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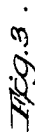
G. GOEBEL ET AL

2,298,368

CALIPERING MECHANISM

Original Filed June 10, 1935

4 Sheets-Sheet 1



Oct. 13, 1942.

G. GOEBEL ET AL

2,298,368

CALIPERING MECHANISM

Original Filed June 10, 1935

4 Sheets-Sheet 2

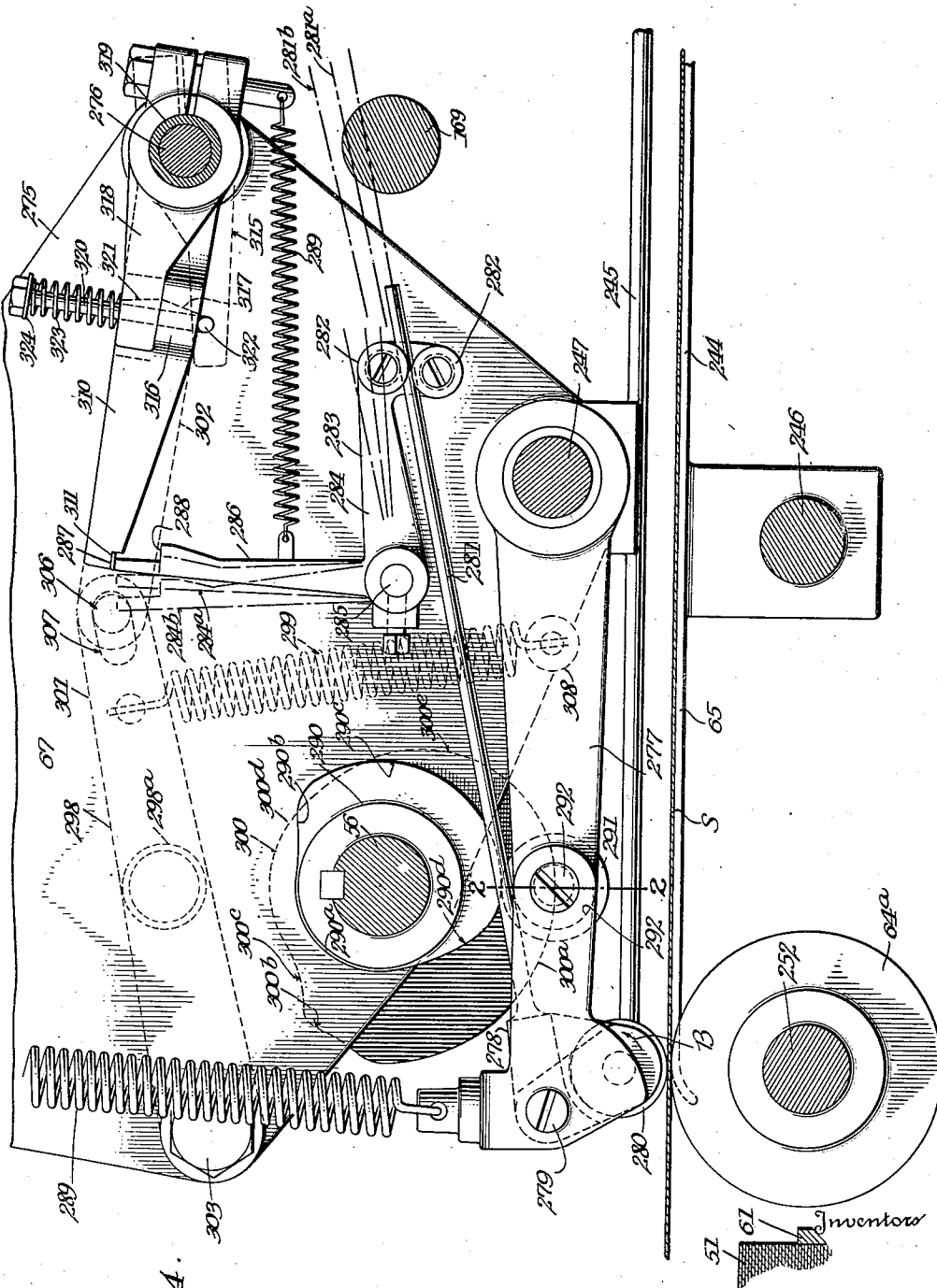


Fig. 4.

George Goebel,
Sherman A. Chantland,
By *Cushman Duff Cushman*
Attorneys

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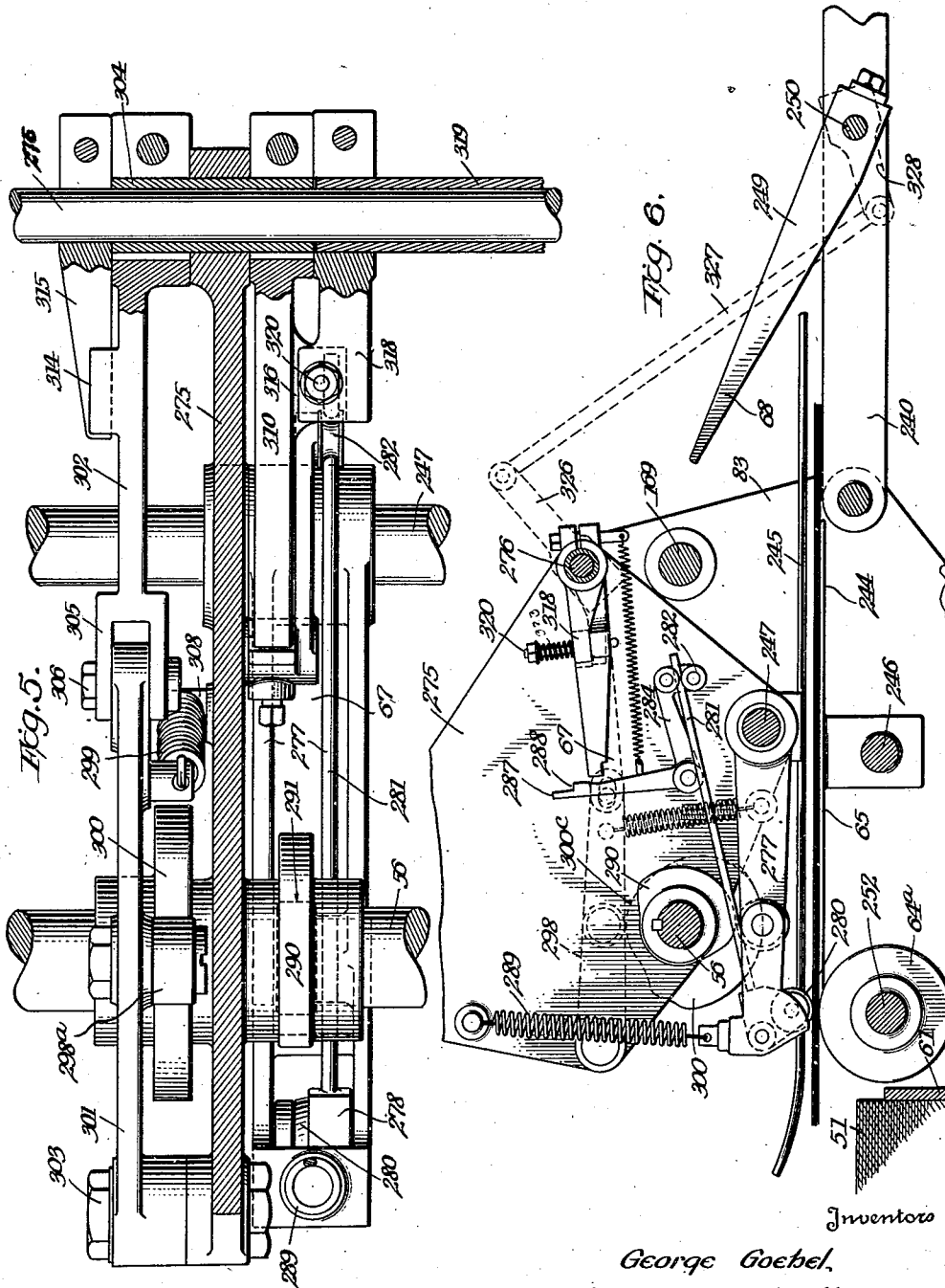
G. GOEBEL ET AL

2,298,368

CALIPERING MECHANISM

Original Filed June 10, 1935

4 Sheets-Sheet 3



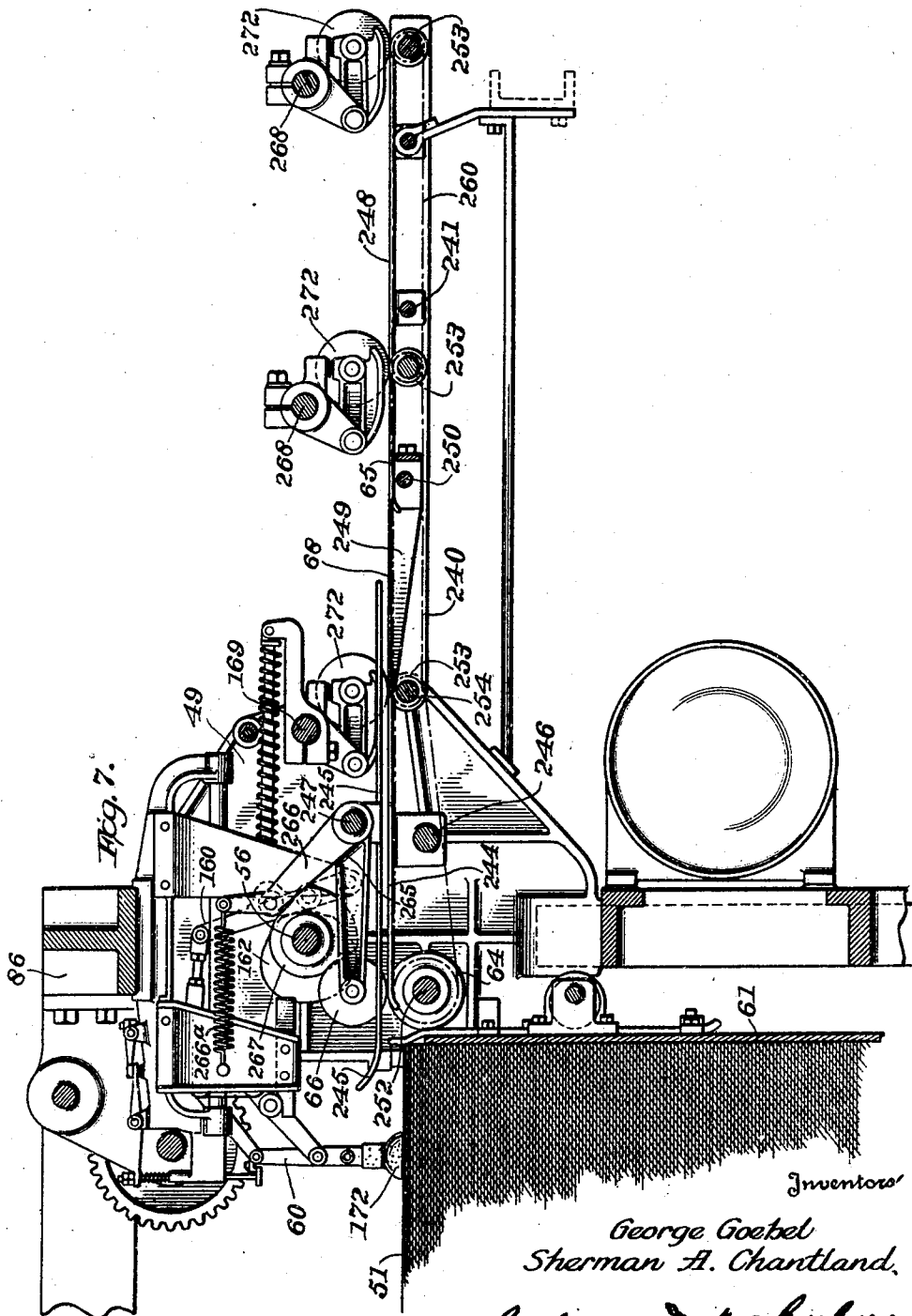
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G. GOEBEL ET AL

2,298,368

CALIPERING MECHANISM

Original Filed June 10, 1935 4 Sheets-Sheet 4



Inventors

George Goebel
Sherman H. Chantland,

By *Cushman, Kirby & Buchanan*
Attorneys

UNITED STATES PATENT OFFICE

2,298,368

CALIPERING MECHANISM

George Goebel and Sherman A. Chantland, Baltimore, Md., assignors to Crown Cork & Seal Company, Inc., Baltimore, Md., a corporation of New York

Original application June 10, 1935, Serial No. 25,908. Divided and this application January 20, 1939, Serial No. 252,051

11 Claims. (Cl. 209—88)

The present invention relates to a calipering mechanism for sheet feeders, the application being a division of our application for Sheet feeders, Serial No. 25,908, filed June 10, 1935, issued December 26, 1939, Patent No. 2,184,296.

The object of the invention is to provide a sheet calipering or gauging mechanism which will be sensitively responsive to the number of sheets simultaneously passing through the same and which will selectively actuate elements of the machine in accordance with the number of sheets passing through the gauging mechanism.

Calipering mechanisms as ordinarily used are arranged and connected in such a manner that if more than one sheet passes through the same, the feeder is entirely stopped by disengagement of the main driving clutch or the like. The reason for so stopping the feeder is based upon the supposition that if a lower sheet adheres to the under-surface of the uppermost sheet when the latter is removed from the stack, other sheets may in turn adhere to the lower sheet and a large number of adhering sheets may thus be drawn through the feeder in trailing relation. If such a condition were always the result of a lower sheet adhering to an upper sheet, it would of course be desirable to stop the feeder whenever the calipering or gauging mechanism indicated that one sheet was adhering to another.

However, it has been found that there is little practical necessity for entirely stopping the operation of the feeder if but two sheets simultaneously pass through the calipering mechanism, since two sheets frequently adhere, in perfect alignment, and the fact that two sheets do adhere does not necessarily mean that other sheets of the stack will adhere to the rear edge of the lower of the two sheets. Hence, there is no real necessity of stopping the feeder under such conditions if the two adhering sheets can be disposed of in some other manner.

By the calipering arrangement of the present invention, if two sheets pass simultaneously through the mechanism, it will be responsive to their number and will cause a reject member to be positioned in the path of movement of the two sheets to deliver them to a point other than the press or feed table and without stopping the feeder.

Since the above operation does not stop the feeder, it will thereafter continue to function in the usual manner without the necessity of the operator having to re-start it, as is customarily the case.

The calipering mechanism of the present in-

vention is also designed to entirely stop the feeder should three or more sheets pass through the calipering mechanism. Practical experience has demonstrated that although two sheets may adhere in substantial alignment and can therefore be satisfactorily disposed of by a reject member without the necessity of any attention on the part of the operator, on the other hand, should three or more sheets adhere, such a condition frequently means that a great number of sheets are adhering in trailing relation. That is to say, if three sheets are in a position to make the calipering mechanism react to their total thickness, it is quite probable that a stream of sheets, each with its forward edge positioned well behind the forward edge of the sheet above it, may be moving from the sheet stack. In such a situation, it is naturally imperative that the machine be stopped to enable the operator to correct this condition. The calipering mechanism of the present invention is therefore designed to stop the machine in the event that three sheets simultaneously register therein.

Another object of the invention is to provide a calipering mechanism which will contact or gauge with a substantial portion of a sheet as the sheet moves through the same.

In most feeders now used, the calipering mechanism merely gauges the extreme forward portion of the sheet and then moves from engagement with the latter. With such an arrangement, it is possible for a lower sheet to adhere to the rear portion of the uppermost sheet so as to be in such trailing relation thereto that the leading edge of the lower sheet will not reach the gauging element of the calipering mechanism until after the latter has moved from gauging position. Under such circumstances, the two sheets will not be stopped by action of the calipering mechanism and when they reach the press or other apparatus to which sheets are fed, are very apt to cause damage.

The calipering mechanism of the present invention, designed to be in gauging position over a substantial portion of the sheet, will obviate all possibility of two or more sheets moving entirely through the feeder.

Other objects and advantages of the invention will be apparent from the following specification and drawings, wherein:

Figure 1 is a vertical sectional view through a sheet feeder, showing the calipering mechanism of the present invention in side elevation.

Figure 2 is a detail transverse sectional view on the line 2—2 of Figure 4.

Figure 3 is a detail perspective view showing the calipering shoe.

Figure 4 is a view similar to Figure 1, but on a larger scale.

Figure 5 is a longitudinal horizontal sectional view through the upper portion of the calipering mechanism.

Figure 6 is a view generally similar to Figure 4, but showing the calipering mechanism in another position, and

Figure 7 is a vertical sectional view of a sheet feeder showing means to deliver sheets to the calipering mechanism of the present invention and to receive sheets from the calipering mechanism.

In Figures 1, 4, 5, 6 and 7, the rearward portion of the sheet feeder is to the left, and the forward portion to the right.

As is best shown in Figure 1, the calipering mechanism, generally designated by the numeral 67, is primarily supported upon a vertical plate 275 extending longitudinally of the feeder and secured to and depending from a cross-beam 86 extending transversely of the feeder above the feed table 65, the beam 86 extending between the side plates of the feeder. The calipering mechanism is positioned forwardly of the stack 51 of sheets to be separated, these having their forward edges contacting with the usual stack gauge plate 61. In the operation of the sheet feeder, the uppermost sheet will be successively removed from the stack 51 by a forwarder mechanism 60 (Figure 7) similar to that disclosed in our divisional application filed of even date herewith entitled Sheet moving mechanisms for sheet feeders, Patent No. 2,199,170, April 30, 1940, or by any suitable forwarder mechanism, and will be moved through the calipering mechanism and between the lower longitudinal strips 244 of the feed table 65 and the upper or hold-down longitudinal strips 245 forming the rear portion of the feed table fully disclosed in our said Patent No. 2,184,296. The lower strips 244 are carried on blocks secured to a cross rod 246, while the upper strips 245 are fixed to blocks carried by a cross rod 247.

The forward or leading edge of a sheet positioned on the rearward portion of the feed table 65 by a forwarder mechanism will lie upon a series of rolls such as 64a (Figure 1) and 64 (Figure 7) spaced along a suitably rotated shaft 252, so that the sheet will be moved to the right and beneath the gauge roll 280 of the calipering mechanism, which is arranged directly above the roll 64a. Roll 64a is slightly larger in diameter than the other rolls 64 (Figure 7) on the shaft 252.

The plate 275 has an aperture therein through which the main cam shaft 56 of the sheet feeder extends, as shown in Figure 4. A shaft 276 for operating the main clutch of the sheet feeder extends through the forward portion of the plate 275 and a rod 247 on which is freely mounted a sheet calipering or gauging lever 277 extending towards the rear of the sheet feeder.

At its free and rear end, the lever 277 has pivotally mounted thereon a block or bracket 278 which is shown in detail in Figure 3. Lever 277 is of open construction and the block 278 is pivotally mounted upon a pin 279 extending between the two beams of which the lever is formed. The block 278 functions as a bell crank, and, for that reason, is provided at a point beneath the pin 279 with a gauge roll 280 adapted to make

contact with sheets passing over the lower gauge roll 64a. The roll 64a and roll 280 are of metal and have smooth surfaces. Since lower gauge roll 64a is of very slightly greater diameter than the other rolls fixed to the same shaft, the portion of a sheet which passes over the same will be bent very slightly upwardly toward the upper gauge roll 280.

The other arm of the bell-crank of which block 279 forms a part, comprises a rod 281 extending forwardly and upwardly from the block, the outer end portion of rod 281 being positioned between a pair of small rollers 282 rotatably mounted on the substantially horizontally disposed arm 283 of a trigger member 284 mounted on a stud 285 carried in the plate 275. The rollers 282 between which the rod 281 is positioned are provided with grooves in their peripheries so that they co-act to form a guide for the rod. The trigger member 284 includes an arm 286 extending substantially at right angles to the arm 283, arm 286 extending upwardly as shown. The tip of the upper end of arm 286 is flattened to form a seat 287 and at a slight distance beneath this tip is formed a shoulder 288. A spring 289 has one end thereof connected to the forward side (the right-hand side of Figure 4) of arm 286 of trigger 284, the other end of the spring being connected to an arm 310 on shaft 276 to thereby tend the trigger member forwardly and the gauge roll 280 carried by block 278 downwardly and rearwardly or to the left in Figure 4.

For the purpose of tending the gauge lever 277 upwardly and away from lower gauge roll 64a, a spring 289 extends from the gauge lever to the upper portion of the plate 275. The action of the spring 289 is intermittently resisted by a gauge lever hold-down cam 290 on the cam shaft 56, the cam 290 being arranged to contact with a roller 291 positioned between the arms of gauge lever 277. The roller 291 is mounted upon a pin 292 eccentrically journaled in the gauge lever 277 as shown in Figure 2 and provided with a nut 292a to hold it in the position to which it is adjusted. The eccentric adjustment of the pin 292 permits the latter to be rotated to vary the position of roller 291 with respect to the gauge lever 277, thereby varying the movement imparted to lever 277 by hold-down cam 290 to move gauge roll 280 toward gauge roll 64a.

Broadly described, the action of the gauge lever 277 and gauge roll 280 and the cam 290, described above, is to cause the gauge lever 277 and gauge roll 280 to be moved downwardly toward the roll 64a after the leading edge of a sheet has been positioned upon the latter roll by a forwarder mechanism. Since roll 280 is carried by the block 278 pivotally mounted in the gauge lever 277, it may move upwardly in the direction of the arrow B, according to the thickness of the sheet or sheets positioned on roll 64a. This swinging movement of the block 278 will affect the position of the rod 281 and, through the latter, the position of the trigger member 284. Shortly after the trigger member 284 has been given a position according to the number of sheets placed upon the roller 64a, a toggle device 298 positioned on the opposite side of plate 275 from the structure thus far described, and tended to downward position by spring 299, will be permitted to move downwardly by a toggle or trip reset cam 300 also fixed on the cam shaft 56.

The toggle device 298 is formed of two arms 301 and 302, arm 301 being pivoted on a stud 303 at the rear end of plate 275 and arm 302

being keyed to a sleeve 304 surrounding and rotatable upon the clutch operating shaft 276. As best shown in Figure 5, the arm 302 is bifurcated at its inner end 305 and a pin 306 extends across the bifurcated portion. Arm 301 is slotted as indicated at 307 to receive the pin 306 and, by this construction, the two arms may swing together on their pivots. The spring 299 has its upper end fixed to the inner end of arm 301, the lower end of the spring being secured to a stud 308 adjacent the lower edge of plate 275. The tendency of spring 299 to draw the toggle device 298 downwardly from the position shown in dotted lines in Figure 4 is resisted by the toggle or trip reset cam 300 in a manner hereinafter described. As is best shown in Figure 5, the sleeve 304 to which the forward arm 302 of toggle device 298 is keyed, extends through the plate 275 and, at its opposite end, carries a drop arm 310 extending rearwardly substantially parallel with the toggle arm 302. The outer end of drop arm 310 is stepped as at 311 and a steel plate may be inserted in the stepped portion to prevent wear. The drop arm 310, being keyed to sleeve 304 with toggle arm 302, will move upwardly and downwardly with the latter arm, according to the action of toggle or trip reset cam 300 and spring 299, but the movement of drop arm 310 will be controlled by the trigger arm 286, the latter arm, in the normal operative position thereof, preventing the drop arm 310, and therefore the toggle arms 301 and 302, from moving downwardly. Toggle arm 302 is provided with a shoulder 314 upon one edge thereof, which shoulder overlies a clutch operating shaft arm 315 rigidly secured to the clutch operating shaft 276. Extreme downward movement of the toggle arm 302 will move the clutch operating shaft arm 315 downwardly to disengage the main clutch of the feeder apparatus as is hereinafter explained.

The drop arm 310 has a shoulder 316 formed integrally therewith, which shoulder has a bore 317 extending therethrough. An arm 318 is arranged above the shoulder 316, this arm being carried on a tubular shaft 319 which is operatively connected to the reject member 68 in a manner hereinafter described. Arm 318 and the shoulder 316 are normally held in the face to face contact illustrated in Figure 4 by means of a pin 320 which extends through an aperture 317 in shoulder 316 and also through an aligned aperture 321 in arm 318. The pin 320 is of T-formation, the head 322 of the T being positioned against the under-surface of the shoulder 316 and the body of the pin extending upwardly through the apertures, its upper portion being surrounded by a spring 323 which bears upon a nut-held washer 324 upon the extreme upper end of the pin, the lower end of the spring bearing upon the upper surface of reject operating shaft arm 318.

The contours of the gauge lever hold-down cam 290 and the toggle reset cam 300 will be described in connection with the discussion of the operation of the mechanism which is hereinafter set forth.

The connection between the tubular reject operating shaft 319 and the reject member 68 on the feed table is illustrated in Figure 1. As appears from this figure, the outer end of the sleeve or shaft 319, that is, the end adjacent the right-hand side of the machine, has fixed thereto an arm 326 to which is pivotally connected a link 327 having its lower end pivotally connected to

an arm 328 fixed to the reject member shaft 250. By this arrangement, when the action of the caliper mechanism causes the reject operating shaft arm 318 to be drawn downwardly, the arm 326 will move in a counter-clockwise direction to the position shown in Figure 1 to draw the link 327 upwardly, thereby raising the arms 249 of the reject mechanism 68.

The clutch operating shaft 276 is journaled in the side plates of the sheet feeder and at one end and beyond the end of sleeve 319, has a suitably operating connection with the main clutch of the sheet feeder, as described in our said Patent No. 2,184,296 so that counterclockwise (Figures 1, 4 and 6) rotation of the shaft will cause the clutch to be disengaged.

Figure 7 shows the general construction of a sheet feeder including sheet delivery means 60 to supply sheets to the caliper mechanism of the present invention, as well as conveyor means to which the caliper mechanism delivers the sheets. More particularly, Figure 7 is a view of the sheet feeder disclosed in our said Patent No. 2,184,296, the view being taken in a vertical plane parallel to the plane of Figure 1, the structure of Figures 1 to 6 being behind the vertical supporting plate 49 of Figure 7.

It will be noted from Figure 7 that the shaft 56 which is shown in Figure 4 as carrying the cams 290 and 300 has fixed thereto, in the plane of Figure 7, a cam 162 which, through a lever 160, and suitable linkage best disclosed in our patent for Sheet handling mechanism for sheet feeders, No. 2,199,170, issued April 30, 1940, raises and lowers the sheet forwarders 60 provided with suction cups 172. The forwarders 60 have a movement toward and from the caliper mechanism so that the uppermost sheet on the stack 51 will be lifted over the gauge plate 61 and its leading edge inserted between the guide strips 244 and 245 and upon rolls 64 and 64a on lower and driven shaft 252.

In order to hold the sheet in close contact with the driven rolls 64 upon the lower shaft 252, a hold-down roll 66 (Figure 7) is positioned upon the outer end of a horizontal arm of each one of a pair of bell-cranks 265 transversely spaced upon the rod 247. The other arm 266 of each bell-crank is provided with a roller which engages one of two cams 267 so spaced on the main cam shaft 56 as to be opposite the bell-cranks, a spring 266a being provided to hold the rollers in contact with the cam. Each cam 267 is designed to bring the hold-down roll 66 controlled thereby downwardly upon the upper surface of a sheet immediately after the leading edge of the sheet has been positioned upon the outfeed rolls 64 on the first shaft 252.

After sheets have moved through the caliper mechanism, they will move upon rolls 253 fixed on shafts 254, which shafts are rotated through a series of chains 260 indicated in dotted lines in Figure 7 and actuated from the shaft 252 which carries the rolls 64 and 64a.

Hold-down rolls 272 suitably supported from rod 169 and rods 268 cooperate with the driven rolls 253. During their movement with the left-hand rolls 253 of Figure 7 the sheets are supported by the arms 249 of the reject member 68. Subsequently they are supported by strips 248 secured to cross-bars 241 extending between the side bars 240 of the feed table 65.

Operation of caliper or gauging mechanism

In order to clearly show the operation of the

trigger member 284, Figure 4 shows a sheet S well advanced through the caliper mechanism, and with the cams 290 and 300 turned approximately 180° in a counter-clockwise direction from the position which they occupied at a moment just prior to the positioning of the leading edge of the sheet S between the gauge rollers 280 and 64a.

Just prior to the moment that the leading edge of a sheet is positioned upon the driven out-feed rolls 64 and the lower gauge roll 64a, the gauge lever 277 and the upper gauging roll 280 will be in a raised position well above that shown in Figure 4 by reason of the fact that gauge lever hold-down cam 290 (turned about 180° from its position shown in Figure 4) will have its low portion 290a in contact with the roller 291 of gauge lever 277. At this moment, the high portion 300a of toggle reset cam 300 will be beneath a roller 298a on the toggle device 298, holding the toggle device upwardly in a position very slightly above that shown in Figure 4.

As the leading edge of the sheet closely approaches the vertical center line of the lower gauge roll 64a, the rotation of hold-down cam 290 in a counter-clockwise direction from the preliminary position just referred to would bring its inclined portion 290b in contact with the roller 291, causing the gauge lever 277 and upper gauge roll 280 to move downwardly toward the position shown in Figure 4.

Subsequent to the passage over the vertical center line of the lower gauge roll 64a of a small portion of the sheet, for example, at about the moment when one and one-half inches of the sheet have passed over this center line, the high point 290c of hold-down cam 290 will be in contact with the roller 291 and the upper gauge roll 280 will come into contact with the upper surface of the sheet S as shown in Figure 4. The gauge roll 280 will press firmly upon the upper surface of the sheet, the cam engaging roller 292 preferably being so adjusted on its eccentric mounting as to cause the cam 290 to move the upper gauge roll 280 to a position spaced from the lower gauge roll 64a very slightly less than the thickness of the sheet to be gauged, in the event that no sheet is in position. However, with the sheet in position, since the block 278 which carries the gauge roll 280 is pivotally mounted on gauge lever 277, the block 278 may be swung upwardly in the direction of the arrow B so that no parts of the mechanism will be bent.

During the rotation of the hold-down cam 290 thus far described, the high portion 300a of toggle trip cam 300, also turning with the shaft 56, will be passing beneath roller 298a on the arm 298 of the toggle device, holding the toggle and the elements arranged to be moved therewith, i. e., the clutch operating shaft arm 315 and the reject operating shaft arm 318, in their highest position, viz., a position very slightly above that shown in Figure 2.

The presence of the single sheet S beneath gauge roll 280 will cause the block carrying the roll to swing very slightly upwardly on its pivot 279 so that the rod 281 extending from the block will have its outer end positioned as indicated in solid lines in Figure 4. After about one-third of the length of the sheet S has passed beneath the upper gauge roller 280, the high portion 300a of toggle trip cam 300 will move from beneath roller 298a, and the first drop 300b of the cam will pass beneath the roller, permitting the toggle device to drop to the position shown in Figure 4. In this

position, the outer end of drop lever 310, which has also moved downwardly with the toggle device 298, will be positioned in contact with the upper end 287 of trigger 284.

The fact that the outer end 311 of drop lever 310 does not come into contact with the upper end of trigger 284 until this time, and after about one-third of the sheet has passed beneath the gauge roll 280, is a factor of some importance in the operation of the mechanism. It sometimes occurs that sheets in the stack immediately beneath the uppermost sheet adhere to the under surface of the uppermost sheet, but with their leading edges some inches behind the leading edge of the latter sheet. Were the cam 300 so arranged as to permit the drop lever 310 to drop into fixed contact with the upper end of the trigger 284 immediately the gauge roller 280 had contacted with a sheet and after but two or three inches of the sheet had passed between the gauge rolls, the upper gauge roll 280 could not readily move to throw the upper end of the trigger further to the left (Figure 4) and to another position with respect to drop lever 310 when an additional or adhering sheet passes beneath the same.

In other words, the mechanism described above enables the caliper mechanism to be sensitive to additional sheets throughout the area of the uppermost sheet which might have additional sheets adhering thereto.

As the toggle reset cam 300 continues to rotate, the further drop 300c thereon will move beneath roller 298a, permitting the toggle device and the drop lever 310 to move downwardly still further by reason of the action of the spring 299. However, since the upper end of the trigger 284 is directly in the path of the outer end 311 of drop lever 310, the latter lever, and likewise the toggle device, cannot drop further than the position shown in Figure 4, and since the drop which has already occurred is insufficient to cause the reject operating shaft arm 318 to operate the reject member 68 or the clutch operating shaft arm 315 to operate the main clutch, the sheet S will move through the caliper mechanism and along the feed table 65 to a press or other apparatus.

When about two-thirds of the sheet has passed beneath the upper gauge roll 280, (the position illustrated in Figure 4) this gauge roll will be lifted by reason of the action of the spring 289 on gauge lever 277 and because the drop 290d leading to the low portion 290a of cam 290 will then move opposite the roller 291 on gauge lever 277. Almost immediately thereafter, the incline 300a on toggle reset cam 300 will move beneath the roller 298a of the toggle device, eventually lifting the end of the drop lever 310 from contact with the upper end of the trigger 284 so that the trigger will be released.

In the event that two sheets should be positioned upon the gauge roll 64a, with their leading edges substantially in alignment, the downward movement of gauge block 278 with gauge lever 277 would be limited to the extent shown in Figure 1 and the block would be turned in the direction of the arrow B of that figure to the position indicated in broken lines at 281a of Figure 4, thereby causing the trigger 284 to assume the position shown in broken lines at 284a. The positions 281a and 284a correspond to the positions of the gauge block rod and trigger respectively, shown in Figure 1. In the latter figure, the hold-down cam 290 has turned to move its high portion 290c opposite the roller 291 on gauge lever 277 and the toggle reset cam 300 has turned to move its first

drop 300b beneath the roller 298a on toggle device 298. The spring 299 is therefore free to draw the toggle device and the drop arm 310 from uppermost position to the position shown in Figure 1. In the latter position, the outer end 311 of the drop lever 310 is in contact with the shoulder 288 of trigger 284. The downward movement which brings drop lever 310 to this lowered position is sufficient to draw the reject operating shaft arm 318 downwardly, through the pressure of spring 323 exerted thereon. Such operation of the arm 318 will cause the link 327 to be moved upwardly to raise the reject member 68, thereby directing the two sheets beneath the feed table 65 and upon a suitable shelf, not shown.

The continued rotation of the cams will bring the low portion 290a opposite the roller 291 on gauge lever 277, permitting the latter lever to be drawn upwardly by the spring 289, and the high portion 300a of the toggle reset cam will move beneath roller 298a, causing the toggle device 298 to be raised, thereby releasing the trigger 286 for subsequent action. The raising of the toggle device 298 will, of course, cause the drop lever 310 to exert pressure against the underside of reject operating shaft arm 318, raising the latter arm and thereby lowering the reject member 68 to normal position.

Should three sheets be positioned between the gauge rolls 64a and 280, the downward movement of gauge lever 277 resulting from the passage of the high portion 290c of hold-down cam 290 described above will cause the gauge block 278 to swing upwardly on its pivot 279 sufficiently to move the gauge block rod 281 to the position indicated in Figure 4 in dot and dash lines at 281b, thereby moving the trigger 284 to the position shown in dot and dash lines at 284b. This position of these parts corresponds to the showing thereof indicated in Figure 6. As will be apparent from both figures, the movement of the low portion 300d beneath the roller 298a on toggle device 298, permitting the toggle device to drop, will result in the dropping of the toggle device to the extent indicated in Figure 6, since both the upper end 287 of the trigger 284 and also the shoulder 288 on the trigger have been moved so far to the left (Figures 4 and 6) that the downward movement of the toggle device will only be limited by the contact of its roller 298a with the low portion 300d of the toggle reset cam.

The dropping action of the toggle device described above will first cause the spring 323 connected to drop lever 310 to move the reject operating shaft arm 318 downwardly to raise the reject member 68 and, as the toggle device continues downwardly, the shoulder 314 on toggle arm 302 will come into contact with the clutch operating shaft arm 315, turning the clutch operating shaft 276 to operate the main clutch, not shown, of the machine to disengaged position so that the machine will be stopped and the feeding of sheets thereby discontinued.

In some instances a single sheet may pass sufficiently far through the caliper mechanism 67 to have its leading portion positioned above the arms 249 of the reject mechanism 68 and the gauge roller 280 may then detect a number of additional sheets beneath the rear portion of the first sheet, resulting in movement of the trigger 284 further to the left to release the toggle device and drop lever so that they may move downwardly to actuate both the reject operating shaft arm 318 and the clutch oper-

ating shaft arm 315. The presence of the uppermost sheet upon the arms 249 of the reject member 68 may prevent this member from being moved upwardly, with the result that the reject operating shaft arm 318 will be held in normal position. However, because of the interpositioning of the spring 323 between the drop lever 310 and the reject operating shaft arm 318, the drop lever and the toggle device may move downwardly and away from the reject operating shaft arm 318 to operate the clutch operating shaft arm 315 to stop the apparatus.

Because of the fact that the gauge rolls are sensitive to a substantial area of the sheets passing between the same, should lower sheets adhere to the uppermost sheet, and even with their leading edges some distance behind the leading edge of the uppermost sheet, the trigger 284 will function accordingly to release the toggle device to properly actuate the reject member or the clutch of the machine to handle the sheets.

After the toggle device has been dropped as described above, any sheets which may remain upon the feed table can be cleared and the clutch re-engaged to re-start the sheet feeder.

It will be understood that the invention is not limited to the details of construction shown in the drawings and that the examples of the use of the machine and mechanisms which have been given do not include all of the uses of which they are capable, and that the phraseology employed in the specification is for the purpose of description and not of limitation.

We claim:

1. The combination in a sheet feeder, of a caliper mechanism, means to deliver sheets to said mechanism, conveyor means to which said mechanism delivers the sheets, reject means included in said last-named means, said caliper means including means to selectively control said delivery means and the position of said reject means in accordance with the number of sheets delivered thereto, and a sheet gauging element arranged to control the operation of said control means.

2. The combination in a sheet feeder, of a caliper mechanism, means to deliver sheets to said mechanism, conveyor means to which said mechanism delivers the sheets, reject means included in said last-named means, said caliper mechanism including means movable through a predetermined path and arranged to control the operation of said conveyor means and the position of said reject means according to its travel in said path, and sheet gauging means movable by contact with sheets to different positions in accordance with the number of sheets simultaneously gauged thereby and to control the travel of said last-named means to thereby determine the operation by the latter of said sheet delivery means and said reject means.

3. The combination in a sheet feeder, of a caliper mechanism, means to deliver sheets to said mechanism, conveyor means to which said mechanism delivers the sheets, reject means included in said conveyor means, said caliper mechanism including control means movable through a predetermined path and arranged to selectively control the operation of said sheet delivery means and the position of said reject means according to its travel in said path, means to initially control the movement of said control means through said path, and sheet gauging means movable to different positions in accordance with the number of sheets simultaneously

gauged thereby and arranged to secondarily control the travel of said control means to thereby determine the operation by the latter of said sheet delivery means and said reject means.

4. The combination in a sheet feeder, of a driving means therefor, a calipering mechanism, means to deliver sheets to said mechanism, conveyor means to which said mechanism delivers the sheets, reject means included in said conveyor means, said calipering mechanism including means movable through a predetermined path and arranged to control the operation of said driving means and said reject means according to its travel in said path, and sheet gauging means movable to different positions in accordance with the number of sheets simultaneously gauged thereby and arranged to control the travel of said last-named means to thereby determine the operation by the latter of said driving means and said reject means.

5. The combination in a sheet feeder, of a driving means therefor, a calipering mechanism, means to deliver sheets to said mechanism, conveyor means to which said mechanism delivers the sheets, reject means included in said conveyor means, said calipering mechanism including control means movable through a predetermined path and arranged to control said driving means and said reject means according to its travel in said path, means to initially control the movement of said control means through said path, and sheet gauging means movable to different positions in accordance with the number of sheets simultaneously gauged thereby and arranged to secondarily control the travel of said control means to thereby determine the operation by the latter of said driving means and said reject means.

6. The combination in a sheet feeder, of a calipering mechanism, means to deliver sheets to said mechanism, conveyor means to which said mechanism delivers the sheets, reject means included in said conveyor means, said calipering mechanism including a pivoted arm movable through a predetermined path and arranged to control the operation of said sheet delivery means and the position of said reject means according to its travel in said path, and pivotally mounted sheet gauging means movable to different positions in accordance with the number of sheets simultaneously gauged thereby and arranged to control the travel of said last-named means to thereby determine the operation by the latter of said sheet delivery means and said reject means.

7. The combination in a sheet feeder, of a driving means therefor, a calipering mechanism, means to deliver sheets to said mechanism, conveyor means to which said mechanism delivers the sheets, reject means included in said conveyor means, said calipering mechanism including a toggle element movable through a predetermined path and arranged to control the operation of said driving means and the position of said reject means according to its travel in said path, a sheet gauging element, a trigger operatively connected to said gauging element, said gauging element being movable to various positions in accordance with the number of sheets simultaneously positioned beneath the same and adapted to thereby move said trigger to various positions in the path of movement of said toggle element to control the operation of said driving means and the position of said reject means.

8. The combination in a sheet feeder, of a driving means therefor, a calipering mechanism, means to deliver sheets to said mechanism, conveyor means to which said mechanism delivers the sheets, reject means included in said conveyor means, said calipering mechanism including a toggle element, means to move said toggle element outwardly and a second means to move said toggle element inwardly, a sheet gauging element, a trigger operatively connected to said gauging element, said gauging element being movable to various positions in accordance with the number of sheets simultaneously positioned beneath the same and adapted to thereby move said trigger to various positions in the path of inward movement of said toggle element, and means adapted to be operated seriatim by said toggle element during its inward movement to actuate said reject means and driving means.

9. The combination in a sheet feeder, of a driving means therefor, a calipering mechanism, means to deliver sheets to said mechanism, conveyor means to which said mechanism delivers the sheets, reject means included in said conveyor means, said calipering mechanism including a toggle element, a cam to move said toggle element outwardly and a spring to move said toggle element inwardly, a sheet gauging element, a trigger operatively connected to said gauging element, said gauging element being movable to various positions in accordance with the number of sheets simultaneously positioned beneath the same and adapted to thereby move said trigger to various positions in the path of inward movement of said toggle element, and means adapted to be operated seriatim by said toggle element during its inward movement to actuate said reject means and driving means.

10. The combination in a sheet feeder, of a driving means therefor, a calipering mechanism, means to deliver sheets to said mechanism, conveyor means to which said mechanism delivers the sheets, reject means included in said conveyor means, said calipering mechanism including a toggle element, a cam to move said toggle element outwardly and a spring to move said toggle element inwardly, a sheet gauging element, a trigger operatively connected to said gauging element, said gauging element being movable to various positions in accordance with the number of sheets simultaneously positioned beneath the same, and adapted to thereby move said trigger to various positions, said trigger being variably positioned in the path of inward movement of said toggle element, an operating arm for said driving means, an operating arm for said reject means, and means on said toggle element to operate said respective arms seriatim.

11. The combination in a sheet feeder, of a calipering mechanism, means to deliver sheets to said mechanism, conveyor means to which said mechanism delivers the sheets, reject means included in said last-named means, said calipering means including means to control the actuation of said delivery means and the position of said reject means, a sheet gauging element arranged to control the operation of said control means in accordance with the number of sheets delivered thereto, and a loose connection between said reject means and said control means so that the latter may move independently of the reject means.

GEORGE GOEBEL.
SHERMAN A. CHANTLAND.