Dec. 14, 1954 A. ANDERSON 2,696,983

AUTOMATIC SHEET FEEDER

Filed June 14, 1949 6 Sheets-Sheet 1

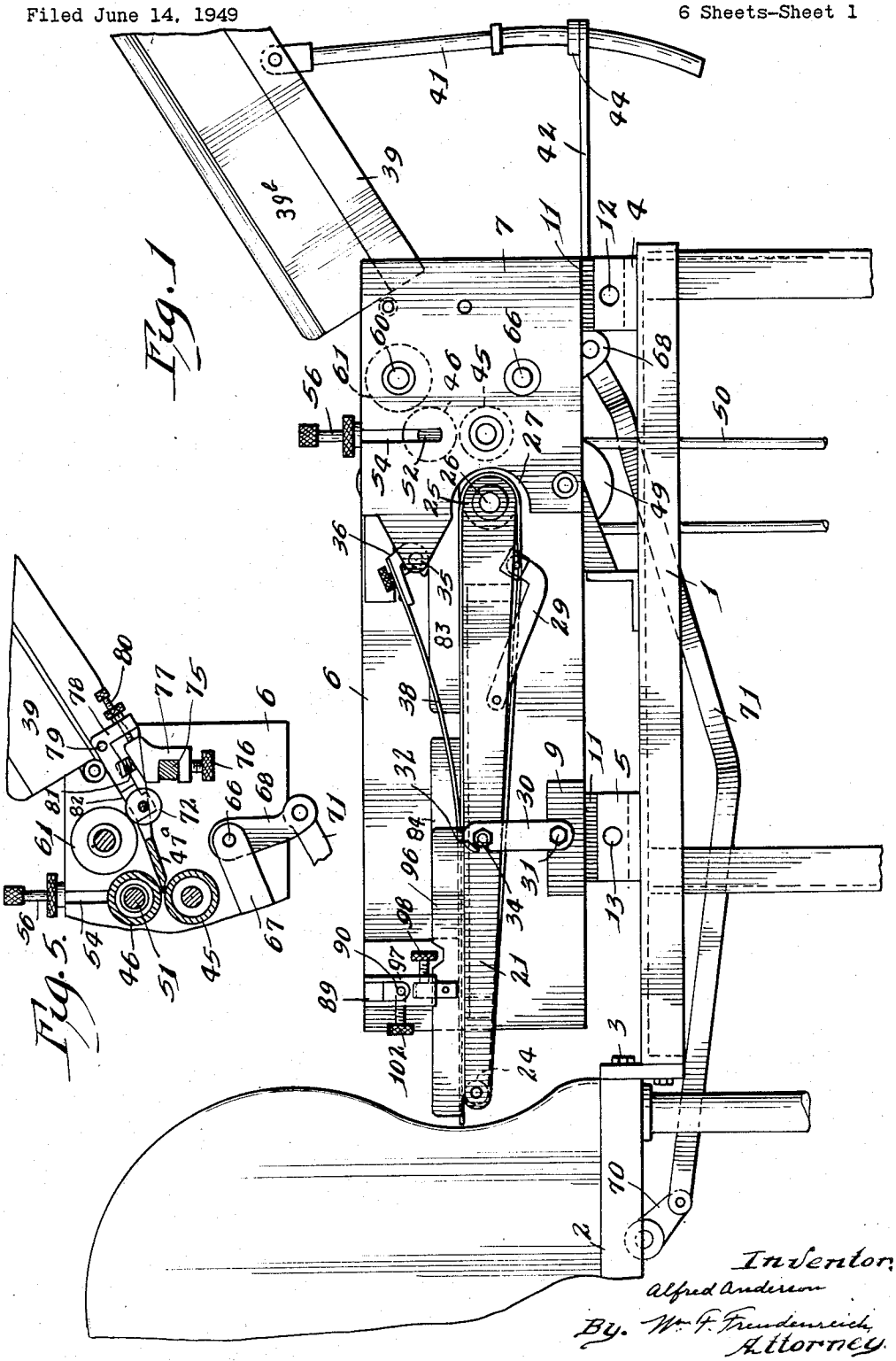


Fig. 1

Fig. 5.

Inventor:
Alfred Anderson
By. Wm. F. Freudenreich,
Attorney.

Dec. 14, 1954 A. ANDERSON 2,696,983

AUTOMATIC SHEET FEEDER

Filed June 14, 1949 6 Sheets-Sheet 2

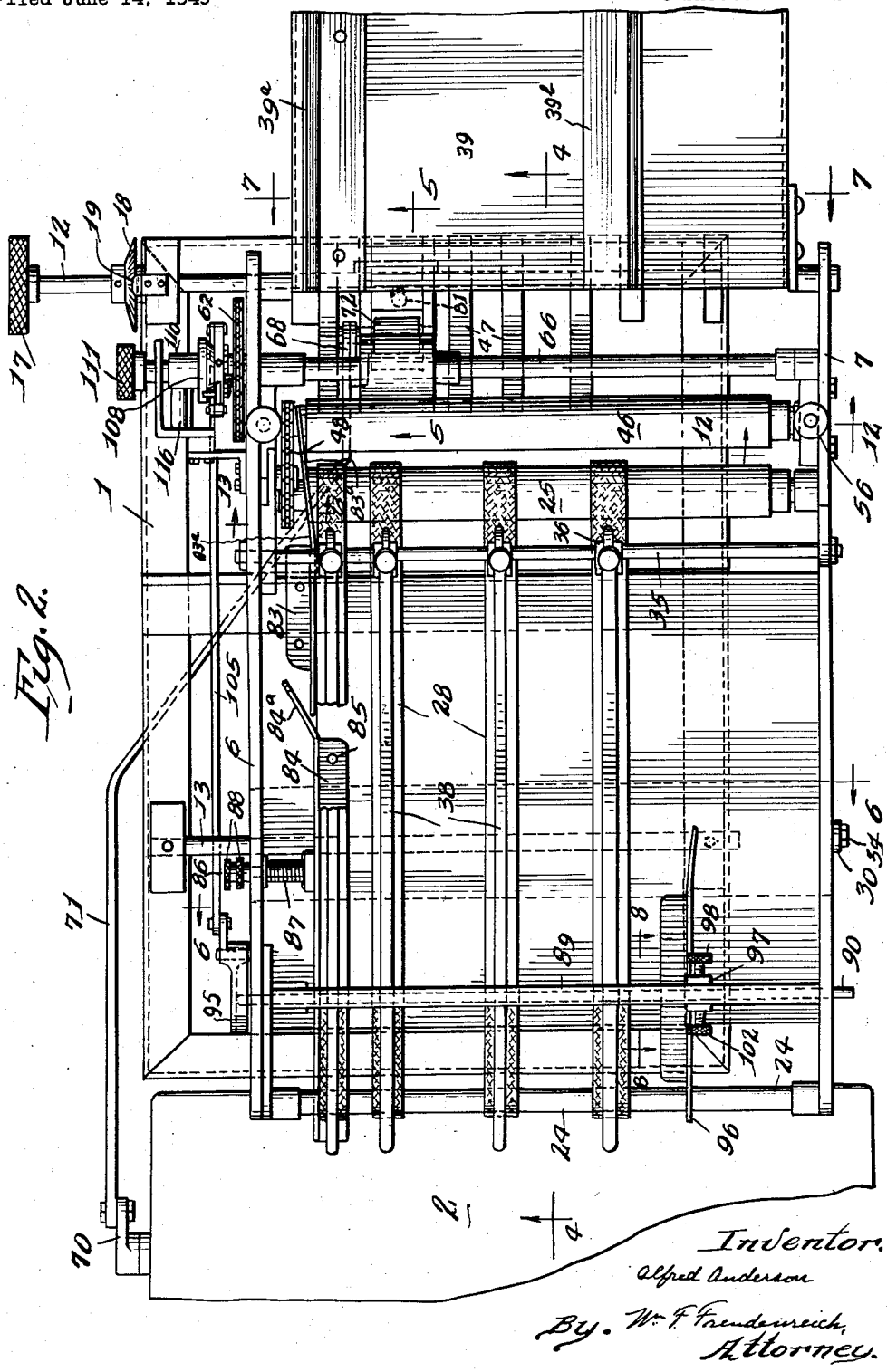


Fig. 2.

Inventor.
Alfred Anderson
By. Wm. F. Freudenreich,
Attorney.

Dec. 14, 1954 A. ANDERSON 2,696,983

AUTOMATIC SHEET FEEDER

Filed June 14, 1949 6 Sheets-Sheet 3

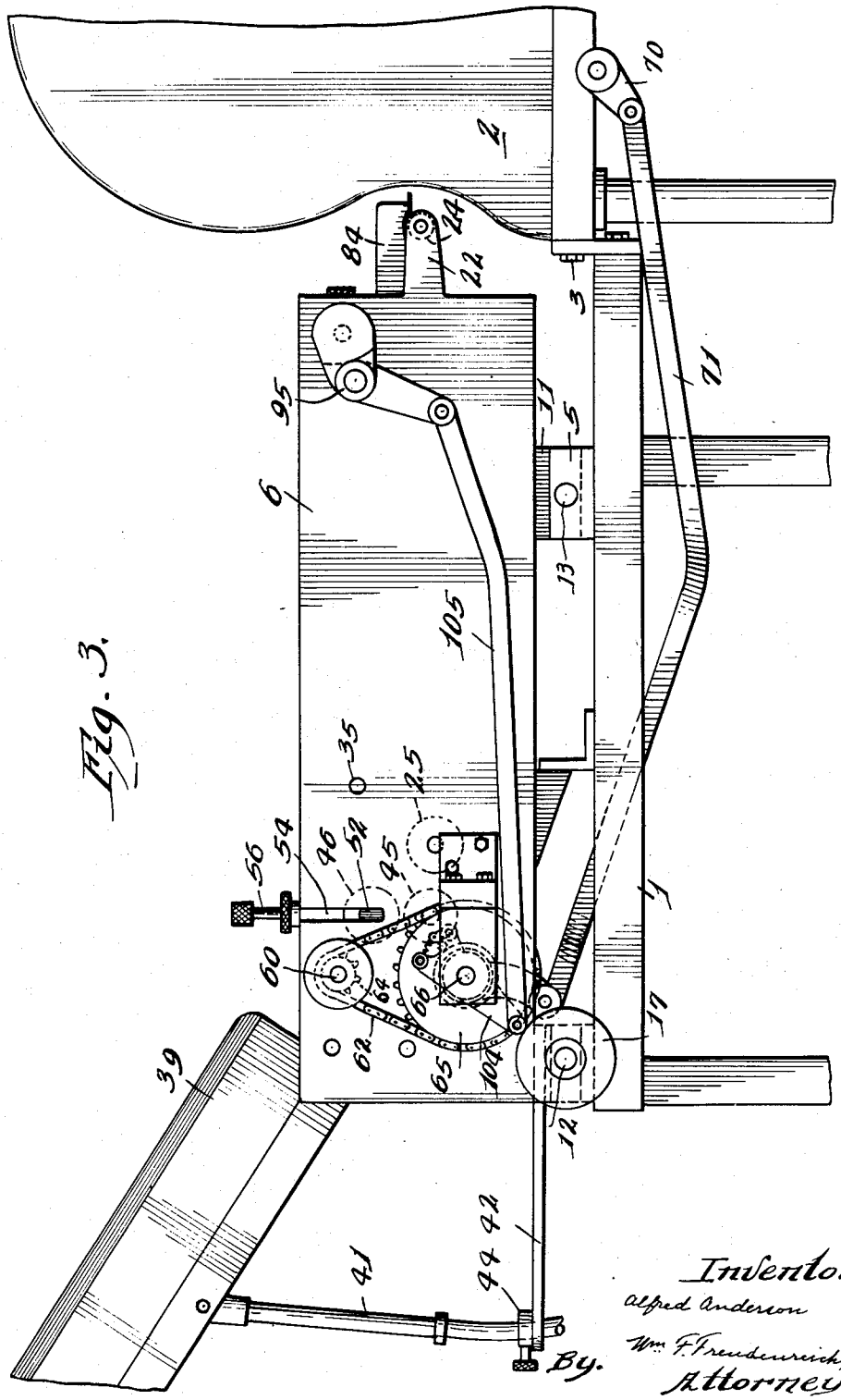


Fig. 3.

Inventor.
Alfred Anderson
Wm. F. Freudenreich,
Attorney.

By.

Dec. 14, 1954 A. ANDERSON 2,696,983

AUTOMATIC SHEET FEEDER

Filed June 14, 1949 6 Sheets-Sheet 4

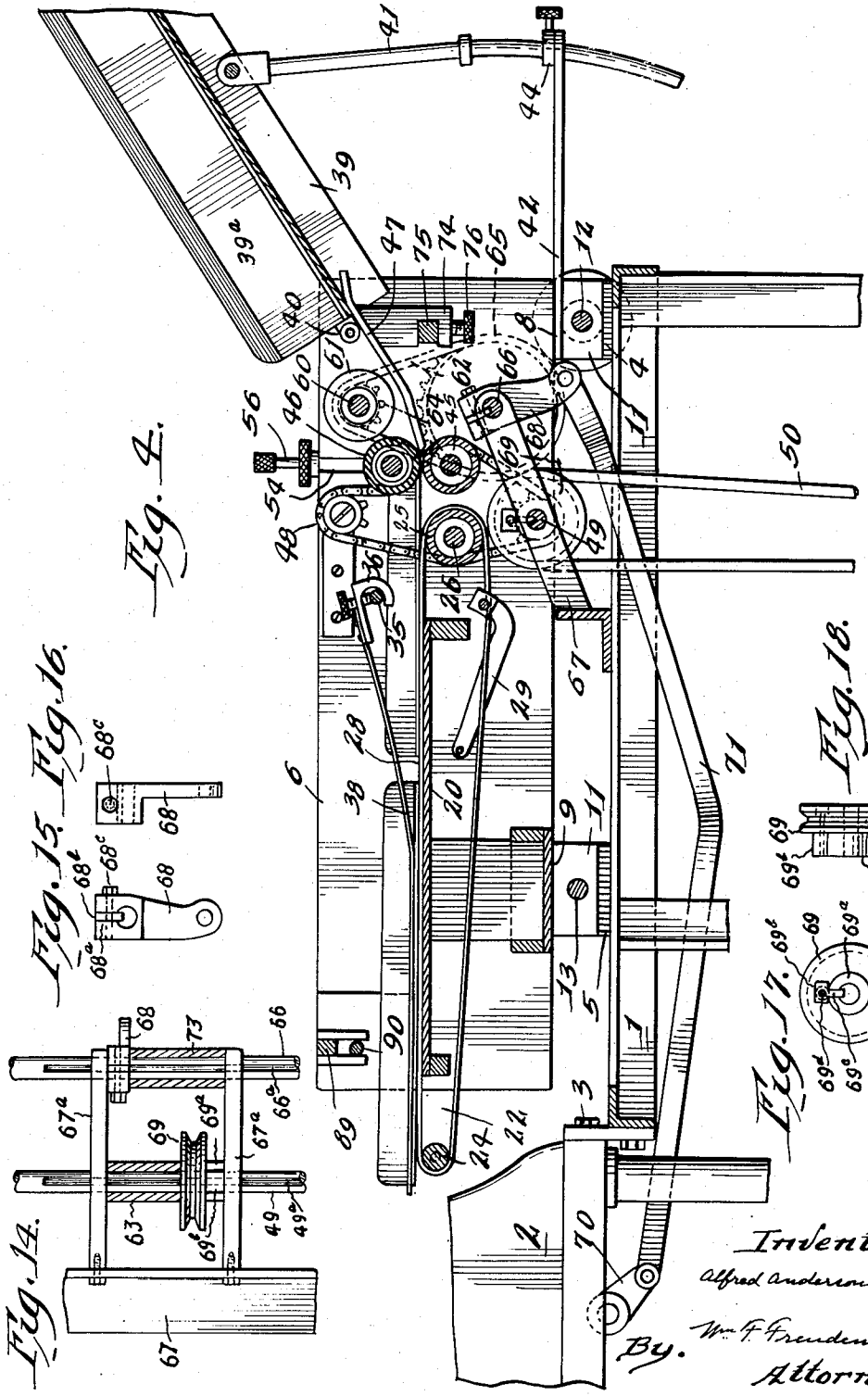


Fig. 4.

Fig. 15.

Fig. 16.

Fig. 14.

Fig. 18.

Fig. 17.

Inventor.
Alfred Anderson
By. Wm. F. Freudenreich
Attorney.

Dec. 14, 1954 A. ANDERSON 2,696,983

AUTOMATIC SHEET FEEDER

Filed June 14, 1949 6 Sheets-Sheet 5

Fig. 6.

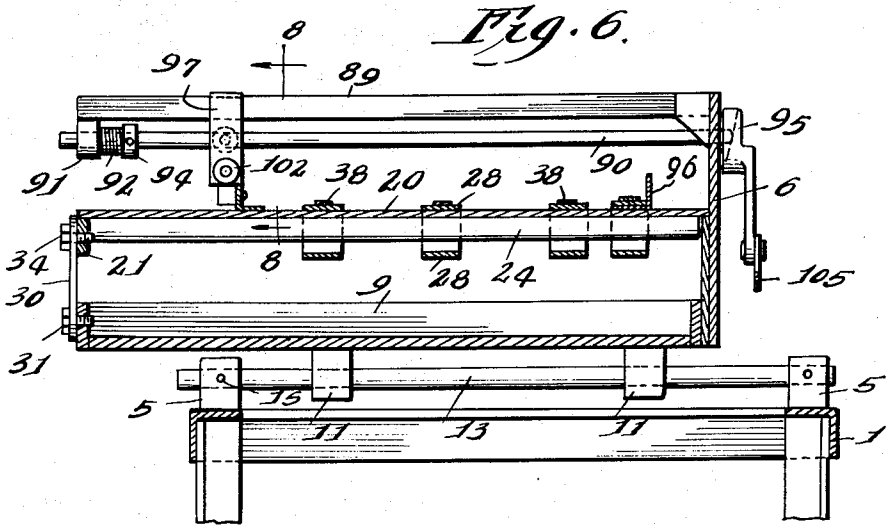


Fig. 7

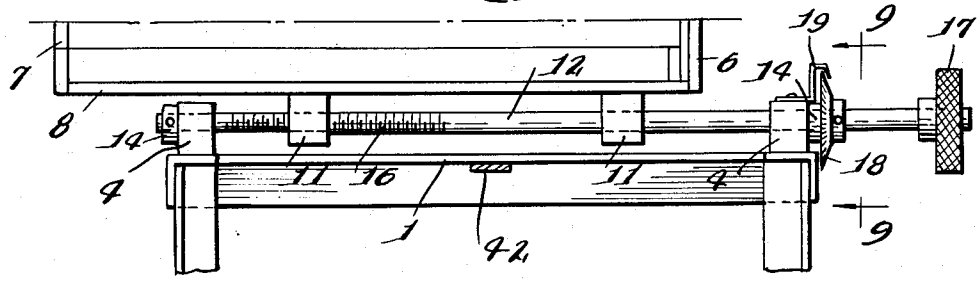


Fig. 8.

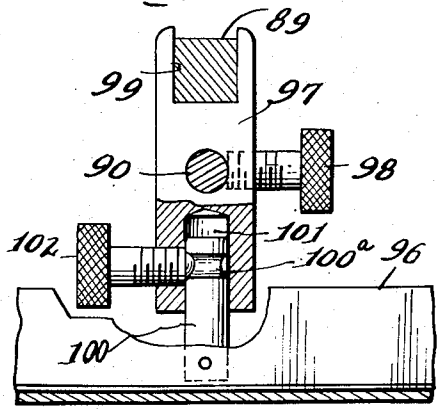
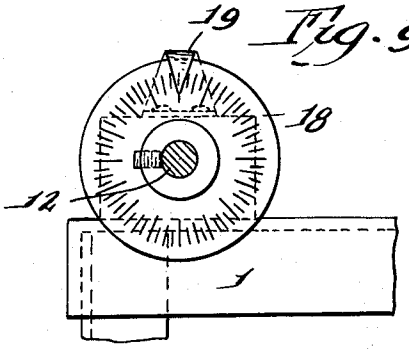


Fig. 9



Inventor:
Alfred Anderson

By. Wm. F. Freudenreich,
Attorney.

Dec. 14, 1954 A. ANDERSON 2,696,983

AUTOMATIC SHEET FEEDER

Filed June 14, 1949 6 Sheets-Sheet 6

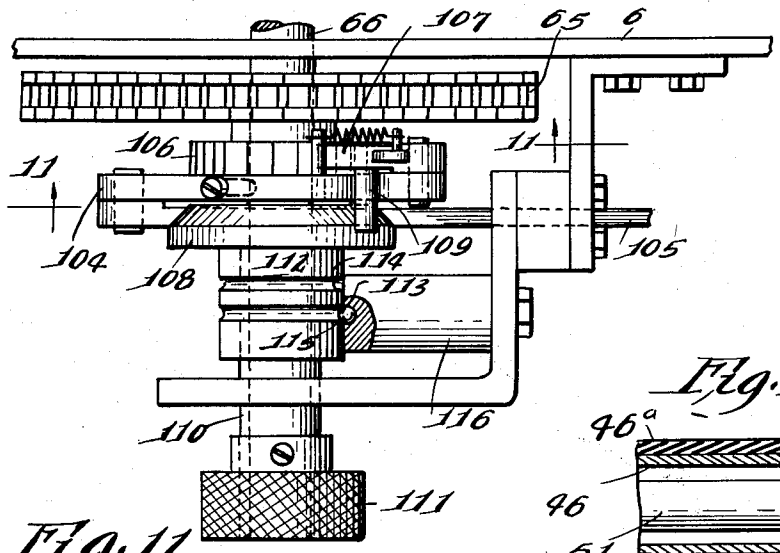


Fig. 11

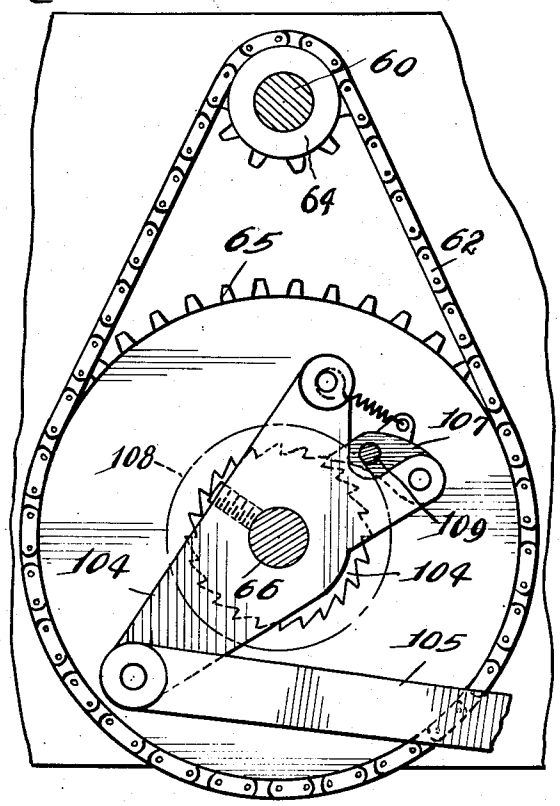


Fig. 10.

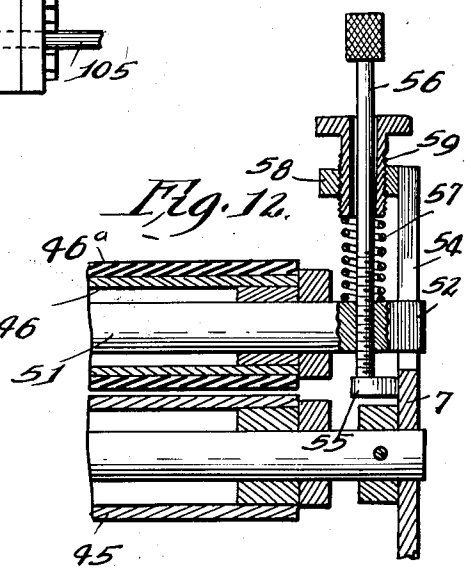


Fig. 12.

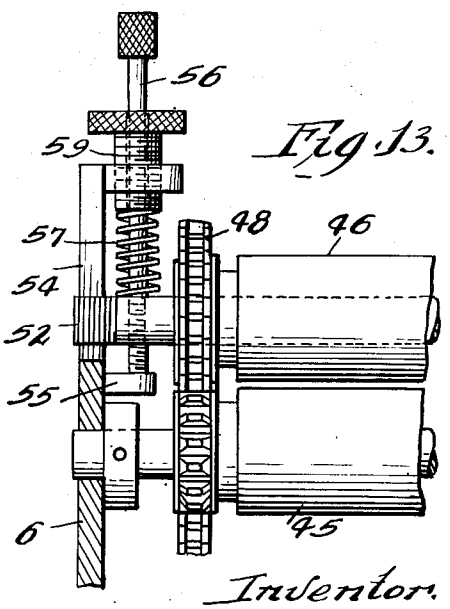


Fig. 13.

Inventor.
Alfred Anderson

By. Wm. F. Frendenreich,
Attorney.

United States Patent Office 2,696,983 Patented Dec. 14, 1954

2,696,983

AUTOMATIC SHEET FEEDER

Alfred Anderson, Elmhurst, Ill.

Application June 14, 1949, Serial No. 99,098

10 Claims. (Cl. 271—59)

There are machines of various types that perform work on individual sheets, which are fed, either by hand or by automatic mechanisms into positions to be further operated upon or handled by such machines. Some times automatic feeders have been built in as a part of the machines which they are to serve and in other cases the feeders have been built separately and then attached to the sheet treating machines.

The present invention relates to such automatic feeders and has for its object to overcome several serious objections to or faults in the prior machines that have come to my attention.

One such fault is that when a sheet treating machine is required to handle sheets of various sizes a plurality of guides in feeders of the old types must be adjusted independently of each other whenever a shift is made from one sheet to sheets that are either narrower or wider. These adjustments are tedious and time taking, and do not always result in satisfactory registration, even though the greatest care be taken in making the adjustments.

One of the objects of the invention is to make the adjustment for different stock widths very simple and easy and yet cause them to insure perfect registration of the stock with the sheet treating mechanism to be served.

To carry out this object I mount the feeder mechanism on a carriage that moves transversely of the direction in which the sheets must travel, so that the sheets may be guided along a member that does not change position with every change in sheet width. That member may be very accurately positioned, along with the carriage, by the use of a screw shaft and a finely calibrated indexing means to shift the carriage bodily.

In the preferred type of feeder to which my invention relates, sheets are fed onto a table embraced by tapes in the form of endless conveyor belts the upper runs of which extend lengthwise of the table and constitute the direct supports for the individual sheets. When one of these belts must be removed or installed, it is necessary, in the prior machines partially to dismantle the same before this can be done.

Another object of the present invention is to make it possible readily to install or remove any conveyor belt without disturbing any other essential part of the machine.

To carry out this last object, I so construct the conveyor table that the endless belts may be slipped off, intact, at one side of the table, this being made possible by supporting the table at one side only, leaving the space above and below the opposite side free from obstruction.

Another feature that has been unsatisfactory in prior machines is the vibrator or "jogger" that acts on sheets traveling over the conveyor tables to achieve side registration. As heretofore made, these devices could not be jumped over the conveyors and so could not be adjusted transversely of the direction of travel of the sheets, as far as is often necessary, without first partially dismantling the machine.

A further object of the present invention is to produce a simple and novel jogger apparatus that shall require only the loosening of two screws on the jogger itself to permit the jogger proper to be moved transversely across and clear of the conveyor belts, from one position to another.

A still further object of the present invention is to improve the means for bringing the sheets from the

magazine to the conveyor table so that not only thin sheets, but also sheets of cardboard thickness and even flattened cartons, may be handled successfully.

Still another object of my invention is to provide a simple and novel means for guiding sheets while traveling over the conveyor table, to make final adjustment for insuring perfect registration when sheets are a little out of square.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of the invention and of its objects and advantages, reference may be had to the following detailed description, taken in connection with the accompanying drawings, wherein:

Figure 1 is a view of the left hand side of a feeding machine, embodying the present invention, formed as a separate unit and bolted to a printing machine of which only a fragment is shown. Fig. 2 is a top plan view of the machine; Fig. 3 is a view showing the right hand side of the machine; Fig. 4 is a section on line **4**—**4** of Fig. 2; Fig. 5 is a section on line **5**—**5** of Fig. 2, showing only a small fragment of the machine; Fig. 6 is a section on line **6**—**6** of Fig. 2; Fig. 7 is a section on line **7**—**7** of Fig. 2; Fig. 8 is a section on an enlarged scale, on line **8**—**8** of Fig. 6; Fig. 9 is a section on line **9**—**9** of Fig. 8, showing only a small fragment; Fig. 10 is a top plan view, on a larger scale than Fig. 2, showing only the clutch for connecting one of the driven shafts to the connecting rod that forms an element of the actuating means for the "jogger," together with some of the parts immediately adjacent to the clutch; Fig. 11 is a section on line **11**—**11** of Fig. 10; Fig. 12 is a section on line **12**—**12** of Fig. 2, but on a larger scale; Fig. 13 is a view, on the same scale as Fig. 12, on line **13**—**13** of Fig. 2; Fig. 14 is a view, partly in section and partly a top plan, showing fragments of two of the shafts and their immediate supports; Figs. 15 and 16 are a side view and an edge view, respectively, of the radial operating arm for one of the shafts in Fig. 14; and Figs. 17 and 18 are a side view and an edge view, respectively, of the pulley on the second of the shafts in Fig. 14.

For the sake of convenience I have illustrated and shall describe a feeder in which the support for the movable carriage, on which all the feeding means are mounted, is a floor stand adapted to be bolted to the frame of a printing machine; **1** representing the floor stand and **2** the printing machine. The stand is rigidly fastened to the printing machine by bolts **3**. Rising from the front end of the stand, at the corners, are two short posts **4**, **4**. Two similar posts, **5**, **5** are located a short distance from the rear end of the stand, one at each side of the latter; the four posts being at the corners of a rectangle. Above the stand is a carriage for the feeder mechanism. The framework for the carriage may take any desired form, that shown comprising a long rectangular plate **6** set on edge at the right hand side of the machine, a short vertical plate **7** at the left hand side, and a sturdy pair of cross beams **8** and **9** fixed to the lower marginal portion of plate **6** and projecting laterally at right angles thereto; beam **9** being fastened to plate **7**. These two beams may be called the base of the structure that constitutes the carriage.

Extending down from beam **8** are a pair of projections **11**, **11**, while a similar pair extends down from beam **9**, the spacing between the projections in each pair being the same and less than that between the posts of each of the aforesaid pairs; and the distance between the pairs of projections being the same as that between the pairs of posts. The superstructure, just described, is placed above the stand, with its projections lying inside of the corresponding posts on the stand. Transverse front and rear rods **12** and **13** extend through and are movable in the aligned projections and posts at the front and rear, to support the superstructure. Rod **12** has collars **14**, **14** pinned on the same on the outer sides of the posts, whereas rod **13** is pinned to posts **5**, **5** as at **15**. Rod **12** has thereon screwthreads **16** by which it is screwed into one of the rear projections.

Upon turning rod 12, the superstructure is shifted transversely of the stand; rod 13 being a sliding fit in the rear projections 11.

The right hand end of rod 12 is extended outward and has thereon a head or knob 17. Fixed to rod 12 is a disc 18 provided with graduations, while a pointer 19 on the adjacent post cooperates with the disc to enable the operator to see just how far the rod is being turned. Fixed at one long edge to frame plate 6 is a horizontal conveyor table 20, situated well above the beam 9 and extended from the rear end of the feeder about two thirds of the distance to the front; the table extending laterally to the plane of short frame plate 7. The table is therefore of cantilever construction, standing free at the left hand edge while supported along its right hand edge. The table has a vertical down-turned flange 21 at its left hand, free edge, and this flange is continued rearwardly beyond the table. Frame plate 6, as shown in Fig. 3, has an arm 22 projecting rearwardly just opposite the rearward extension of flange 21. A transverse roller 24 spans the space between arm 22 and the extended flange 21 and is journalled in these members. A second, larger transverse roller 25 is positioned a little beyond the opposite or front end of the table on a shaft 26 fixed at one end to frame plate 6 and projecting therefrom in the manner of a cantilever. It will be seen that the short, vertical frame plate 7 on the left hand side of the machine is cut away at its rear edge to create a large notch or recess 27 into which roller 25 extends without coming in contact with the plate.

Embracing the conveyor plate and the rollers 24 and 25, are a plurality of endless tapes or belts 28, the upper runs of which lie upon the table. Suitable devices 29, to take up slack and hold the tapes taut, are associated with the lower runs of the tapes. These tapes or belts can be installed by slipping them onto the table and rollers 24 and 25 from the left hand side of the machine, namely that side facing the observer in Fig. 1, because the conveyor unit comprising the table and the two rollers at the ends thereof stand free in space on that side. The belts contain sufficient slack to permit any one of them to be slipped along the rollers 24 and 25 and across the table, without disturbing any other belt, in applying or removing that belt. This is true, even though the left hand side of the table may normally be provided with an easily removable support; such a support conveniently taking the form of a short strut 30, pivoted at 31 to the end of beam 9 and having therein, near its upper end, a notch 32. When the strut is swung up, a headed stud 34 on flange 21 enters this notch, so that the strut serves both as a support for the table and as a latch that holds the left side of the table from moving either up or down. When a belt is to be installed or removed, the latch is first swung down, out of the way.

Extending between the plates 6 and 7, above the front end of the table, is a rod 35, parallel to the axes of the conveyor belt rollers. On this rod are as many little fittings 36 as there are belts, these fittings being loose on the rod so that they may be moved along, or angularly of the axis of, the same. Each fitting is provided with a set screw 37 to fasten it to the rod. Connected at one end to each fitting is a flat, resilient strip 38, somewhat narrower than the belts and long enough to extend rearwardly a little past roller 24. In setting up the machine the fittings are adjusted so that each of the strips overlies one of the belts and lies flat against the same for the greater portion of the length of the strip.

Positioned between the upper parts of frame plates 6 and 7, at the front end of the machine, is the lower end of the usual inclined load magazine 39; hinged to the plates, at 40, in the usual manner; and provided with a depending, swinging leg 41 that extends loosely through a bracket 42, projecting forwardly from the framing of the superstructure, and has thereon an adjustable collar 44 resting on the bracket.

Extending between and journalled at their ends in frame plates 6 and 7, are two feed rollers 45 and 46, arranged one below the other a little in front of the conveyor table unit. Small sheet-supporting rails 47 extend rearwardly and downwardly from the discharge end of the magazine into the valley between the feed rollers that must be entered by the sheets to reach the line at which they are gripped by the rollers. Both feed rollers are positively driven, conveniently by a sprocket chain 48 that runs over sprocket wheels on a drive shaft 49, the feed rollers and the front conveyor roller 25; shaft 49 being caused to rotate by any suitable means as, for example, a power belt 50.

The structure of the main feed rollers and the manner of supporting them are best shown in Figs. 12 and 13. It will there be seen that the lower roller is hard while the upper roller is provided with a covering 46a of rubber or other cushioning material. Since both rollers are positively driven, they take a better bite on sheet material drawn through the same than is possible where one roller is frictionally driven. The lower roller runs in fixed bearings. The upper roller, however, is rotatable on its shaft 51. The ends 52 of this shaft are flattened and extend into deep slots 54, opening down through the upper edges of frame plates 6 and 7. The parts are so proportioned that shaft 51 is held against rotation, but can slide up and down in the slots. Below each slot, on the inner side of the corresponding plate, is a stop 55. A rod 56 is screwed down through each end of the shaft in position normally to rest on the corresponding stop. Surrounding each rod and resting on the shaft is a spring 57. Each of the two frame plates has thereon a lug 58 through which the adjacent screw rod passes and which overlies the spring on that rod. A bushing 59 is screwed into each of these lugs and engages with the upper end of the spring. By turning the rods, the normal gap between the rollers may be varied and, by turning the bushings, the thrust of the springs on the shaft may be increased or decreased. Thus the rollers may be adjusted to handle stock of different thicknesses and the grip on the stock may be varied to suit the needs of the stock that is being fed.

Above the rails 47 is a transverse shaft 60 journalled at its ends in frame plates 6 and 7. On this shaft is a heavy roller 61 that is larger in diameter than the feed rollers and the length of which is only a small fraction of that of the feed rollers. Shaft 60 is driven by a sprocket chain 62 that runs over a sprocket wheel 64 on that shaft and over a much larger sprocket wheel 65 on a transverse shaft 66 that extends between and is supported by frame plates 6 and 7. Shaft 66 is preferably a rock shaft and extends loosely through and is braced by a bracket 67 carried by the floor stand. The rock shaft is provided with a radial operating arm 68.

Since both the rock shaft and the drive shaft 49 must move transversely with the carriage, while the operating arm for shaft 66 and the driven pulley 69 on shaft 49 should not have such transverse movements, provision is made to effect this end. As will be seen from Figs. 4 and 14, both of these shafts extend through bracket 67, that has two arms 67a, 67a. Shaft 49 contains a long keyway 49a, and shaft 66 has therein a similar keyway 66a. Loose on shaft 49 is the driven pulley 69, positioned between the two arms of the bracket. Arm 68 is loose on shaft 66 and is also located between the bracket arms. Placed against the periphery of hub 69a on the pulley is a little block 69b that is provided with a key 69c entered in the keyway in shaft 49; the block being secured to the pulley by a screw 69d. The pulley is placed close to one arm of the bracket and is held away from the second arm by a long spacing sleeve 63 surrounding the shaft. Arm 68 contains a slot 68a in which there is a key 68b entered in keyway 66a in shaft 66; the key being held in place by a screw 68c. A sleeve 73 on shaft 66 holds the arm against the second arm of the bracket.

Rock shaft 66 is oscillated by means of a long connecting rod 71 connected at one end to arm 68 and at its other end to a crank 70 on the printing machine. Means to cause shaft 66 to turn shaft 60 step by step in one direction will be described later.

Cooperating with roller 61 on shaft 60 is a small retard roller 72, the periphery of which is hard. This roller does not rotate while the machine is operating, but may be reset from time to time to present fresh wearing surface areas. Since the retard roller acts on the stock sliding down over the aforesaid rails 47, I provide a special such rail device to support this roller. Each rail 47 is fixed to the top of a transverse bar 75; a set screw 76, carried by each block serving to secure it to the bar. The special rail device is best shown in Figs. 2 and 5, there being a block 77, the lower part of which is the same as in the blocks 74, whereas the upper part is widened and fashioned into a pair of rails 47a spaced

apart from each other and at their base ends constituting a jaw into which an L-shaped bracket is set. One arm of the bracket extends rearwardly and the other downwardly. A hinge pin **79** allows the bracket to rock. An adjustable stop screw limits the rocking movement of the bracket in one direction, while a light spring **81** tends to hold the bracket at that limit. The set screw is always adjusted that stock passing between feed roller **61** and the retard roller is yieldingly gripped between these two rollers.

The magazine for holding the stock has right and left hand guides, **39a** and **39b**, but, instead of making both of these adjustable in the transverse direction, the right hand guide is made stationary, only the left hand guide being so adjustable. In other words, the left hand guide is adjusted only according to the width of the stock, while adjustment for alignment is made by shifting the feeder bodily on the stand or other support that may be used; and so no time need be wasted to achieve registration, either when changing from one width of stock to another or when, for example, multi-color printing is to be done. It is evident that lateral adjustment may be done quickly and accurately by simply watching dial **18** while turning knob **17** to shift the feeder carriage. Right hand guide **83** on the conveyor table is also stationary, so as always to be in position to guide a sheet that has moved down along the right hand magazine guide and delivered to the table. The portion of guide **83** that is first reached by the sheets entering upon the table is preferably made a little flaring, as at **83a**, to avoid the danger of sheets catching on the end of the guide as they move ahead. Guide **83** is fairly short, and a second guide section **84** forms a continuation thereof and being held at its front end by a pin **85**, for swinging movements about a vertical axis. The advance end **84a** of the swinging guide section is flared outwardly and overlaps the adjacent end of the stationary section; insuring that there shall be no obstruction in the path of a sheet as it moves from one guide section to the other. Connected to the swinging guide section, at a point distant from both ends, is a stem **86** that extends loosely through frame plate **6**. A spring **87** surrounds the stem, bearing at one end against the guide and at the other end against the inner side of plate **6**. Nuts **88** on the stem, outwardly from said plate, engage the latter and limit the inward swinging movement of the guide. With this arrangement adjustment for stock "out of square" can readily be made.

As is customary, I employ a vibrator or "jogger" to act on the sheets at the discharge end of the conveyor table. In my improved construction there is a heavy bar or light beam **89** fixed a short distance from the discharge end of the feeder, and extending across the width of the table. Like the table itself, this beam is a cantilever. Underlying the beam is a lengthwise reciprocable rod **90** having a bearing at one end in a lug **91** on the under side and at the free end of the beam. The other end of the rod extends slidably through plate **6**. A coiled compression spring **92** surrounds the left hand end of the rod and bears at its ends against lug **91** and a collar **94** on the shaft, respectively. Mounted on the outer side of plate **6** and extending past the end of rod **90** is a rocking cam **95** that swings in a plane at right angles to the rod. The cam is shaped to push the rod laterally against the resistance of its spring when swung in one direction and to leave rod free to recoil on the return movement of the cam. The "jogger" is carried by rod **90**. As best shown in Figs. 2, 6 and 8, it comprises a long, light shoe **96**, L-shaped in cross section, one thin flange or web resting flat on the table while the other stands on edge. The support for this shoe is a crosshead **97** through the midde of which rod **90** passes. A set screw **98** serves to secure the crosshead to the rod at any desired point along the latter. Cut into the top of the crosshead is a notch **99** into which beam **89** slidably fits. Attached to the upright flange of the shoe is a vertical stem **100** that is entered in a bore **101** extending up into the crosshead from underneath. The crosshead is provided with a set screw **102** to engage with said stem and hold the shoe in fixed relation to the crosshead. The parts are so proportioned that, upon loosening set screw **102**, the shoe may be raised far enough above the plane of the belts to allow the crosshead to be shifted along the rod without meeting interference. Furthermore, when installing or removing a belt, the shoe is simply raised, to be lowered again after the work on the belts has been completed.

The cam for actuating the "jogger" may be driven in any desired way. In the arrangement shown, power for this purpose is derived from shaft **66**. As shown in Figs. 3, 10 and 11, shaft **66** extends out through frame plate **6** and has thereon a fixed, radial arm **104**. A connecting rod **105** connects this arm to the rocking cam, so that the cam rocks back and forth whenever the machine is running.

As heretofore stated, shaft **60**, in which heavy short roller **61** is mounted, must turn in one direction only. It is also desirable to make it possible to let this roller stand idle at times when the machine is running. The means for accomplishing both of these objectives are best shown in Figs. 10 and 11. Sprocket wheel **65**, which is loose on shaft **66**, has a ratchet wheel **106** secured to one side thereof. On arm **104** is a spring held pawl **107** that tends constantly to engage the teeth in the ratchet wheel. Slidable on shaft **66**, outwardly from arm **104**, is a frustoconical pawl release **108**, the pawl having a pin **109** projecting laterally therefrom, parallel to the shaft and into the path of the pawl releaser. The pawl releaser is on a sleeve **110** that has on its outer end a knob **111** by which it may be shifted lengthwise. In the positions occupied by the parts in Figs. 10 and 11, sprocket wheel **65**, stands still because the pawl is resting on the portion of largest diameter of member **108**, clear of the ratchet wheel. By pulling on the knob, member **108** may be withdrawn from under the pawl, so that the latter drops into the ratchet teeth and turns the said sprocket wheel intermittently in one direction. The sleeve may be latched yieldingly in each of its extreme positions. In the arrangement shown, a hub **112** on the pawl releasing member **108** is provided with spaced circumferential grooves, **113** and **114**. A spring pressed ball **115**, mounted in a stationary part **116**, is adapted to enter whichever of these grooves is brought into registration therewith. In Fig. 10 the sleeve has been latched in the pawl-releasing position. Upon pulling outwardly, the knob until the ball drops into groove **114**, member **108** is brought into and latched in its idle position.

It should perhaps be noted that the set screw **102** that engages the stem of the jogger shoe enters an annular groove **100a** in the stem when the shoe is in its working position, so that after the shoe has been raised it can be reset quickly and without requiring any particular care to be exercised.

In the main, the operation of the feeder follows conventional lines, the stock being slid down from the inclined magazine in groups of sheets displaced lengthwise of each other, so that one sheet at a time reaches the short feeding roller. Should two sheets arrive at the same time, one of them will be held back by the retarder, so that only one of them will be gripped by the said short feeding roller. Because the minimum gap between the short feed roller and the retard roller and between the two long feed rollers can be adjusted quickly and easily, at will, stock varying over a considerable range of thicknesses may be handled satisfactorily. Thus, for example, I have fed stock of cardboard thickness and flattened cartons as easily as paper of the type ordinarily used for correspondence.

As the stock moves over the conveyor table, with its right hand edge bearing against the long, right hand guide, and a marginal portion at the left resting on the horizontal flange of the jogger shoe, the jogger makes certain that the stock bears against that guide. When stock is a little "out of square" the yieldingly held, swinging section of the guide can be adjusted to afford compensation.

It will thus be seen that I have produced a simple and novel sheet feeding construction which greatly simplifies the work of the operator in achieving accurate adjustment of the stock transversely of the direction of travel, at all times and under any conditions that may be encountered; that installation and removal of the conveyor belts is made easy and involves no partial dismantling of the feeder for its accomplishment; that the jogger may be shifted laterally to any point on the conveyor table, jumping belts when necessary, without first doing more than loosen two screws on the jogger itself; and that, because of the novel feed roller arrangement, the stock is more positively fed than heretofore, and heavy stock can be handled as easily as thin sheets of paper or other material.

I claim:

1. In a machine of the character described, a support, a conveyor table on the support, a magazine, provided with two side walls, for sheets to be fed mounted on the support near one end of the table with one side wall having a fixed position and the opposite side wall being adjustable transversely of the table, means to move sheets from the magazine onto the table, a guide extending lengthwise of the table, in alignment with the fixed side wall of the magazine, to engage with an edge of each sheet as it reaches and travels over the table, the guide being in two sections arranged end to end, the guide section farthest from the magazine being hinged at the meeting ends of the sections for lateral swinging movements and the other section at all times occupying a fixed position on the table, and means to adjust the swinging guide section and yieldingly hold it in any position into which it may be adjusted.

2. In a sheet feeding machine, a conveyor table, a magazine for sheets near and above one end of the table, cooperating feed rollers extending crosswise of the table between the table and the magazine, rails leading from the magazine close to the aforesaid rollers in the region where sheets enter into feeding relation with the latter, a short roller above and near the rails, means positively driving the feed rollers and said short roller, and a small spring pressed roller under the rails and extending up between two of them into engagement with said short roller.

3. In a sheet feeding machine, a conveyor table, a magazine for sheets near and above one end of the table, cooperating feed rollers extending crosswise of the latter between it and the magazine, a pair of cooperating short rollers disposed between the said feed rollers and the magazine, a reciprocable rod near the other end of the table and well above the same extending across the width of the table, a jogger shoe carried by the rod and having a thin, flat-lying flange resting loosely on the table and adapted to underlie a sheet moving over the table, a rocking cam engaging an end of said rod to shift the rod in one direction, a spring to shift the rod in the opposite direction, a member connected to the cam to rock it, an oscillatory shaft, a connection between said shaft and the cam operating member to drive the latter, means for positively and continuously rotating the said feed rollers, means yieldingly pressing the short rollers together, and driving means for one of the short rollers, including a manually operable clutch, connecting said shaft to one of the short rollers to drive it intermittently in the same direction.

4. In a sheet feeding machine, a table, parallel conveyor belts lying on and extending lengthwise of the table, a reciprocable rod mounted above the table and the belts and extending crosswise of the latter, a stationary guide bar above and parallel to said rod, a crosshead slidably mounted on said rod and extending up and down from the latter, said crosshead having a notch in its upper end in which said bar has a sliding fit, means to lock said cross head to the rod at any desired point along the latter, and a jogger shoe having a part to underlie a sheet on the belts and a part to engage a side edge of such sheet, said shoe being connected to the cross head for quick adjustment to raise the shoe high enough to bring it above the level of the belts.

5. In a sheet feeding machine, a stand, a superstructure having a base, two transverse, parallel sets of aligned upward projections on the stand, two sets of downward projections on the base, each upper set of projections being aligned with the projections of one of the lower sets, a rod extending through each group of projections consisting of an upper set and a lower set aligned therewith, the rods being held against lengthwise movement relative to the stand, and one of the rods having a screwthreaded connection with one of the projections on the base to cause the superstructure to shift laterally when that rod is turned.

6. In a sheet feeding machine, a conveyor table, a magazine for sheets near and above one end of the table, cooperating feed rollers extending across the width of the table between the latter and the magazine, vertical supports for said rollers at the ends of the latter, the lower roller being mounted between said supports for rotation about a fixed axis, said supports containing slots extending upwardly from the aforesaid bearings, the upper roller being loose on a shaft the ends of which extend into said slots and are shaped to permit them to slide along said slots and be held against turning movements therein, springs on the supports above said shaft yieldingly to hold it down, stops on the supports below the shaft, vertically adjustable members on the shaft adapted to rest on said stops to limit the downward movement of the upper feed roller, the lower roller having a hard surface, and the upper roller having an outer layer of cushioning material.

7. In a machine for feeding sheets, a support, a conveyor table above and in spaced relation to the support, rollers at the ends of the table and extending transversely of the latter, a plurality of endless belts embracing the table and the rollers, with their upper runs overlying and extending lengthwise of the table, elements rising from said support along one edge of the table and fastened to the table at that edge to hold the table rigidly as a cantilever projecting from said elements; said belts containing sufficient slack to allow any belt to be shifted crosswise of the table and along said rollers over and past any of the other belts when a belt is to be removed or replaced; and adjustable belt tighteners engaged with the belts to keep them taut.

8. A machine as set forth in claim 7, having in addition, a strut mounted on the support so as to be movable from a position in which it is interposed between the support and the table to aid in supporting the latter and a position in which it is clear of the table.

9. A machine as set forth in claim 7, having, in addition, a strut hinged at its lower end to the support, a pin on the free longitudinal edge of the table, and a hook on the free end of the strut to engage with said pin.

10. In a sheet feeding machine, a table, parallel conveyor belts lying on and extending lengthwise of the table, a reciprocable rod mounted above the table and the belts and extending crosswise of the latter, a stationary guide bar near and parallel to said rod, a crosshead slidably mounted on said rod and extending to said bar, said crosshead containing an opening in which said bar has a sliding fit, means to lock said crosshead to the rod at any desired point along the latter, and a jogger shoe having a part to underlie a sheet on the belts and a part to engage a side edge of such sheet, said shoe being connected to the crosshead for quick adjustment to raise the shoe high enough to bring it above the level of the belts.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,051,206	Feuerstein	Jan. 21, 1913
1,366,046	Williams et al.	Jan. 18, 1921
2,108,799	Davidson	Feb. 22, 1938
2,133,726	Staude	Oct. 10, 1938
2,224,138	Trydal	Dec. 10, 1940
2,267,998	Storck	Dec. 30, 1941
2,288,149	Williams	June 30, 1942
2,300,625	Martin	Nov. 3, 1942
2,302,060	Ryan	Nov. 17, 1942
2,359,852	Morse	Oct. 10, 1944
2,359,856	Morse	Oct. 10, 1944
2,385,047	Adrian	Sept. 18, 1945
2,387,954	Thompson	Oct. 30, 1945