed, an upper and lower series of continuously traveling spaced endless belts extending from the hopper to the press roller to receive the lowermost paper sheet from the kicker bar and deliver said paper sheet to the press roller, stop members adjustably mounted between the lower series of belts and the press roller, means to adjust the stop members into and out of the line of travel of the upper stretches of the lower series of belts, a resilient finger mounted above each stop member to engage the upper face of the paper sheet resting on the stop member, a buffer plate reciprocatory toward and away from one side edge of the paper sheet positioned between the stop members and the resilient fingers to properly adjust said paper sheet between said stop members and resilient fingers, and means connected to said buffer plate and actuated by the vertical movement of the press roller to reciprocate the buffer plate toward the edge of the paper sheet during the movement of the press roller toward the press bed and reciprocate the buffer plate away from the edge of the paper sheet during the movement of the press roller away from the press bed.

10. In a paper feeder for a press having a reciprocating bed and a rotating roller above the bed, a hopper having a bed supporting a stack of paper sheets at one end of the press bed and arranged with slots extending longitudinally of the hopper bed, supporting members suspended from the hopper bed adjacent the opposite ends of the slots,

bearings mounted in the supporting members to extend longitudinally below the hopper bed, a plate slidable on the bearings in a plane parallelly spaced below the hopper bed and limited in its sliding movements by the supporting members, guideways mounted on the plate and extended into the slots in the hopper bed and arranged with opposed flanges, a kicker bar having clamping members mounted in the guideways to abut the opposed flanges and adjustably connected to the kicker bar to secure the kicker bar to the guideways in adjusted position for accommodating different size paper sheets and the kicker bar arranged to engage the lowermost paper sheet of the stack, means connected to the plate and actuated by the reciprocation of the press bed to reciprocate the plate, guideways and the kicker bar and move the lowermost sheet from the stack, and means traveling between the hopper and press roller and arranged to receive the lowermost paper sheet from the kicker bar and feed said paper sheet to the press roller.

11. In a paper feeder as claimed in claim 10, a spring connected to a rear portion of the hopper bed and to the plate to yieldingly urge the plate into engagement with the supporting members adjacent the rear ends of the slots.

12. In a paper feeder as claimed in claim 10, air-



cushion cylinders fixedly spaced from the opposite ends of the reciprocatory movement of the press bed, pistons carried by the press bed to extend into the air-cushion cylinders and cushion the reciprocatory movement of the press bed, and the means to reciprocate the plate, guideways and kicker bar comprises a two-way air cylinder suspended from the rear portion of the hopper bed and having the rear end portion connected in air communication with the air-cushion cylinders at the front end of the reciprocatory movement of the press bed and the front end portion of the two-way air cylinder connected in air communication with the air-cushion cylinders at the rear end of the reciprocatory movement of the press bed, and a piston slidable in the two-way air cylinder and connected to the plate, whereby the forward movement of the press bed actuates the kicker bar to move the lowermost sheet from the stack and the rearward movement of the press bed actuates the kicker bar to the rear portion of the stack of paper sheets.

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