

Jan. 22, 1963

W. J. HOLT, JR., ETAL
HIGH SPEED BALLOT HANDLER

3,074,712

Filed Dec. 17, 1959

5 Sheets-Sheet 1

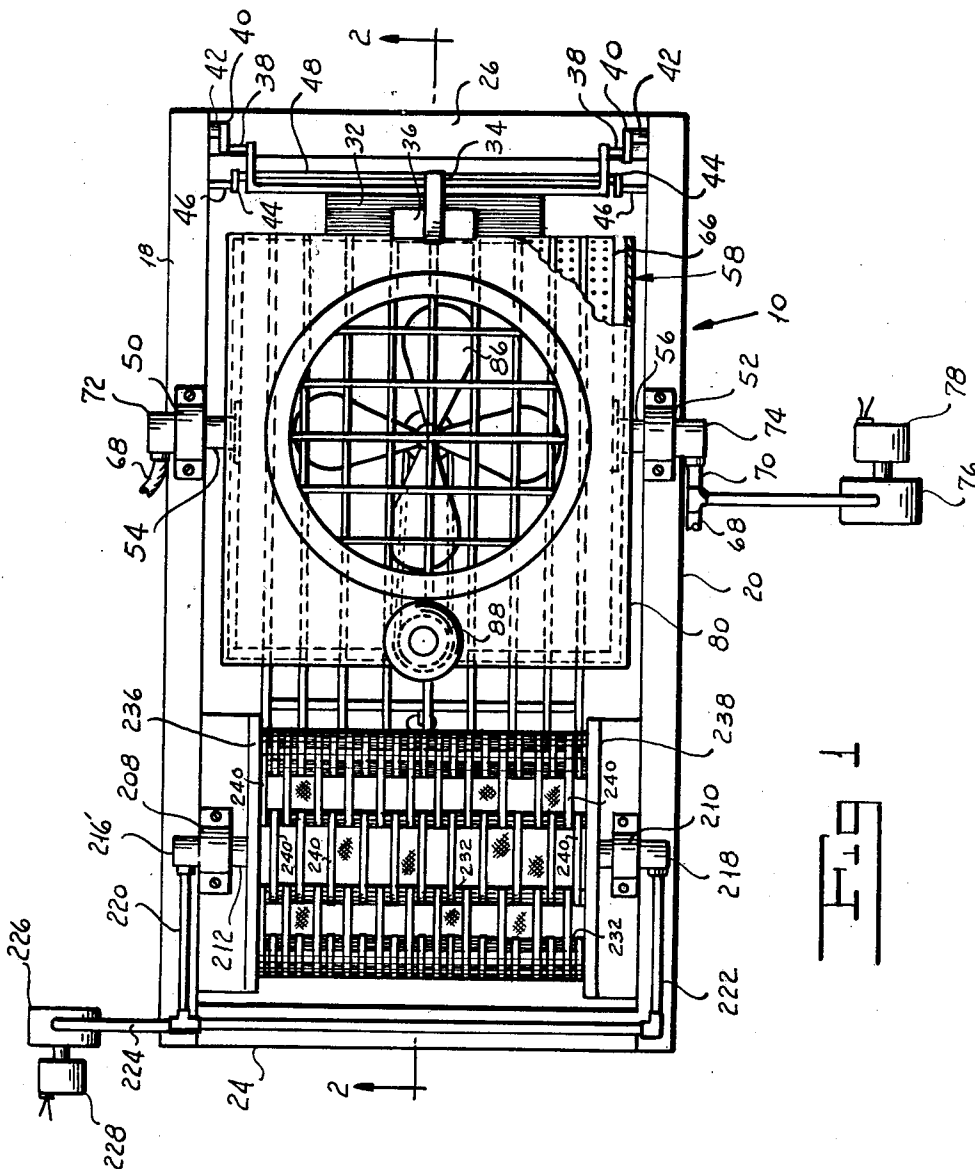


FIG. 1

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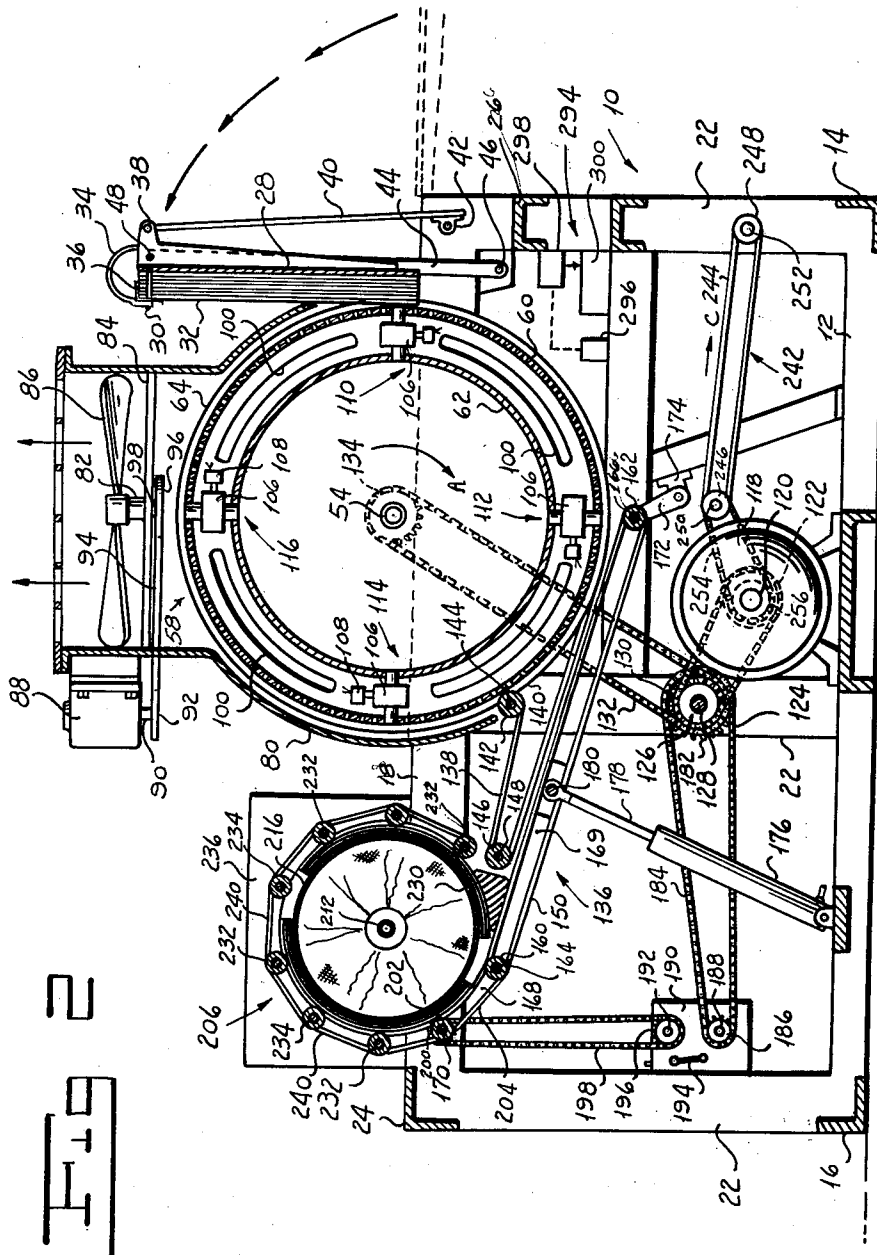
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5 Sheets-Sheet 2



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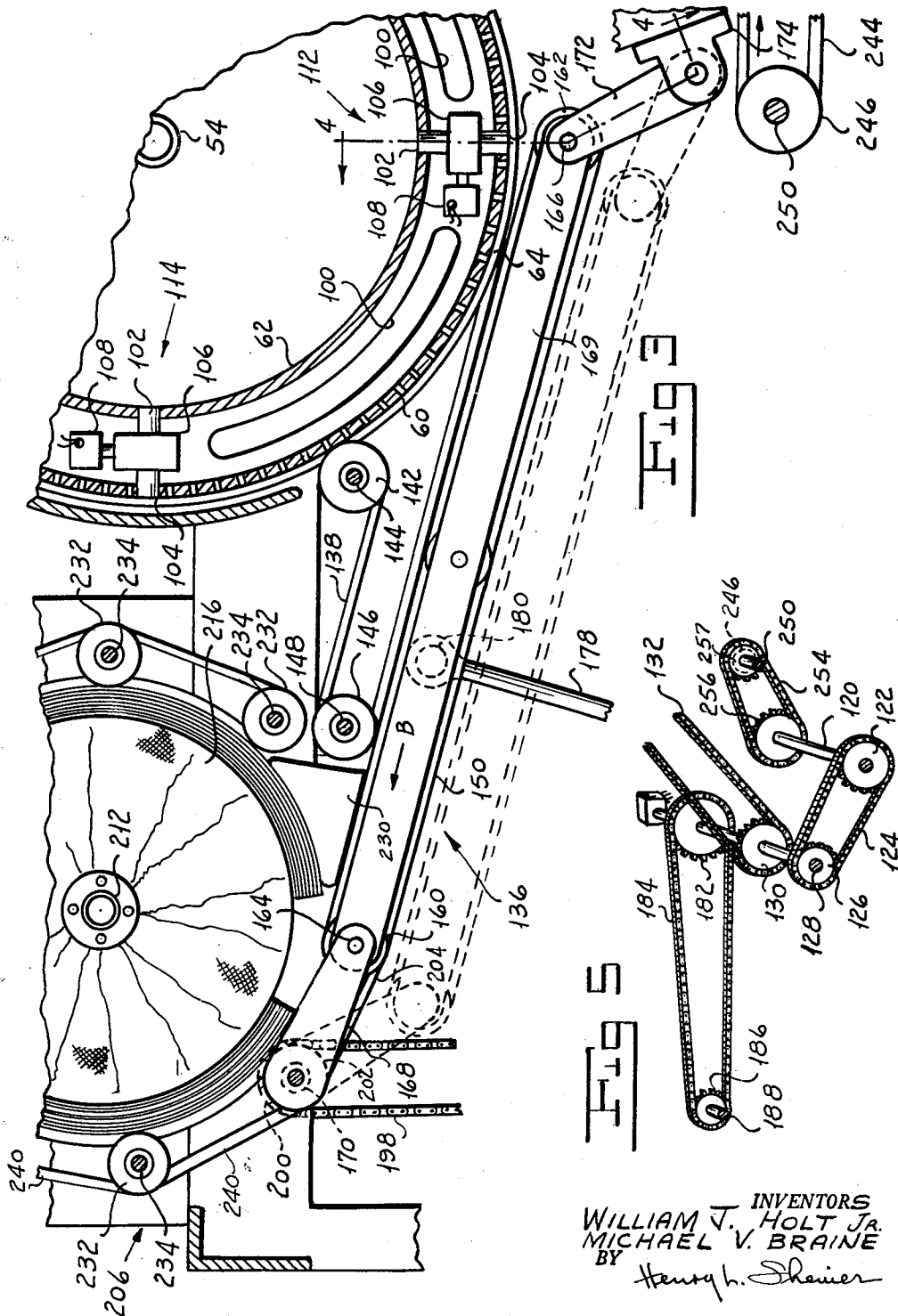
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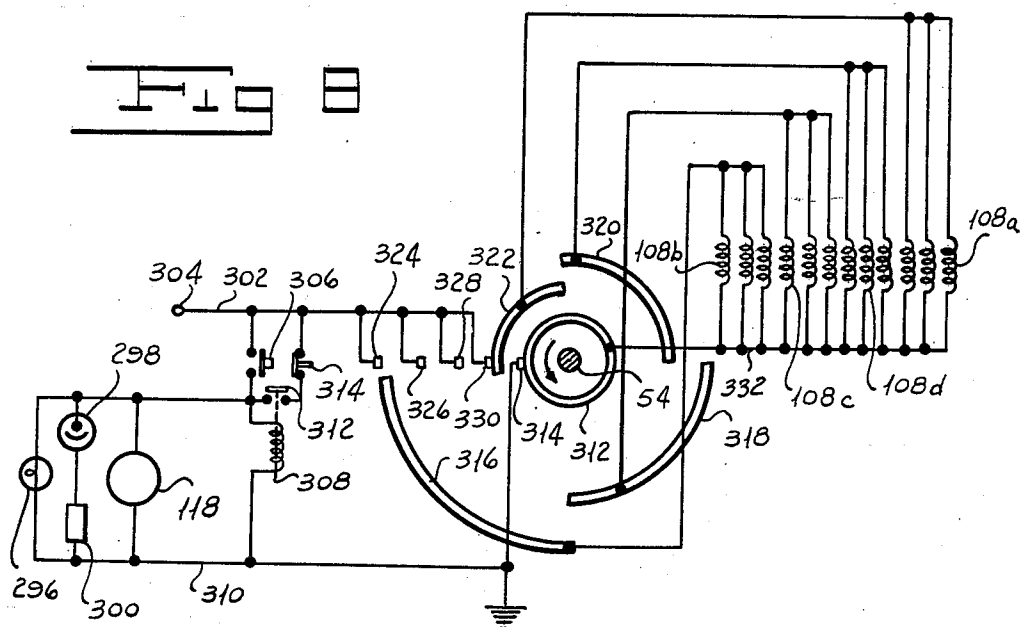
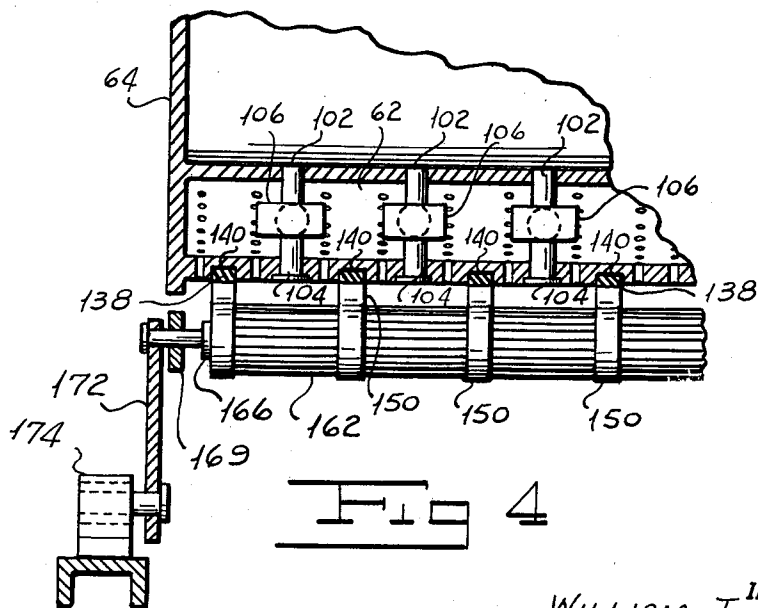
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HIGH SPEED BALLOT HANDLER

5 Sheets-Sheet 4



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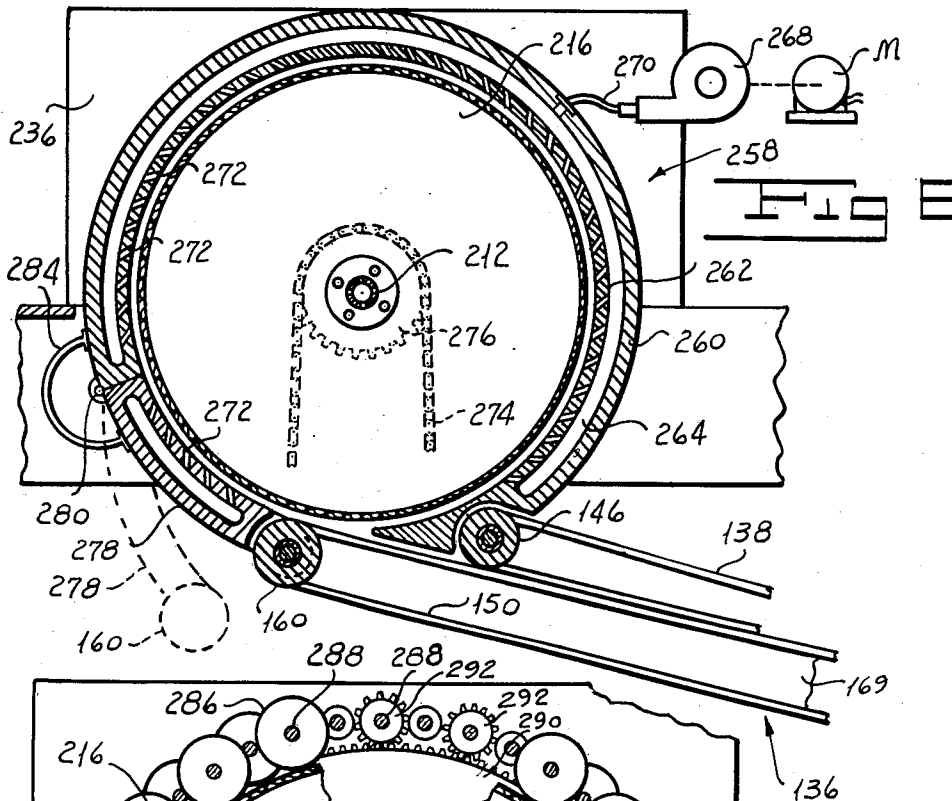
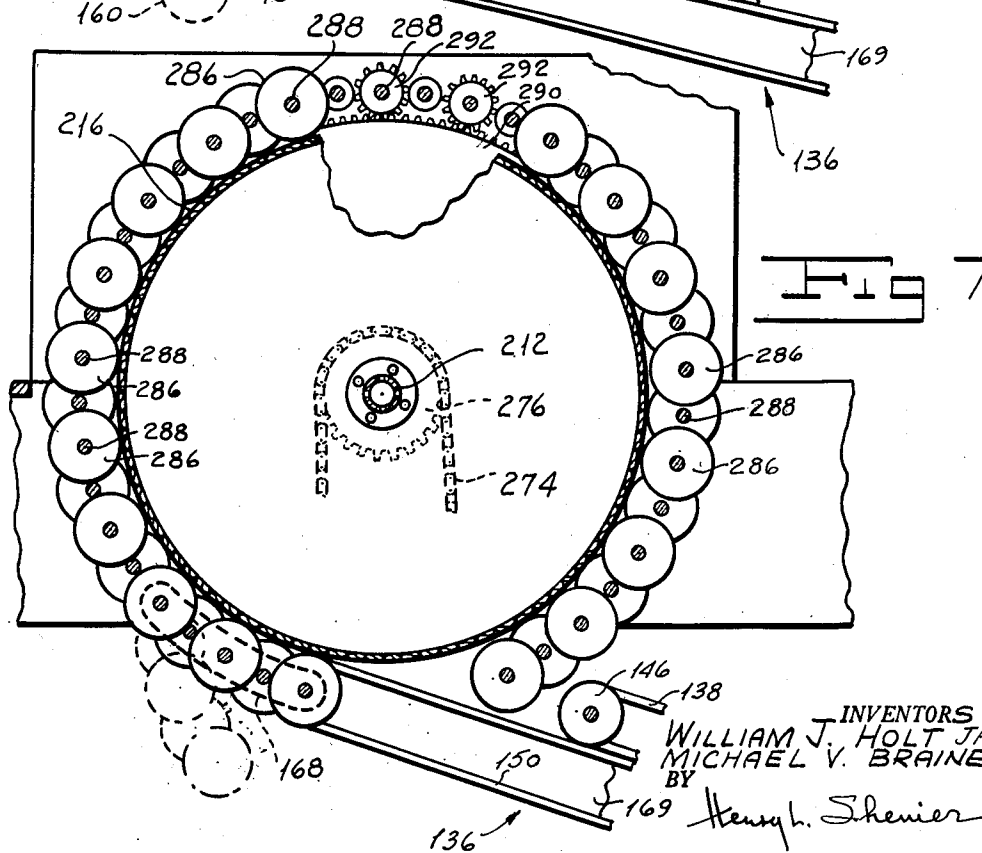
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3,074,712

HIGH SPEED BALLOT HANDLER

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Filed Dec. 17, 1959, Ser. No. 860,276

14 Claims. (Cl. 271-5)

Our invention relates to a high speed ballot handler and more particularly to apparatus for counting and stacking paper forms such as ballots in an extremely rapid and expeditious manner.

Our copending application, Serial No. 860,272, filed December 17, 1959, discloses a voting ballot handling machine which separates acceptable ballots from rejected ballots and which stacks the separated ballots. The apparatus for performing this operation includes an evacuated drum having ports in its peripheral skin which are normally closed by solenoid operated valves. As a row of valves approaches a supply of ballots to be separated, the valve solenoids are energized to open the valves to cause the drum to pick a ballot off the supply. In response to the operation of a scanner, acceptable ballots are taken off the drum at a first station and rejected ballots are taken off at a second station. At each station a slow speed conveyor system receives ballots from the take off means and conveys them to a tray at which the ballots are stopped and dropped to a stationary stack.

While the system disclosed in the copending application functions satisfactorily at reasonable speeds, at very high speeds aerodynamic problems such, for example, as windage interfere with the operation of the stacking system in which ballots are first decelerated and then stopped as they are stacked. In other words, the ballot handling machine disclosed in our copending application does not operate satisfactorily at speeds which are as high as are desirable in handling ballots.

We have invented an improved high speed ballot handler which counts and stacks paper forms such as ballots or the like in an extremely rapid and expeditious manner. Our machine includes an improved conveyor for picking ballots from a supply and for conveying the ballots to a stacker. Our machine is arranged to overcome the effects of windage on the conveyor. We provide our improved handler with a means for stacking ballots as they move. Our machine permits ballots to be handled and stacked at much higher speeds than those possible with paper form handling systems of the prior art.

One object of our invention is to provide a high speed ballot handler which counts and stacks paper forms such as ballots in an extremely rapid and expeditious manner.

Another object of our invention is to provide a high speed ballot handler in which the effect of windage is substantially reduced.

A still further object of our invention is to provide a high speed ballot handler which stacks the ballots as they move at the speed at which they are conveyed from a supply to the stacker.

Still another object of our invention is to provide a high speed ballot handler in which the effect of centrifugal force on ballots being carried is overcome.

Other and further objects of our invention will appear from the following description.

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In general our invention contemplates the provision of a high speed ballot handler including a rotatable drum having an outer foraminous skin and an inner impervious skin spaced from the outer skin. We mount the drum in a housing and draw air through the housing to cause the air to flow inwardly through the outer skin at a position adjacent a paper form supply and to flow outwardly through the outer skin at a substantially diametrically opposite location. We evacuate the space enclosed by the inner skin and provide spaced rows of solenoid operated valves adapted to be operated to connect ports in the outer skin to ports in the inner skin to pick ballots from the supply as a row of ports passes the supply. We drive the drum to carry the ballots from the supply to a rotary stacker disposed at a location remote from the supply. Our rotary stacker includes a rotatable cylindrical inflatable bag to which the ballots are fed together with means for causing ballots fed to the stacker to move around with the bag. As the stacker is driven, spaced stacks of ballots form on the bag surface. We provide our stacker with means for unloading the stacks of ballots at the end of a counting operation.

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views:

FIGURE 1 is a top plan view of our high speed ballot handler.

FIGURE 2 is a sectional view of our high speed ballot handler taken along the line 2-2 of FIGURE 1.

FIGURE 3 is a fragmentary sectional view of our high speed ballot handler drawn on an enlarged scale and showing the manner in which ballots are fed to the stacker.

FIGURE 4 is a fragmentary view of the conveyor drum of our high speed ballot handler showing the arrangement of the pick off valves.

FIGURE 5 is a fragmentary perspective view showing the driving mechanism of our high speed ballot handler.

FIGURE 6 is a sectional view of an alternate form of stacker which may be used with our high speed ballot handler.

FIGURE 7 is a sectional view of yet another form of stacker which may be used with our high speed ballot handler.

FIGURE 8 is a schematic view of one form of electrical control circuit which may be used with our high speed ballot handler.

Referring now more particularly to FIGURES 1 and 2 of the drawings, our high speed ballot handler includes a frame indicated generally by the reference character 10 having a base formed with sides 12, a front 14, and a back 16. The top of the frame includes sides 18 and 20 connected to the base by means of a plurality of uprights 22. Respective crossbars 24 and 26 complete the frame. We secure the frame members to each other by any suitable means such for example as by welding or the like.

We provide our handler with a tray 28 having pins 30 for receiving a supply of ballots 32 having holes permitting the ballots to be slipped onto the pins 30. A spring 34 actuates a retainer 36 to hold the supply of ballots 32 against the tray 28. We pivotally support tray 28 on a pair of pins 38 carried by arms 40 supported by bearings 42 carried by the machine frame. Arms 44 extend-

ing between pivot pins 46 carried by the machine frame and a rod 48 supported on the tray 28 cooperate with the arms 40 to permit the tray to be moved from a generally horizontal position at which it is loaded with a supply of ballots to be counted and restacked to an erect position in which it is held by the cooperating pairs of arms 40 and 44.

Respective bearings 50 and 52 carried by the sides 18 and 20 of the top of the machine frame rotatably support the respective stub shafts 54 and 56 of the conveyor drum indicated generally by the reference character 58 of our handler. Drum 58 includes an outer foraminous skin 60 and an inner impervious skin 62, each of which skins extends between the end plates 64 and 66 of our drum 58. Each of shafts 54 and 56 is hollow to permit communication to the interior of the drum to the space enclosed by the impervious skin 62. We secure lengths of flexible hose 68 and 70 between fittings 72 and 74 secured to the respective shafts 54 and 56 and an exhaust pump 76 driven by a motor 78.

We provide our handler with a housing 80 surrounding the upper portion of the drum 58 as viewed in FIGURE 2. A bearing 82 supported on a bracket 84 carried by the housing 80 rotatably supports a fan 86. A motor 88 carried by the housing 80 is adapted to be energized to drive a shaft 90 carrying a pulley 92 for rotation therewith. A belt 94 connects the pulley 92 to pulley 96 carried by the shaft 98 of fan 86 for rotation therewith. As fan 86 rotates, it draws air upwardly through the housing 80 as viewed in FIGURE 2 to cause the air to pass inwardly through the portion of the skin 60 adjacent the bottom of the drum 58 as viewed in FIGURE 2 and outwardly through the skin 60 at the top of the drum as viewed in FIGURE 2. We provide the end plates 64 and 66 with annular openings 100 through which more air can be drawn into the space between the skins 60 and 62. In this manner we create a low vacuum space between skins 60 and 62 in the area of the bottom of the drum 58 as viewed in FIGURE 2.

Referring now to FIGURES 1 to 5 we provide the inner skin 62 with a plurality of ports 102 adapted to be connected to ports 104 in the outer skin 60 by means of valves 106 adapted to be opened in response to the energization of solenoids 108. From the structure just described, it will be appreciated that when a solenoid 108 is energized, it opens its associated valve 106 to connect the interior of the skin 62 which is at a relatively high vacuum produced by the pump 76 to the exterior of the drum 58. We provide our drum with four respective spaced rows indicated generally by the reference characters 110, 112, 114, and 116 of ports 104 and 102 adapted to be connected by valves 106.

Our handler includes a motor 118 adapted to be energized to drive its shaft 120 which carries a sprocket wheel 122 for rotation therewith. Wheel 122 drives a pitch chain 124 which drives a sprocket wheel 126 carried by a shaft 128 rotatably supported on the handler frame 10. Shaft 128 carries a second sprocket wheel 130 which drives a pitch chain 132 leading to a sprocket wheel 134 carried by the shaft 54 for rotation therewith. From the structure just described, it will be apparent that when motor 118 is energized in a manner to be described hereinafter, shaft 120 drives the shaft 128 through the medium of sprocket wheel 122, chain 124 and sprocket wheel 126. As shaft 128 rotates, it drives the sprocket wheel 130 to drive shaft 54 through the chain 132 and sprocket wheel 134.

As a row, such for example as the row 110 of valves 106, approaches the supply of ballots 32, we energize the solenoids 108 in a manner to be described hereinafter to open the valves to connect the ports 102 and 104 to cause a ballot 32 to be picked off the supply. As the drum continues to rotate in the direction of the arrow A in FIGURE 2, it approaches a transfer conveyor indicated generally by the reference character 136.

We provide our handler with a plurality of stripper belts 138 disposed in grooves 140 in the surface of the drum 58. Belts 138 pass around a roller 142 rotatably carried by a shaft 144 supported by the machine frame 10. From the roller 142 belts 138 pass around a roller 146 rotatably carried by a shaft 148 supported on the frame 10. As a row of valves such as the row 110 approaches the conveyor 136, we de-energize the solenoids 108 of the row and the belts 138 carry the ballot which has been picked out of the supply by the row 110 away from the surface of the drum to permit it to be acted upon by the conveyor 136.

Conveyor 136 includes a plurality of spaced belts 150 carried by rollers 160 and 162 rotatably carried by shafts 164 and 166 supported by a pair of bars 169 forming a frame for the conveyor 136. A pair of spaced arms 168 pivotally supported in bearings 170 carried by the machine frame support the shaft 164. A second pair of arms 172 pivotally supported in bearings 174 on the machine frame carry the shaft 166. From the structure just described, it will be seen that the pairs of arms 168 and 172 swingably support the conveyor 136 on the machine frame. A cylinder 176 pivotally supported on the frame 10 is adapted to be supplied with fluid under pressure from a suitable source (not shown) to actuate a piston rod 178 pivotally connected to a bar 180 secured to the spaced bars 169 by any suitable means such as by welding. When pressure is supplied to the cylinder 176, it actuates rod 178 to swing the conveyor 136 to the position shown in the full lines in FIGURE 3. In this position of the conveyor, sufficient pressure is exerted to clamp a ballot or the like coming from the drum 58 between the stripper belts 138 and the belts 150 of the conveyor 136.

Shaft 128 carries a third sprocket wheel 182 for rotation therewith. Wheel 182 drives a pitch chain 184 connected to a sprocket wheel 186 carried by the input shaft 188 of a reversing gear mechanism 190 of a suitable type known to the art adapted to produce a step up in speed from the input shaft 188 to the output shaft 192 in the forward direction of drive and a speed reduction from the input shaft 188 to the output shaft 192 in the reverse drive direction. The mechanism 190 includes an operating handle 194 adapted to be moved between a forward drive position and a reverse drive position.

Shaft 192 carries for rotation therewith a sprocket wheel 196 which drives pitch chain 198 in engagement with a sprocket wheel 200 carried by a roller 202 rotatably supported on shaft 170. We provide our handler with a plurality of spaced belts 204 extending between the roller 160 and the roller 202. While we may employ any type of belt and roller for the parts of our machine, preferably we employ toothed belts adapted to engage teeth on the rollers. With the chain 198 driving in the forward direction and with the drum 58 rotating in the direction of the arrow "A" in FIGURE 2, the lower stands of belts 138 and the upper stands of belts 150, as viewed in FIGURES 2 and 3, move in the direction of the arrow "B" to carry ballots stripped from the drum 58 toward a stacking unit, indicated generally by the reference character 206.

Referring to FIGURES 1 to 3, the unit 206 includes respective bearings 208 and 210 for supporting a hollow shaft 212 which carries an inflatable bag 216 having a generally cylindrical shape. We form this bag from any suitable material such for example as a nylon fabric. Respective fittings 216' and 218 connect the ends of hollow shaft 212 to flexible ducts 220 and 222 leading to the outlet 224 of a fan or air pump 226. Openings in the central portions of the shaft permit air to flow into the interior of the bag. A motor 228 is adapted to be energized in a manner to be described hereinafter to drive the pump 226 to supply air under pressure to the bag 216. The air flowing inwardly through the pipes 220 and 222 inflates the bag with a predetermined pressure and escapes through

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the pores of the fabric from which the bag is formed. From the structure described, it will be seen that ballots stripped from the drum 58 are carried by the conveyor 136 toward the periphery of the inflatable bag 216. A guide 230 carried by the machine frame guides the ballots from the point at which they leave the stripper belts 138 to the point at which they enter the stacking mechanism 206.

In one form of our ballot handler, we provide the stacker 206 with a plurality of rollers 232 rotatably supported by shafts 234 spaced around the bag 216. Any suitable means such for example as a pair of brackets 236 and 238 carried by the frame 10 support the shafts 234. Spaced belts 240 extend between roller 202 and the first roller 232 and between adjacent rollers 232 to the last roller 232 disposed over the roller 146, as shown in FIGURE 2.

Owing to the connection between the roller 202 and the first roller 232, all the belts 240 are driven along with the belts 150 of the conveyor 136. With the bag 216 inflated, its periphery is in engagement with the belts 240 with the result that the bag 216 is frictionally driven by the belts. As a ballot leaves the conveyor 150, it is caught between the surface of the fabric bag 216 and the surface of belts 240.

In the particular embodiment of our ballot handler illustrated in FIGURES 1 to 4, we provide the drum 58 with four sets or rows of valves 106. We drive the conveyor 136 at a linear speed which is the same as the peripheral speed of the drum 58. We so arrange the gear mechanism 190 that the linear speed of belts 240 is equal to the speed of the conveyor 136. The diameter of the circular path provided by the inboard lengths of belts 240 is substantially half the diameter of the drum 58 with the result that as the system operates, the stacker 206 receives two ballots 32 from conveyor 136 in spaced relationship to each other. As the third ballot passes from the conveyor 136 to the stacker 206, its leading edge registers with the leading edge of a ballot which has already been received by the conveyor. As a result of this operation, two stacks of ballots are formed on the bag 216. It will be appreciated that as the thickness of the stacks builds up, the fabric bag yields against the pressure of the air being supplied to the bag. While we have shown a stacker 206 which forms two spaced stacks, it will be understood that three or four or more stacks could be provided by changing the diameter of the stacker system 206.

After a supply of ballots has been handled in a manner to be described hereinafter, we relieve the fluid pressure to the cylinder 176 to permit the conveyor 136 to drop to the broken line position shown in FIGURE 3. At the same time we operate handle 194 to cause the conveyor 136 and the belts 240 to be driven at a reduced speed in the reverse direction. When this is done, the stacks of ballots pass out of the stacker 206 and along the conveyor 136 in a direction opposite to the arrow B in FIGURE 3 to an unloading conveyor indicated generally by the reference character 242.

The conveyor 242 includes a plurality of spaced belts 244 supported on rollers 246 and 248 rotatably carried by shafts 250 and 252 on the machine frame. A pitch chain 254 driven by a sprocket wheel 256 on the shaft 120 may be employed to drive sprocket wheel 257 on roller 246 to drive conveyor 242 in the direction of the arrow C in FIGURE 2 to move the stacks of ballots being unloaded to the front of the machine.

Referring now to FIGURE 6 in an alternate form of our stacker, we provide a double walled stationary housing indicated generally by the reference character 258 having an outer wall 260 and an inner wall 262. We supply air under a relatively high pressure to the space 264 enclosed by walls 260 and 262. A motor 266 drives a pump 268 to provide the required pressure for the air supplied to the space 264 through a tube 270. We pro-

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vide the inner wall 262 with a plurality of spaced bores 272 through which air may escape from the space 264 to the inside of the housing. This action provides a thin film of air between the inner surface of wall 262 and the surface of bag 216. Ballots coming from the conveyor 136 are held against the surface of bag 216 by this film of air.

In this form of our invention, bag 216 is driven by a chain 274 which drives a sprocket wheel 276 carried by the shaft 212 for rotation therewith. Any suitable means such for example as a sprocket wheel (not shown) on the shaft 192 may be employed to drive chain 274. We provide the housing 258 with a movable wall section 278 connected to the housing by a hinge 280. A shaft 282 on the section 278 rotatably supports the roller 160 of conveyor 136. A length 284 of high pressure tube connects the interior of section 278 to the space 264. When this form of our stacker is to be unloaded, fluid under pressure is exhausted from cylinder 176 and conveyor 136 together with wall section 278 swings to its open position to permit the ballots to be removed.

In still another form of our stacker shown in FIGURE 7, a plurality of slotted roller 286 have shafts 288 rotatably supported on the frame 10 such for example as on the brackets 236 and 238. We so arrange the rollers 288 that the discs of adjacent rollers are interleaved. We provide the shaft 212 for example with a large gear 290 which drives gears 292 on the alternate shafts 288 to drive rollers 286. In this form of our invention the arms 168 support a plurality of the roller shafts 288 to permit a section of the stacker to be unloaded.

We provide our handler with a scanning mechanism indicated generally by the reference character 294 which may for example include a source 296 of illumination adapted to direct light onto the surface of a ballot carried by the drum. Light reflected from the ballot is adapted to energize a photocell or the like 298 to energize a counter 300. We may arrange this scanning mechanism either to count the total number of ballots handled or to count ballots containing certain indicia. The scanner may be a photoelectric scanner of the type described or alternatively it could be a magnetic pick-up head of any suitable type known to the art adapted to read magnetic indicia printed on the ballots being handled.

Referring now to FIGURE 8, one form of control circuit which may be used to operate our handler includes a conductor 302 connected to the positive terminal 304 of a suitable source of electrical energy. We connect a "start" push button switch 306 in series with a holding relay winding 308 between the conductor 302 and conductor 310 connected to ground. In response to the operation of push button switch 306, winding 308 is energized to close a normally open switch 312 connected in series with a "stop" push button switch 314 between the conductor 302 and the common terminal of switch 306 and winding 308. We connect counter 300 and the photoelectric cell 298 in a series circuit and connect this circuit, the motor 118 and the lamp 296 in parallel with winding 308. From the structure just described it will be seen that upon actuation of push button 306 relay winding 308 is energized to close switch 312 to complete holding circuit for motor 118, lamp 296, and photoelectric cell 298.

We provide the shaft 54 for example of drum 58 with a slip ring 312 adapted to be engaged by a brush 314 connected to conductor 310. We mount respective commutator segments 316, 318, 320, and 322 on shaft 54 for rotation therewith. Respective brushes 324, 326, 328 and 330 are adapted to engage the respective segments 316, 318, 320, and 322. We connect the solenoid winding 108a associated with the row 110 of valves 106 in parallel between segment 322 and a conductor 332 connected to slip ring 312. We connect the solenoid windings 108b associated with row 112 in parallel between segment 316 and conductor 332. Solenoid wind-

ings 108c associated with row 114 are connected in parallel between segment 318 and conductor 332, while solenoid windings 108d associated with row 116 are connected in parallel between segment 320 and conductor 332.

In operation of the form of our handler shown in FIGURES 1 to 5 with a supply of ballots 32 on the tray 28 and with the tray in its elevated position, all the motors 89, 88, and 222 are energized to place the interior of skin 62 under a relatively high vacuum to draw air through the housing 80 and to supply air under pressure to the bag 216. To start the system, push button 306 is actuated to energize winding 308 to close switch 312 to complete the holding circuit for motor 118 and to energize the scanning system 294. As the drum 58 begins to rotate to cause the row 110 of valves 106 to approach the tray 28, segment 322 engages brush 330 to complete the circuits of windings 108a to open the valves 106 to connect the relatively high vacuum to the exterior of the drum 58 to pick the top ballot off the stack of ballots 32. As the drum moves, the air being drawn through foraminous outer skin assists in retaining the ballot on the drum. As the drum 58 completes a half revolution, segment 322 leaves brush 330 to de-energize windings 108a to permit the valves 106 of row 110 to close. When the valves close the ballot is retained on the drum only through the action of the air flowing through the outer skin of the drum. After the ballot is released by the high vacuum in the manner described, the stripper belt 138 carries the ballot away from the drum surface to permit the conveyor 136 to carry the ballot from the drum 58 to the stacker 206.

As the drum 58 continues to rotate in the manner described, ballots are successively picked from the supply of ballots 32, carried past the scanning system 294 and delivered to the conveyor 136. These ballots are successively fed by the conveyor 136 to the nip between the inflatable bag 216 and the belts 204. As has been explained hereinabove, the speed of rotation of the surface provided by the inner stands of belts 240 is substantially the same as the linear speed of the belts 150 of conveyor 136. The diameter of this surface is such that two stacks of ballots are formed by the ballots fed to the stacker by conveyor 136. When the supply of ballots 32 is exhausted or when stacks of the maximum size which can be handled by the stacker 206 have built up on the bag 216, we move the tray 28 to its inoperative position so that no more ballots are picked from the supply by the drum 58. It is to be understood that we could, if desired, provide a clutch for disengaging the drive of the drum 58 during the unloading operation. When the drum 58 has thus been rendered inactive either by moving the tray 28 to its inoperative position or by interrupting the drum drive, we operate lever 194 to reverse the direction of drive of conveyor 136 and belts 240. At the same time we exhaust the cylinder 176 to permit conveyor 136 to move to its unloading position. The belts 240 and the conveyor 136 then drive at a reduced speed and the stacks of ballots are carried to the discharge conveyor 242. When a new supply of ballots is to be handled, the conveyor 136 is moved to its ballot handling position and lever 194 is operated to cause the conveyor and the stacker to drive in the forward direction.

The operation of the forms of our invention shown in FIGURES 6 and 7 is substantially the same as that described in connection with the form of the invention shown in FIGURES 1 to 5 with the exception that other means are used to guide the ballots on the bag 216. A further exception is that in the form of our invention shown in FIGURES 6 and 7, the bag is directly driven.

While we have described our apparatus in connection with handling and stacking ballots it is to be understood that it may be used for any flexible sheet which is to be handled. It is further contemplated by our invention that the conveying and stacking systems shown in this

application could be employed in form separating systems such as that shown in our copending application referred to hereinabove. It will be appreciated that the formation of a plurality of stacks of ballots in the manner set forth is inherently a separation operation. Thus, by varying the size and relationship of the pickup drum and stacker various sorting operations can be performed.

It will be seen that we have accomplished the objects of our invention. We have provided a high speed ballot handler which handles and stacks ballots in an extremely rapid and expeditious manner. Our handler overcomes the effects of windage and the like which are present in many form handlers of the prior art. Our ballot handler forms stacks of ballots or the like without decelerating the ballots being handled.

It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of our claims. It is further obvious that various changes may be made in details within the scope of our claims without departing from the spirit of our invention. It is, therefore, to be understood that our invention is not to be limited to the specific details shown and described.

Having thus described our invention, what we claim is:

1. In a paper form handling machine apparatus for stacking forms fed thereto including a resilient cushion adapted to receive forms, means for constraining forms fed to said apparatus to follow a path conforming to the shape of said cushion and means for driving said cushion to build up a moving stack of forms on said cushion, said cushion resiliently urging forms fed thereto into engagement with said constraining means to permit a stack of appreciable size to be built up on said cushion against the resilient action of the cushion.

2. In a paper form handling machine apparatus for stacking forms fed thereto including an inflatable means for receiving forms fed thereto, means for inflating said means, means for retaining forms fed to said apparatus on said inflatable means, means for feeding forms in spaced relation to said inflatable means and means for rotating said inflatable means to cause forms fed thereto to build up a stack of forms on said inflatable means, said inflatable means collapsing as said stack builds up thereon to permit a stack of appreciable size to build up on the inflatable means.

3. In a paper form handling machine apparatus for stacking forms fed thereto including an inflatable bag for receiving forms fed thereto, means for inflating said bag, means providing a generally circular path for retaining forms fed to said apparatus on said bag, means for feeding forms in spaced relation to said bag and means for driving said bag to cause forms fed to the apparatus to build up a plurality of moving stacks of forms on said bag, said bag collapsing as said stacks build up to permit stacks of appreciable size to build up on the bag.

4. In a paper form handling machine apparatus for stacking forms fed thereto including an inflatable bag for receiving forms fed thereto, a plurality of belts surrounding said bag, means for inflating said bag to cause the bag to form an endless path for forms between said belts and said bag, means for feeding forms in spaced relation to said apparatus between said belts and said bag and means for driving said bag to cause forms fed to the apparatus to build up a plurality of moving stacks of forms on said bag, said bag collapsing as said stacks build up to permit stacks of appreciable size to be built up on said bag.

5. In a paper form handling machine apparatus for stacking forms fed thereto including an inflatable bag, a stationary housing surrounding said bag, said housing having an impervious outer wall and an inner wall formed with pores for the passage of fluid, means for supplying fluid under pressure to the space between said walls to provide a film of fluid between said inner wall and said

bag, means for inflating said bag, means for feeding forms to said apparatus between said bag and said fluid film and means for driving said bag.

6. In a paper form handling machine apparatus for stacking forms fed thereto including an inflatable bag for receiving forms fed thereto, a plurality of rollers surrounding said bag to provide an endless path for forms fed to said apparatus between said bag and said rollers, means for inflating said bag, means for feeding forms in spaced relation to said bag and means for driving said bag to cause forms fed thereto to build up a stack of forms on said bag, said bag collapsing as said stacks build up thereto to permit stacks of appreciable size to build up on said bag.

7. In a paper form handling machine apparatus for stacking forms fed thereto including an inflatable bag, means for inflating said bag, form retaining means providing an endless path around said bag between the bag and the retaining means and means for driving said bag, said retaining means being provided with a movable section for permitting said apparatus to be unloaded, said bag collapsing as said stacks build up thereon to permit stacks of appreciable size to build up on said bag.

8. In a paper form handling machine having a supply of forms to be individually removed from the supply and to be conveyed to a location remote from said supply including an impervious inner wall, a foraminous outer wall, means for producing a relatively high vacuum within said inner wall, means for producing a relatively low vacuum between said walls, means adapted to be actuated to provide communication between the inside of said inner wall and the outside of said outer wall, means for driving said conveyor to move said communication providing means past said supply and to said remote location, means for actuating said communication providing means as it approaches said supply and means for deactuating said communication providing means as it approaches said remote location.

9. In a paper form handling machine having a supply of forms to be individually removed from the supply and to be conveyed to a location remote from said supply including a drum having an impervious inner wall and having a foraminous outer wall, means for producing a relatively high vacuum within said inner wall, means for producing a relatively low vacuum between said walls, means adapted to be actuated to provide communication between the inside of said inner wall and the outside of said outer wall, means mounting said drum for rotary movement, means for driving said drum to move said communication providing means past said supply and to said remote location, means for actuating said communication providing means as it approaches said supply and means for deactuating said communication providing means as it approaches said remote location.

10. In a paper form handling machine having a supply of forms to be individually removed from the supply and to be conveyed to a location remote from said supply including a drum having an impervious inner wall and having a foraminous outer wall, means for producing a relatively high vacuum within said inner wall, means for producing a relatively low vacuum between said walls, means adapted to be actuated to provide communication between the inside of said inner wall and the outside of said outer wall, means mounting said drum for rotary movement, means for driving said drum to move said communication providing means past said supply and to said remote location, means for actuating said communication providing means as it approaches said supply, means for deactuating said communication providing means as it approaches said remote location, and means for stripping forms from said drum as said communication providing means arrives at said remote location.

11. In a paper form handling machine having a supply of forms to be individually removed from the supply and to be conveyed to a location remote from said supply,

apparatus including a housing having an inlet opening an outlet opening, a drum having a foraminous outer wall and having an impervious inner wall, means mounting said drum for rotary movement within said housing, means for moving air through said housing from said inlet opening to said outlet opening to cause said air to pass through the space between said walls to provide a relatively low vacuum in the space between said walls in the area of said inlet opening, means for producing a relatively high vacuum within said inner wall, means adapted to be actuated to provide communication between the inside of said inner wall and the outside of said outer wall, means for driving said drum to move said communication providing means past said supply to said remote location, means for actuating said communication providing means as it approaches said supply and means for deactuating said communication providing means as it approaches said remote location.

12. A paper form handling machine for handling and arranging a supply of paper forms in stacks including in combination means for removing said forms individually from said supply, means for causing forms to build up a plurality of moving stacks of forms, said stack building means comprising a section adapted to be moved to permit the stacks built up to be unloaded, means for conveying forms from said form removing means to said stack build up means and means mounting said conveying means for movement from a first position at which it carries forms from said removing means to said stack forming means to a second position at which it receives stacks of forms from said stack build up means.

13. In a paper form handling machine apparatus for stacking forms fed thereto including an inflatable bag for receiving forms fed thereto, means for inflating said bag, form retaining means providing an endless path around said bag between the bag and the retaining means, means for feeding forms in spaced relation to said bag, means for driving said bag to form a stack of forms on said bag and means for unloading said stack of forms from said bag, said bag collapsing as said stack builds up to permit a stack of appreciable size to build up on said bag.

14. Apparatus for handling forms including in combination means for positioning a supply of forms to be handled, a housing having an inlet opening and an outlet opening, a drum having a foraminous outer wall, and having an impervious inner wall, means mounting said drum for rotary movement within said housing, means for moving air through said housing from said inlet opening to said outlet opening to cause said air to pass through the space between said walls to provide a relatively low vacuum in the space between said walls in the area of said inlet opening, means for producing a relatively high vacuum within said inner wall, means adapted to be actuated to provide communication between the inside of said inner wall and the outside of said outer wall, means for driving said drum to move said communication providing means past said supply positioning means to a remote location, means for actuating said communication providing means as it approaches said supply positioning means to cause forms from said supply to be removed individually from the supply and to be conveyed to said remote location, means for deactuating said communication providing means as it approaches said remote location, collecting means providing a pair of synchronously moving surfaces defining a collecting area therebetween and means including guide means for directing forms from said drum at said remote location to said collecting area to cause a moving stack of forms to build up on said collecting means between said surfaces.

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