April 19, 1960 A. R. STOBB 2,933,314

METHOD AND MEANS FOR COLLECTING AND STACKING FLEXIBLE SHEETS

Filed Jan. 27, 1958 4 Sheets-Sheet 1

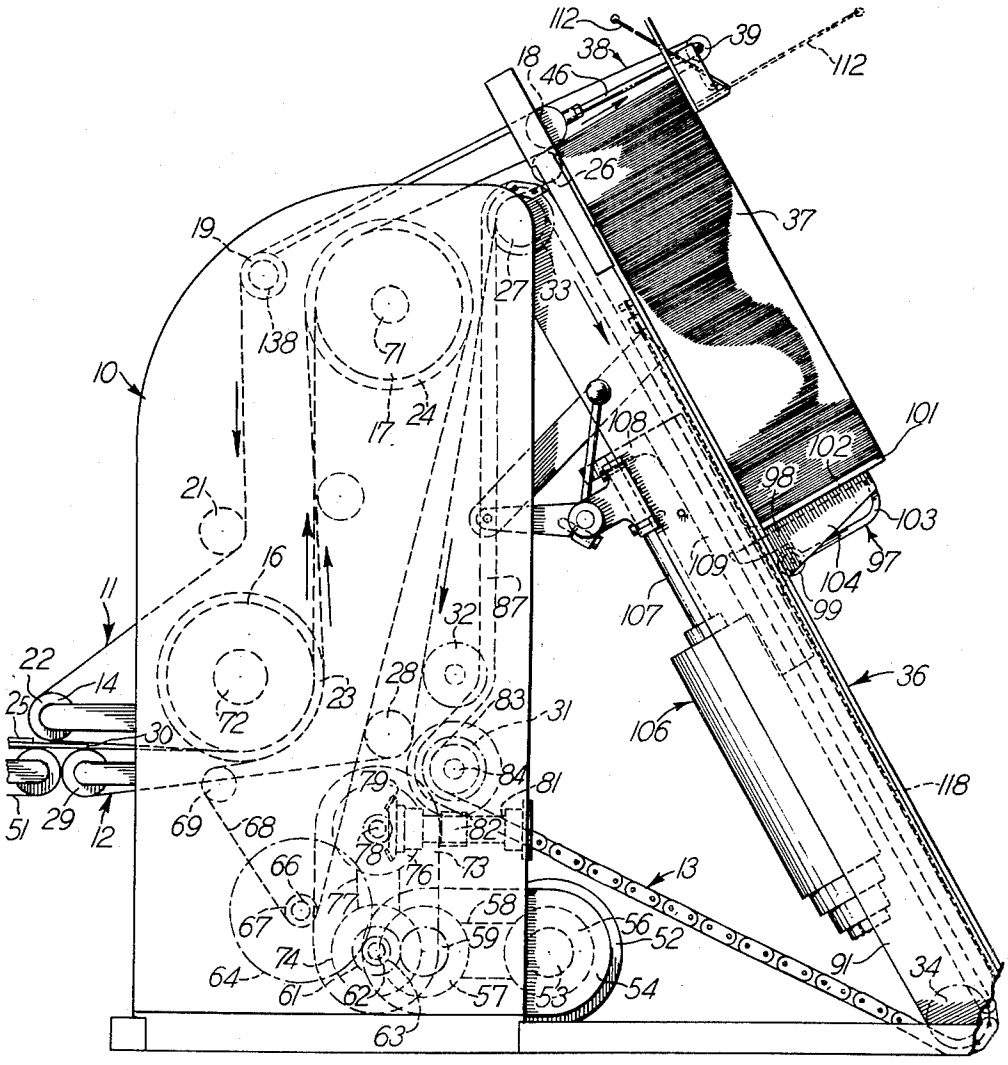


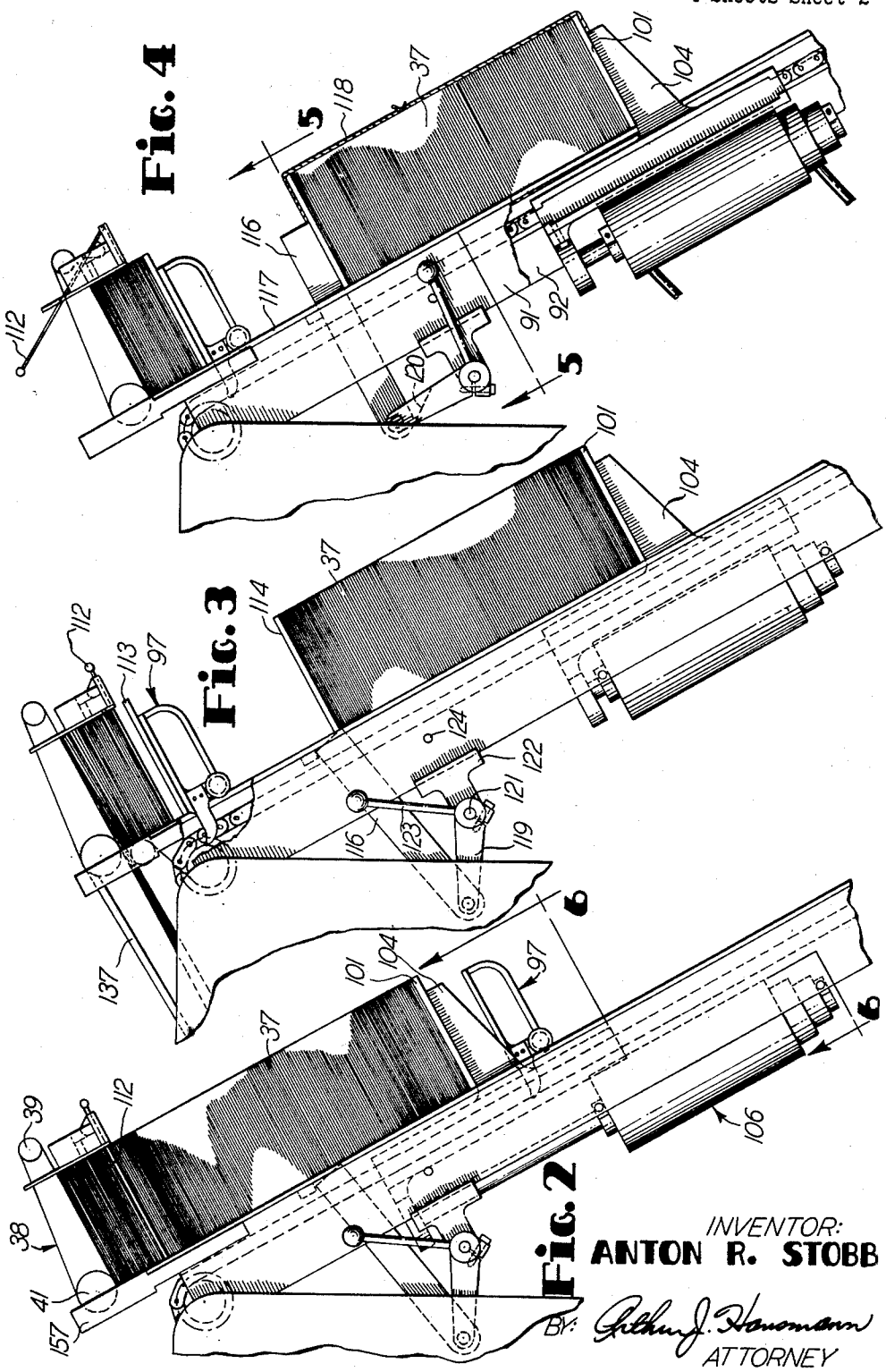
Fig. 1

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METHOD AND MEANS FOR COLLECTING AND STACKING FLEXIBLE SHEETS

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METHOD AND MEANS FOR COLLECTING AND STACKING FLEXIBLE SHEETS

Filed Jan. 27, 1958 4 Sheets-Sheet 3

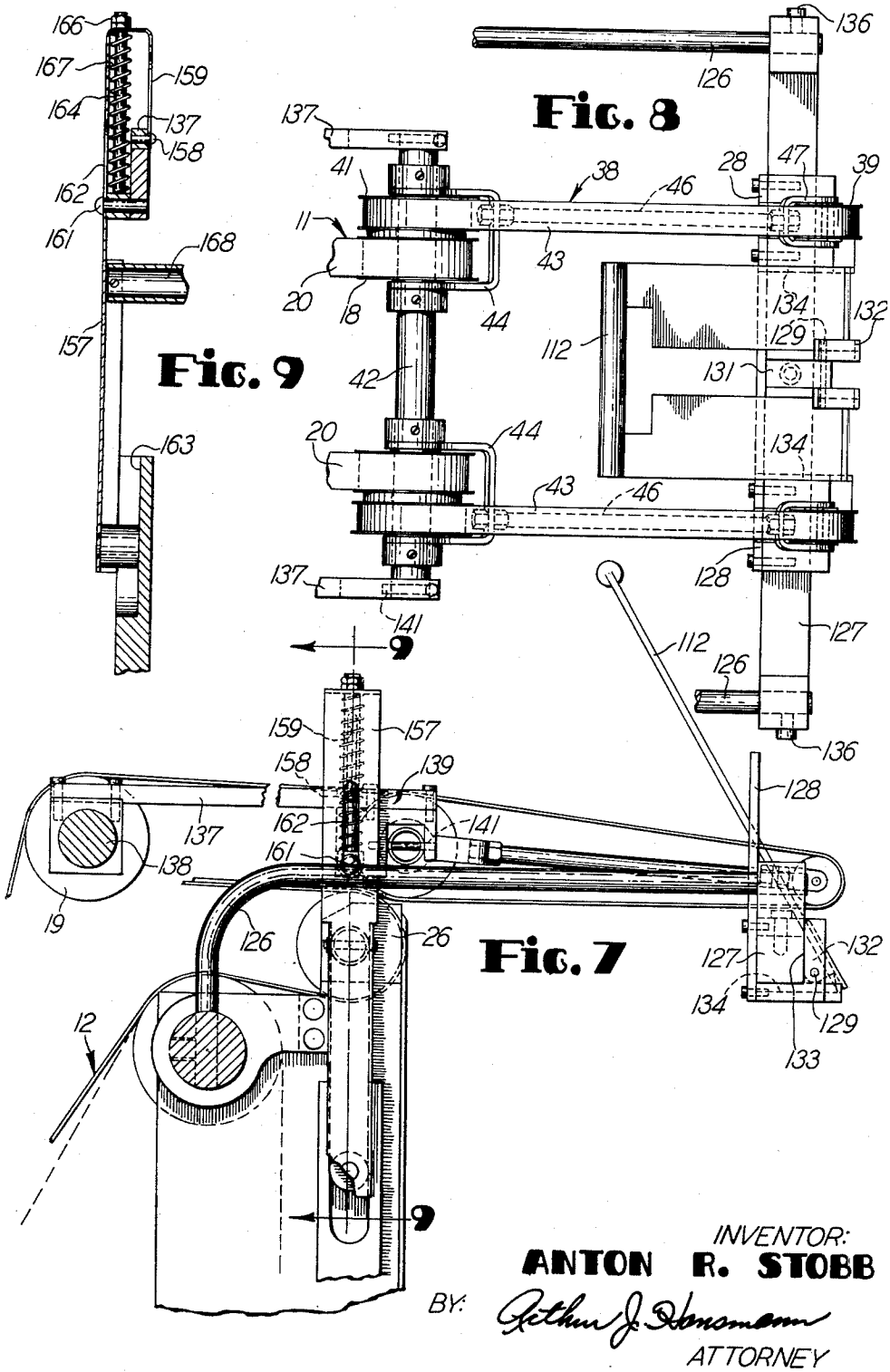


Fig. 8

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METHOD AND MEANS FOR COLLECTING AND STACKING FLEXIBLE SHEETS

Filed Jan. 27, 1958 4 Sheets-Sheet 4

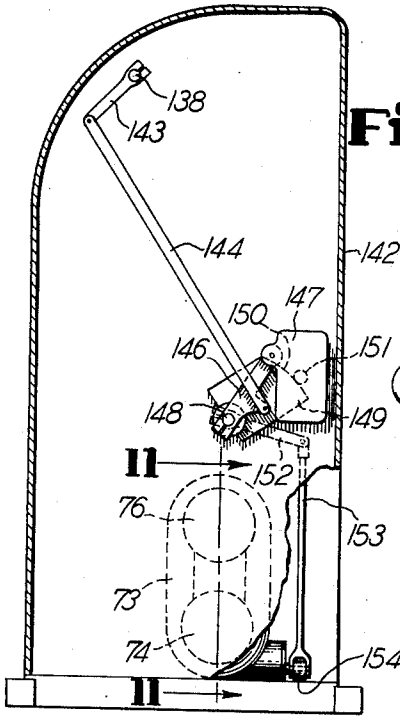


Fig. 10

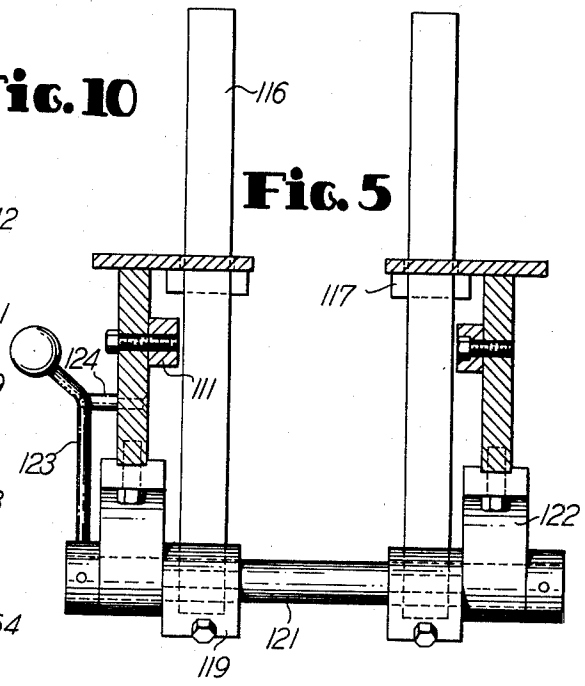


Fig. 5

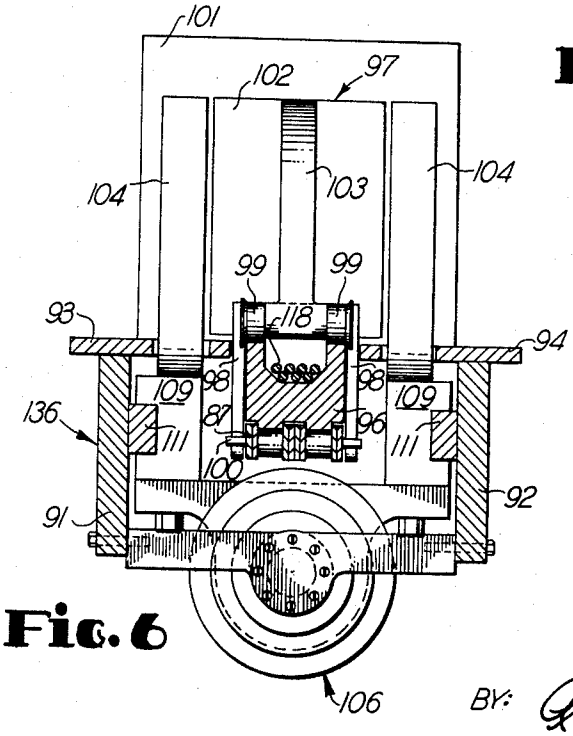


Fig. 6

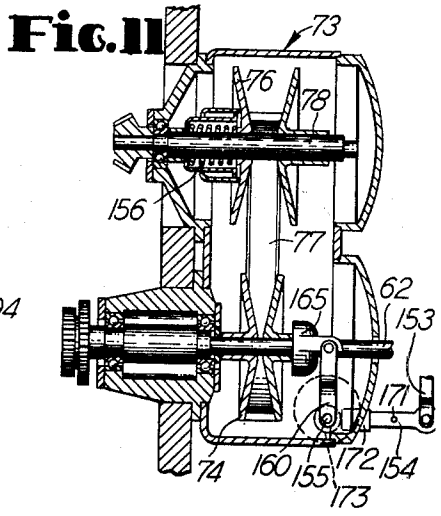


Fig. 11

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United States Patent Office 2,933,314 Patented Apr. 19, 1960

2,933,314

METHOD AND MEANS FOR COLLECTING AND STACKING FLEXIBLE SHEETS

Anton R. Stobb, Racine, Wis.

Application January 27, 1958, Serial No. 711,515

17 Claims. (Cl. 271—88)

This invention relates to a method and means for collecting and stacking flexible sheets. Also see my companion Patent No. 2,933,313, application Serial No. 711,516.

It is a general object of this invention to improve the presently known method and means of collecting flexible sheets through the use of endless conveyors whereon the sheets are deposited and carried to the receiver or packer box. In stating this general object, it should be understood that this patent is not directed at making any claim for the basic invention of conveyors transporting sheets of signatures or the like to a receiver or packer box, but rather it is concerned with certain improvements in this basic structure.

A specific object of this invention is to provide an improved method and means for handling flexible sheets in a receiver or packer box where the sheets are conveyed thereto by means of endless belts or the like. In accomplishing this object, the end result is that the sheets are readily and easily handled by only one operator tending the packer box, and the operator can accurately determine and control the size of each bundle of sheets, and he can compress the bundle and bind or tie the same while also tending to the operation of the rest of the machine conveying the sheets to the packer box.

Still another object of this invention is to provide a collector for flexible sheets wherein the sheets are delivered to a packer box which is disposed at a downward angle or on a downgrade so that the sheets themselves will pack under their own weight in the desired stack in the packer box.

Another and important object of this invention is to provide a collector for flexible sheets wherein the collector is composed of a series of conveyors and a packer box with a conveyor such that the stack of the sheets in the packer box will automatically govern the speed of the incoming conveyors so that the stacking of the sheets in the packer box will be automatically controlled by the collector.

Other objects and advantages will become apparent upon reading the following description in conjunction with the accompanying drawings, wherein:

Fig. 1 is a side elevational view of a preferred embodiment of this invention with parts broken away and parts removed.

Fig. 2 is a side elevational view of a fragment of that shown in Fig. 1 and showing certain parts in a different position.

Fig. 3 is similar to Fig. 2, but with parts thereof in a different position and showing the paper or signatures entering the packer box or receiver, and with parts broken away.

Fig. 4 is also similar to Fig. 2, but with the parts thereof in still a different position, and with parts added and parts broken away.

Fig. 5 is an enlarged sectional view taken on the line 5—5 of Fig. 4, but with parts removed.

Fig. 6 is an enlarged sectional view taken on the line 6—6 of Fig. 2.

Fig. 7 is an enlarged side elevational view of a fragment of that shown in Fig. 1, but with parts added.

Fig. 8 is a top view of Fig. 7, but with parts removed and parts broken away.

Fig. 9 is a sectional view taken on the line 9—9 of Fig. 7.

Fig. 10 is a side elevational view of a fragment of Fig. 1 with parts added and with parts removed.

Fig. 11 is a sectional view taken on the line 11—11 of Fig. 10.

The same reference numerals refer to the same parts throughout the several views.

Fig. 1 shows the machine to consist generally of a frame 10 which supports a first conveyor 11 and a second conveyor 12 and a third conveyor 13. The conveyor 11 is suitably trained around a pulley or the like 14 and a larger pulley or roller 16 and a pulley or roller 17 and pulleys 18, 19, 21 and 22. It will thus be understood that the conveyor 11 is endless and is shown in Fig. 8 to be composed of two belts 20 disposed along the pulleys and rollers mentioned. Likewise, the conveyor 12 is trained about the pulleys or rollers 16 and 17 and the pulleys or the like 26, 27, 28 and 29. In this manner, the conveyors 11 and 12 are disposed for movement in the direction of the arrows shown adjacent to the conveyors such that the conveyors 11 and 12 in their extents from the pulley 16 to the pulleys 18 and 26 convey echeloned and overlapped sheets of paper 25 which are preferably and normally folded to form signatures for books, magazines and the like. It will be seen that the signatures are of a given thickness and their leading edges 30 are spaced apart as shown by the signatures entering the collector. Also, the conveyor 13 is trained about its series of pulleys or rollers or sprockets 31, 32, 33 and 34. Thus, the conveyor 13 is disposed along a receiver or packer box generally designated 36 so that the extent of the conveyor 13 between the sprockets 33 and 34 extends along the bed of the receiver 36 to move therealong in the direction of the arrow shown so that the sheets disposed between the conveyors 11 and 12, as shown in Fig. 3, are transported to the receiver 36 to form the stack or pile of sheets 37 with the conveyor 13 controlling the downward movement of the pile 37 in the receiver 36. For reasons more fully apparent hereinafter, it is preferred that the conveyor 13 be made of a chain having links and cross pins, as shown and described in connection with other views.

Still another conveyor 38 is mounted on the upper end of the collector so that the conveyor 38 is composed of belts trained about pulleys 41 axially aligned with the pulley 18 and other pulleys 39. Fig. 8 shows the pulleys 41 supporting one terminal of the conveyor 38, and it also shows the pulleys 39. In this arrangement, both pairs of pulleys 18 and both pairs of pulleys 41 are supported on a common shaft 42 and are joined together such that rotation of the pulleys 18 induces similar rotation of the pulleys 41 for movement of the belts 43 of the conveyor 38 in the direction of the arrow shown in Fig. 1. At this time it will also be noticed that yokes 44 are mounted on the shaft 42 to support rods 46 which in turn carry yokes 47 which rotatably support the pulleys 39. With this arrangement, the overhanging end of the conveyor 38, that is, the end where pulleys 39 are located, merely rests against the top of the paper stack 37 since the overhanging end of the conveyors 38 is pivotal about the axis of the shaft 42, as the yokes 44 are pivotal on the shaft 42.

In tracing the sheets in an upstream direction with respect to the operation of the conveyors 11 and 12, it should be understood that the flexible sheets are disposed

between the conveyors and are stripped therefrom into the stack 37. At this time it should also be noticed that the pulley 26 is in contact with the lower edge of the stack 37 at the entrance or top end thereof so that the clockwise direction of rotation of the pulley 26 will cause the lower end of the signatures to be brushed or moved away from the pulleys 18 at the entrance of the stream to the receiver 36. Also, in the upstream position beyond the pulleys 22 and 29, it should be understood that the signatures are being laid onto the conveyor 51 which passes the signatures to the conveyor 12 in the overlapped and echeloned relation, as shown in Figs. 1 and 3.

To power the conveyors 11, 12 and 13, an electric motor 52 can be disposed and connected in any suitable manner to have its drive shaft 53 enter a variable speed pulley unit 54 and drive the pulleys 56 and 57 disposed within the unit 54 and attached through the usual V-belt 58. It should be understood that the motor and the pulley unit 54 are all conventional and need not be further described.

It will thus be understood that the pulleys 56 and 57 are of the expansible type so that the speed of rotation of one pulley with respect to the other can be varied by expanding or contracting either or both of the pulleys 56 and 57. A drive gear 59 is driven off the pulleys 57 and meshes with a driven gear 61, and a shaft 62 supporting the gear 61 also carries a gear 63 which meshes with a larger gear 64 mounted on a shaft 66. In this power train, the rotation of the motor 52 is transmitted to the shaft 66 through the variable speed unit 54 and the gears mentioned so that a sprocket 67 on the shaft 66 is rotated to drive a chain 68 which is engaged with the sprocket 67 and is trained over a sprocket 69 and sprockets 23 and 24. In this manner, the chain 68 engages the sprocket on the shaft 71 on which the pulley 17 is mounted. Also, the chain 68 drives the shaft 72 on which the pulley 16 is mounted, and thus the conveyors 11 and 12 are driven through the chain drive described.

It will also be noticed in Figs. 1 and 11 that a second variable speed pulley unit 73 is disposed to have the shaft 62 as a part thereof, and the pulley unit 73 includes expansible pulleys 74 and 76 which are connected by the conventional V-belt 77 trained therebetween. With this arrangement, the shaft 78 is rotated from the motor 52 and through the pulley unit 54 to drive the bevel gear 79 which is mounted on a shaft 81 carrying the worm gear 82. The latter engages the worm wheel 83 to rotate the shaft 84 which carries the chain sprocket 31 over which the chain 87 of the conveyor 13 is trained and extends to the path previously mentioned.

With this arrangement of the two variable speed pulley units 54 and 73, it will be seen that one speed from the drive of the motor 52 will be transmitted through the unit 54 and to the shafts 62 and 66 to drive the conveyors 11 and 12 while another speed can be transmitted from the shaft 62 to the shaft 81 and thus to the shaft 84 and the conveyor 13. The fact that separate and different speeds are obtainable between the conveyor 13 and the conveyors 11 and 12 is important and will be more fully appreciated hereinafter, but for the present it will be understood that the spacing of the signatures on the conveyors 11 and 12 and the speed of the conveyors 11 and 12 along with the thickness of the signatures all determine the rate of growth of the stack 37, and such growth is determinative of the speed of the conveyor 13 which is lowering the stack 37 at the speed at which the stack is growing or increasing. The actual mechanism and method of controlling the speed of the conveyor 13 will be described later in connection with Fig. 10, and this mechanism is an important feature of the invention.

Referring to the receiver 36, it will be noted that it includes two spaced apart side frame pieces 91 and 92 along with the floor pieces 93 and 94 and the center piece 96. These are all stationary pieces and, of course, are suitably mounted. Fig. 6 shows that the chain 87 is guided in the center piece 96. A backstop or abutment 97 at the lower end of the stack in Fig. 1 and in Fig. 6 includes a lower projecting portion 98 on each side of the backstop 97 to engage and lock with the pin 100 of the chain 87. Also, the backstop 97 includes two spaced-apart rollers 99 which roll on the upper surface of the center piece 96 so that between the engagement with the chain and the rollers 99, the backstop 97 is supported in the position transverse to the floor of the receiver 36, as shown. Also, a board or support 101 is disposed in front of the plate 102 of the backstop 97, and the board actually engages the lower end of the stack 37 to support the latter as shown. Also, a handle 103 is provided on the backstop 97 for removal of the backstop in the manner and for the purpose mentioned hereinafter.

It will also be understood that as the stack 37 increases, it is lowered to the Fig. 1 position where the abutment 97 is aligned with a projection 104 of a ram of the air compressor unit 106 which is suitably attached to the receiver 36, as shown in Fig. 6. The ram of the unit 106 includes the rod 107, and the lower projection 108 which is attached to the upper projection 104 through the shoes 109. At this time, it should also be noticed, as shown in Figs. 4 and 6, the shoes 109 are slotted on their outer sides to ride on rails 111 attached to the inside of each of the receiver sides 91 and 92 so that the ram is stable with respect to the receiver 36. Fig. 6 also shows that the upper projecting portion of the ram consists of two arms or projections 104 spaced apart so that the stop 97 can pass therebetween as the conveyor 13 lowers the stop with the stack 37. Thus, the machine moves from the Fig. 1 to the Fig. 2 position, and the abutment 97 is lowered beyond the ram arms 104 as the conveyor 13 is preferably speeded up to lower the abutment 97. In the Fig. 2 position, the stack 37 is supported by the ram of the air cylinder unit 106 and, of course, the stack is resting on the bed of the receiver 36.

About the time that the conveyor 13 is speeded up, as mentionoed, a separation plate 112 is pivoted from its full line position in Fig. 1 to its dotted line position, and it is inserted into the stack to the full line position shown in Fig. 2 to separate the stack at that point. The separation plate 112 supports the incoming sheets, which are those above it in Figs. 2 and 3, so that the stack 37 can be lowered to the Fig. 3 position as the ram of the unit 106 is lowered to the position shown. Also, then the abutment 97 is removed from its position in the chain 87 and is placed further up on the chain, as shown in Fig. 3, and a board or support 113 can be placed in front of the abutment 97 to be similar to the board 101 which can be left at the lower end of the stack. Another board 114 can then be placed at the upper end of the stack, and a pair of upper abutments or arms 116, which are pivotally mounted on the receiver 36, could be moved from the Fig. 3 position to the Fig. 4 position to support the upper end of the stack 37 as the arms 116 rest against stops 117 fixed on the receiver 36. See Fig. 5. Then, when the compressor unit 106 is activated to extend the ram from the Fig. 3 to the Fig. 4 position, the stack 37 is compressed and a rope or the like 118 can be easily tied around the stack to bind the same. It is further preferred that a supply of the rope, wire or twine be disposed in the receiver 36 along the bed thereof so that the stack 37 is moved over the rope 118, and then the ends of the latter can be raised to the tied position shown in Fig. 4. The cycle is then repeated as the stack accumulates from the Fig. 4 condition back to the Fig. 1 condition.

Referring to the arms 116, Figs. 3, 4 and 5, for instance, show that there are two such arms, preferably spaced apart and connected to a leg 119 which is rotatably mounted about a shaft 121 supported on the receiver 36 by a bracket 122. Also, a handle 123 is secured to the shaft 121 to rotate the latter upon moving the handle from the Fig. 3 to the Fig. 4 position, for instance.

Then the handle 123 can engage a stop 124 projecting from the side 91 of the receiver 36 to retain the handle 123 in the Fig. 4 position. Also, in the Fig. 3 position the handle and the arms 116 are retained in position by a bifurcation on the link 119, as shown by the line 120, and also the arms 116 rest against the stops 117 in the Fig. 3 position. Of course, when the stack 37 is bundled, as shown in Fig. 4, it can be removed from the receiver 36 and a new stack will be formed by the incoming sheets.

Figs. 6 and 7 show the separation plate 112 and its mounting. It will be seen that a beam or support 126 is mounted on the frame 10 to extend therefrom and to support a U-shaped cross bar 127. The latter has a stripper or stop plate 128 attached thereto, and the plate 128 extends across the path of the stream of sheets coming to the receiver 36 and, of course, the plate extends between the belts 43 of the conveyor 38 so that the stripper 128 interrupts the stream of movement of the sheets and causes them to align in their leading edges 30 to form the stack 37, as shown. It is also shown that the separation plate 112 is pivotally mounted at a pin 129 on a support 131 which is attached to the beam 127. In actual construction, the pin 129 pivotally mounts a U-shaped bracket 132 to the support 131, and the bracket 132 provides a slide guide for the plate 112 and also supports the plate 112 in the Figs. 7 and 8 position as the edges 133 of the bracket 132 abuts the beam 127, as shown in Fig. 7. Then, when the plate 112 with the bracket 132 is pivoted to the Fig. 2 position, the plate 112 can be slid from the dotted position shown in Fig. 1 to the position shown in Fig. 2, and the plate is guided by the bracket 132, and shoulders or guide surfaces 134 also guide the plate 112 and secure it in the Fig. 3 position so that the sheets coming into the receiver will be retained as shown in Fig. 3. For different heights of sheets or signatures, the stripper or stop 128 can be adjusted in its fixed position along the beams 126 to accommodate, for instance, shorter sheets than those shown. To accomplish this adjustment, Fig. 8 shows two set screws 136 which secure the bar 127 to the two beams 126.

Figs. 7, 8 and 9 also show that the shaft 42 is pivotally mounted on two spaced apart bars 137 which are pivoted to the frame 10 by the shaft 138 which is the shaft on which the pulleys 19 are mounted. The extended ends of the bar 137 have U-shaped brackets 139 attached thereto so that pins 141 pass through the legs of the brackets 139 to lock the shaft 42 to the arms 137. It will be seen in Fig. 8 that pulleys 18 and 41 are rotatably mounted on the shaft 42, and it should be understood that these two pairs of pulleys 18 and 41 are bolted together for rotation together so that movement of the conveyor 11 rotates the pulleys 18 which, in turn, drive the pulleys 41 and the belts 43.

The important feature is the pivotal mounting of the shaft 42 about the pivot 138, and this is significant with the fact that the signatures coming into the receiver 36 are in contact with the conveyor 38 so that if the signatures come in at a rate of speed and are of a sufficient thickness that the conveyor 38 is raised, then this movement of the conveyor 38 is transmitted to a control mechanism described hereinafter to automatically increase the speed of the conveyor 13 and thereby lower the stack 37 at a faster speed, which speed corresponds to the rate of growth of the stack 37.

The mechanism for controlling the speed of conveyor 13 is shown in Fig. 10, and it includes an oil tight housing 142 with an arm 143 attached to the shaft 138 to rotate with the latter when the conveyor 38 rises or lowers with the height of the stack as the conveyor 38 always rests upon the top of the signature stack 37. A link 144 is pivoted at one end to the arm 143 and is pivoted at the other end to a T-shaped connector 146. One end of the connector 146 is pivotally connected to a weight 147, and the opposite end of the connector 146 is mounted on a fixed rock shaft 148 so that the connector 146 pivots about the shaft 148. A cam plate 149 is suitably mounted in a fixed position on the far side of the weight 147 with the upper edge of the cam having a cam surface 150 on which a roller 151 attached to the weight 147 is supported, and thus the roller is a cam follower roller which always rests upon the cam 149. The shaft 148 projects to the outside of the housing 142, and a link 152 is pivotally connected to a link 153 at one end, while the other end of the link 152 is attached to the projecting end of the shaft 148 for rotating the latter and transmitting this rotation to the link 153. The lower end of the link 153 is attached to an arm 154 which extends to the variable speed pulley unit 73 to transmit the movement of the link 153 to the arm 154 and ultimately to the pulley 74 of the unit 73 for controlling the speed of the pulley 76 and thus its output to the shaft 81 and ultimately to the conveyor 13, as previously outlined. The arm 154 is pivoted at 171 and has a conventional rock gear 172 meshed with a spur gear indicated at 173 and being on the shaft 155 of Fig. 11 to rock the fork 160 and axially move the sleeve or shifter 165 which is hooked with the fork 160. Fig. 11 shows a section of the variable speed pulley unit 73, and it will be seen that the unit is provided with the usual counter spring 156 which keeps the belt taut on the two pulleys, and the weight 147, therefore, balances the effect of the spring 156 as well as balancing the pressure of the belt 77, and thus the unit is in a delicate balance so that the least amount of change in the height of the stack 37 is transmitted to the linkage mentioned to adjust the variable speed unit 73 and also the speed of the conveyor 13. Also, the overhanging weight of the conveyor 38 could be balanced by a separate weight to place the entire structure in delicate balance.

Figs. 7 and 9 show that a bracket 157 is attached to the bars 137 through pins 158 with the latter engaged in slots 159 in the bracket 157. Also, a pin 161 is engaged in the slots 162 in the bracket 157 so that the bracket 157 can move vertically, as in Fig. 7, with the respective slots of the bracket riding on the pins mentioned. The lower end of the bracket 157 is received in a slot 163 in the frame 10 so that the lower end of the bracket is guided in the vertical movement of the bracket. A rod or bolt 164 is connected to the pin 161 at the lower end of the bolt and extends up through the top of the bracket 157 with nuts 166 securing the rod to the bracket 157 in a limit position shown in Fig. 9. A compression coil spring 167 is disposed around the bolt 164 to yieldingly urge the bracket 157 upwardly with respect to the bolt 164, and thus a shaft 168 mounted on the bracket 157 is spring urged with respect to the bars 137. The shaft 168 has the pulley 26 rotatably mounted thereon, and the belt of conveyor 12 is trained over the pulley 26 so that, in effect, the pulleys 18 and 26 are spring urged together so that the signatures coming between the two pulleys are pressed by the spring 167 to maintain good contact between the belts and the signatures.

While a specific embodiment of this invention has been shown and described, it should be obvious that certain changes could be made therein, and the scope of this invention should, therefore, be limited only by the appended claims.

What is claimed is:

1. A collector for flexible sheets comprising a first conveyor and a second conveyor with both including face-to-face portions disposed for supporting said sheets therebetween and in an echeloned and overlapped relation and for moving said sheets in a stream in their edgewise direction with the trailing edges of said sheets in contact with said first conveyor, said second conveyor disposed in contact with said sheets in an end extended beyond said first conveyor, a third conveyor angularly disposed

to said stream at a downstream location from the terminal end of said stream and adjacent said end and toward the side of said stream adjacent said first conveyor, said third conveyor being disposed at a downwardly directed angle to said stream and oblique to the horizontal, means adjacent said terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter on said third conveyor, a backstop attached to said third conveyor for movement therewith and for supporting the stack on said third conveyor, said end of said second conveyor being disposed to urge said stream downwardly against the top of said stack, and drive means for moving said third conveyor at selected speeds independent of the speeds of said first and said second conveyors.

2. A collector for flexible sheets comprising a first conveyor and a second conveyor with both being in face-to-face relation and disposed for supporting said sheets therebetween and in an echeloned and overlapped relation and for moving said sheets upwardly in a stream in their edgewise direction with the trailing edges of said sheets in contact with said first conveyor, a third conveyor angularly disposed to said stream at a downstream location from the terminal end of said stream, said third conveyor being disposed at a downwardly directed and declining angle to said stream to be perpendicular thereto, means adjacent said terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter on said trailing edges on said third conveyor, a backstop attached to said third conveyor for movement therewith and for supporting the stack on said third conveyor, drive means for moving said third conveyor at selected speeds independent of the speeds of said first and said second conveyors, and sensing means in contact with the top of said stack and connected to said drive means for regulating said speeds of said third conveyor according to the location of said top of said stack.

3. A collector for flexible sheets comprising a first conveyor and a second conveyor with both being in face-to-face relation and disposed for supporting said sheets therebetween and in a stream relation of one behind another and for moving said sheets in their edgewise direction, a third conveyor angularly disposed to said stream at a downstream location from the terminal end of said stream and to one side thereof, said third conveyor being disposed at a downwardly directed angle to said stream, means adjacent said terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter on said third conveyor, said second conveyor including a portion pivotally mounted for pivotal movement in the plane transverse to the plane of said stream and extending past said third conveyor for contacting the top of the stack on said third conveyor, a backstop attached to said third conveyor for movement therewith and for supporting the lower end of said stack on said third conveyor, drive means for moving said third conveyor at selected speeds independent of the speeds of said first and said second conveyors, and means connected between said drive means and said portion of said second conveyor for regulating the speed of said drive means in response to the pivotal position of said portion.

4. A collector for flexible sheets comprising a first conveyor and a second conveyor with both being in face-to-face relation and disposed for supporting said sheets in a stream relation of one behind another and for moving said sheets upwardly in their edgewise direction, a third conveyor angularly disposed to said stream at a downstream location from the terminal end of said stream, said third conveyor being disposed at a right angle and downwardly directed angle to said stream, means adjacent the terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter in an upstanding position on said third conveyor, a backstop attached to said third conveyor for movement therewith and for supporting the bottom of the stack on said third conveyor, and drive means for moving said third conveyor at selected speeds independent of the speeds of said first and said second conveyors.

5. A collector for flexible sheets comprising a first conveyor and a second conveyor with both being in face-to-face relation and including a portion directed upwardly and being disposed for supporting said sheets therebetween and in a stream relation of one behind another and for moving said sheets in their edgewise direction, first variable speed drive means connected to said conveyors, a third conveyor angularly disposed to said stream at a downstream location from the terminal end of said stream and to one side thereof, said third conveyor being disposed to present a vertical support along a length thereof and being at a downwardly directed angle to said stream and oblique to the horizontal, means adjacent said terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter on said length of said third conveyor, a backstop attached to said third conveyor for movement therewith and for supporting the lower end of said stack on said third conveyor, a second variable speed drive means connected to said third conveyor for moving said backstop downwardly at selected speeds separate of the drive control of said first and said second conveyors, and means connected between said second variable speed drive means and said stack for regulating the speed of said second variable speed drive means in response to the position of the top or upper end of said stack.

6. A collector for flexible sheets comprising a first conveyor and a second conveyor with both being in face-to-face relation and disposed for supporting said sheets therebetween and in an echeloned and overlapped relation and for moving said sheets in a stream in their edgewise direction with the trailing edges of said sheets in contact with said first conveyor, a third conveyor angularly disposed to said stream at a downstream location from the terminal end of said stream and to the side thereof adjacent said first conveyor, said third conveyor being disposed at a downwardly directed angle to said stream, means adjacent said terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter on said third conveyor, a backstop attached to said third conveyor for movement therewith and for supporting the lower end of the stack on said third conveyor, drive means for moving said third conveyor at selected speeds independent of the speeds of said first and said second conveyors, sensing means in contact with the top of said stack and connected to said drive means for regulating said speeds of said third conveyor according to the location of said top of said stack, compression means mounted adjacent said third conveyor and including a first part movable along said third conveyor for engaging said lower end of said stack and supporting said lower end while said backstop moves therefrom, and a second part for engaging the upper end of said stack for securing the latter against force applied by movement of said first part as said stack is compressed.

7. A collector for flexible sheets comprising a first conveyor and a second conveyor with both being in face-to-face relation and disposed for supporting said sheets therebetween and in an echeloned and overlapped relation and for moving said sheets in a stream in their edgewise direction with the trailing edges of said sheets in contact with said first conveyor, a third conveyor angularly disposed to said stream at a downstream location from the terminal end of said stream and to one side thereof, said third conveyor being disposed at a downwardly directed angle to said stream, means adjacent said terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter on said third conveyor, a backstop attached to said third conveyor for movement therewith and for supporting the lower end of the stack on said third conveyor, drive means for moving said third conveyor at selected speeds independent of the

speeds of said first and said second conveyors, sensing means in contact with the top of said stack and connected to said drive means for regulating said speeds of said third conveyor according to the location of said top of said stack, means for separating said stack at an upper end spaced from said lower end, a fluid compressor mounted adjacent said third conveyor, a ram extended from said compressor and including a first abutment movable in the direction of said third conveyor for engagement of one end of said stack, and a second abutment mounted for engagement of the other end of said stack for compression of the latter against the force of said ram.

8. A collector for flexible sheets comprising a first conveyor disposed for supporting said sheets thereon in an echeloned and overlapped relation and for moving said sheets in a stream in their edgewise direction with the trailing edges of said sheets in contact with said first conveyor, a second conveyor disposed in contact with said sheets and to the face thereof for pressing said sheets against said first conveyor, a third conveyor angularly disposed to said stream at a downstream location from the terminal end of said stream and to the side thereof adjacent said first conveyor, said third conveyor being disposed at a downwardly directed angle to said stream, means adjacent said terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter on said third conveyor, a backstop removably attached to said third conveyor for movement therewith and for supporting the stack on said third conveyor, drive means for moving said third conveyor at selected speeds independent of the speeds of said first and said second conveyors, sensing means in contact with the top of said stack and connected to said drive means for regulating said speeds of said third conveyor according to the location of said top of said stack, a compressor mounted adjacent said third conveyor and including a ram and an abutment with the latter disposed in the downward path of said stack and arranged for the passage of said backstop beyond said abutment, and a stop mounted for engagement of the top of said stack and holding the same spaced from said second conveyor and against the upward force of said compressor.

9. A collector for flexible sheets comprising a first conveyor and a second conveyor with both being in face-to-face relation and disposed for supporting said sheets therebetween and in a stream relation and for moving said sheets in their edgewise direction, a third conveyor angularly disposed to said stream at a downstream location from the terminal end of said stream and to one face thereof, said third conveyor being disposed at a downwardly directed angle to said stream, means adjacent said terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter on said third conveyor, a backstop removably attached to said third conveyor for movement therewith and for supporting the stack on said third conveyor, a compressor mounted adjacent said third conveyor and including a ram and an abutment with the latter disposed in the downward path of said stack and arranged for the passage of said backstop beyond said abutment, and a stop mounted for engagement of the top of said stack and holding the same spaced from said second conveyor and against the upward force of said compressor.

10. A collector for flexible sheets comprising one conveyor disposed for supporting said sheets in a stream relation of one behind another and for moving said sheets in their edgewise direction, another conveyor angularly disposed to said stream and directed downwardly at a declining angle, means adjacent the terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter on said another conveyor, a variable speed drive means connected to said another conveyor for moving the latter at selected speeds separate of the speeds of said one conveyor, means connected between said variable speed drive means and the stack on said another conveyor for automatically regulating the speed of the latter in response to the rate of growth of said stack, a backstop removably mounted on said another conveyor for supporting the lower end of said stack, stack separation means mounted adjacent the upper end of said stack for insertion thereinto and dividing said stack into an upper portion and a lower portion, and powered means for engaging the lower end of said stack and lowering said lower portion along said declining angle at a speed in excess of the speed of said upper portion for readying said lower portion for tying.

11. A collector for flexible sheets comprising one conveyor disposed for supporting said sheets in a stream relation of one behind another and for moving said sheets upwardly in their edgewise direction, another conveyor angularly disposed to said stream and directed downwardly therefrom at an angle perpendicular thereto and within the end limit of said one conveyor, means adjacent the terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter on said another conveyor with the top of the stack in contact with said stream and with the trailing edges of said sheets being on said another conveyor, a variable speed drive means connected to said another conveyor for moving the latter at selected speeds separate of the speeds of said one conveyor, and means connected to said variable speed drive means and in contact with said top of said stack for moving up and down with said top to automatically regulate the speed of said another conveyor in response to the movement of said top.

12. A collector for flexible sheets comprising one conveyor disposed for supporting said sheets in a stream relation of one behind another and for moving said sheets upwardly in their edgewise direction, another conveyor angularly disposed to said stream and directed downwardly therefrom at an angle oblique to the horizontal, means adjacent the terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter on said another conveyor with the top of the stack in contact with said stream, a variable speed drive means connected to said another conveyor for moving the latter with said stack at selected speeds separate of the speeds of said one conveyor, sensing means in contact with said top of said stack for movement in response to the raising and lowering of said top, said sensing means connected to said variable speed drive means for transmitting said movement thereto for automatically regulating the speed of said another conveyor in response to said movement, stack separation means mounted adjacent the upper end of said stack for dividing the latter into an upper portion and a lower portion, and means for moving said lower portion away from said upper portion for tying said lower portion.

13. A collector for flexible sheets comprising a first conveyor and a second conveyor with both being in face-to-face relation and disposed for supporting said sheets therebetween and in a stream relation of one behind another and for moving said sheets in their edgewise direction, a third conveyor forming an extension to said second conveyor and mounted for movement in a transverse direction to the direction of extension, a fourth conveyor angularly disposed to said stream at a downstream location from the terminal end of said stream and to one face thereof in said transverse direction which is at a downwardly directed angle to said stream, means adjacent said terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter on said fourth conveyor with the weight of said third conveyor supported by the top of the stack, a backstop attached to said fourth conveyor for movement therewith and for supporting the lower end of said stack on said fourth conveyor, drive means for moving said fourth conveyor at selected speeds, and means connected between said drive means and said third conveyor for regulating the speed

of said drive means in response to said movement of said third conveyor.

14. A collector for flexible sheets comprising a first conveyor and a second conveyor with both being in face-to-face relation and disposed for supporting said sheets therebetween and in a stream relation of one behind another and for moving said sheets in their edgewise direction, a third conveyor forming an extension to said second conveyor and pivotally mounted for movement in a transverse direction to the direction of extension, a fourth conveyor angularly disposed to said stream at a downstream location from the terminal end of said stream and in said transverse direction which is at a downwardly directed angle to said stream, means adjacent said terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter on said fourth conveyor with the weight of said third conveyor supported by the top of the stack, a backstop attached to said fourth conveyor for movement therewith and for supporting the lower end of said stack on said fourth conveyor, a variable speed pulley unit for moving said fourth conveyor at selected speeds, means for balancing the internal resistance in said variable speed pulley unit, and means connected between said drive means and said third conveyor for regulating the speed of said drive means in response to pivotal movement of said third conveyor.

15. A collector for flexible sheets comprising a first conveyor and a second conveyor with both being in face-to-face relation and disposed for supporting said sheets in a stream relation of one behind another and for moving said sheets in their edgewise direction, a third conveyor angularly disposed to said stream at a downstream location from the terminal end of said stream, said third conveyor being disposed at a downwardly directed angle to said stream, means adjacent the terminal end of said stream for interrupting edgewise movement of said sheets and stacking the latter in an upstanding position on said third conveyor, a backstop attached to said third conveyor for movement therewith and for supporting the bottom of the stack on said third conveyor, a variable speed pulley unit for driving said third conveyor at selected speeds independent of the speeds of said first and said second conveyors and said unit being of the expansible type having internal resistance against expansion and contraction movements, force applying means mounted to be in engagement with said pulley unit for counteracting said internal resistance and adjusting the speed of the latter, and linkage engaged between said stack and said force applying means for moving the latter in response to the position of the top of said stack.

16. In a method of collecting flexible sheets, the steps comprising disposing said sheets in an overlapped stream relation of one behind another, moving said sheets upwardly at an oblique angle to the horizontal and in the edgewise direction of alignment in the stream, engaging the top edge of said sheets for interrupting the edgewise movement of said sheets, stacking the interrupted ones of said sheets at a downwardly directed angle perpendicular to said oblique angle and with the weight of the stack against both the lower edges of said sheets and the lower one of said sheets, pressing said stream against the top of said stack to pack said sheets of said stream into said stack, and moving said stack away from said stream and at said downwardly directed angle for providing space for succeeding ones of said sheets of said stream to be snugly pressed into position on said top of said stack.

17. In a method of collecting flexible sheets, the steps comprising disposing said sheets in an overlapped stream relation of one behind another, moving said sheets upwardly in the edgewise direction of alignment in the stream, interrupting the edgewise movement of said sheets to cause said sheets to form an upstanding stack at an angle directed downwardly from said stream, pressing the upper end of said stream into snug contact with the top of said stack, supporting the bottom of said stack to cause said stack to pack under its own weight, lowering said bottom at a selected rate of speed corresponding to the speed that said sheets are forming said stack so that said end of said stream is pressed snugly against the top of said stack, separating said stack at the upper end thereof, lowering the lower separated portion of said stack at a speed faster than said selected rate and at said angle to permit tying of said portion.

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