M. O. CLAUSS.

ARTICLE COLLECTING AND BUNDLING MECHANISM.

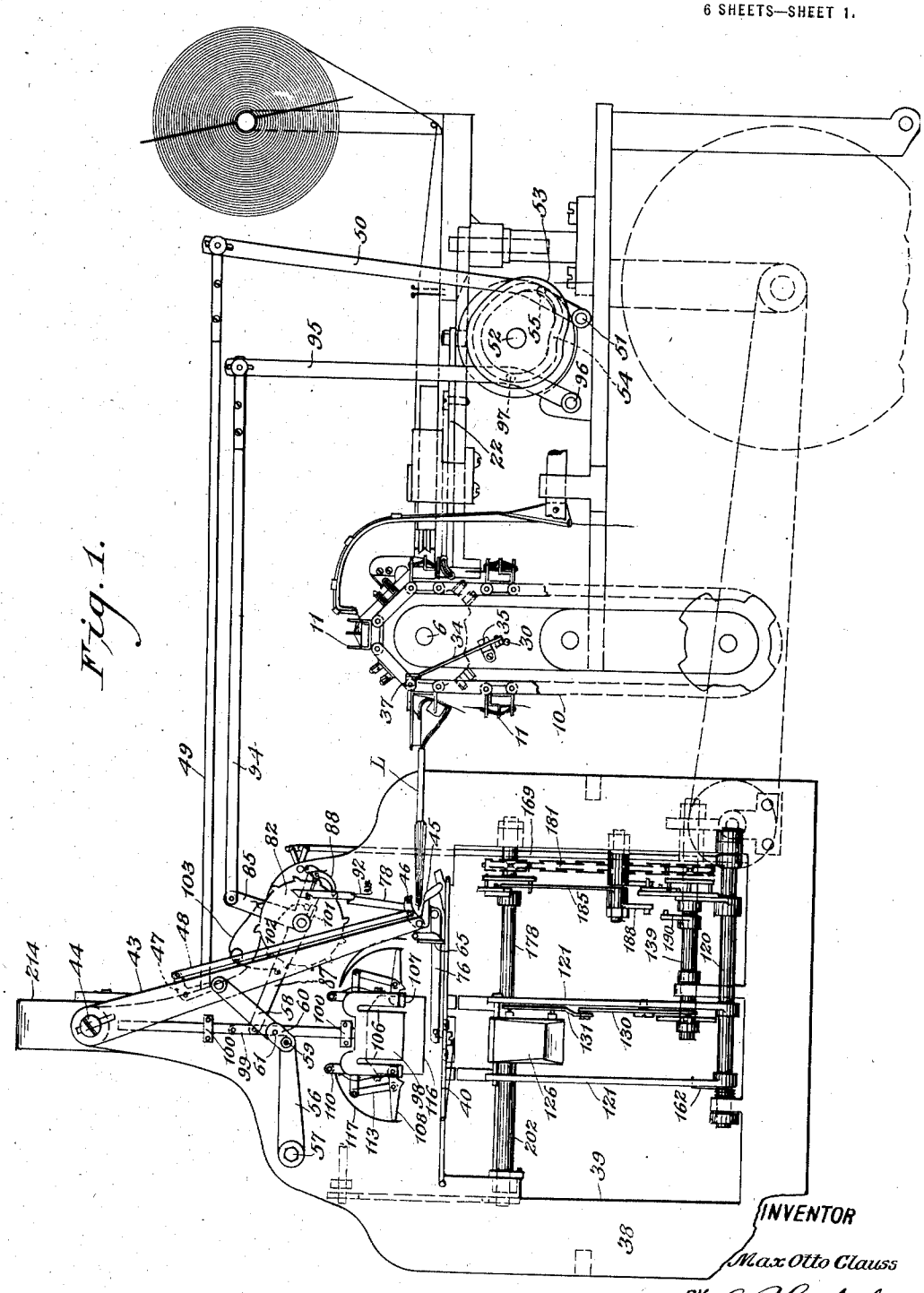
APPLICATION FILED JUNE 10, 1920.

1,401,520.

Patented Dec. 27, 1921.

6 SHEETS—SHEET 1.

Fig. 1.



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6 SHEETS—SHEET 2.

Fig. 2.

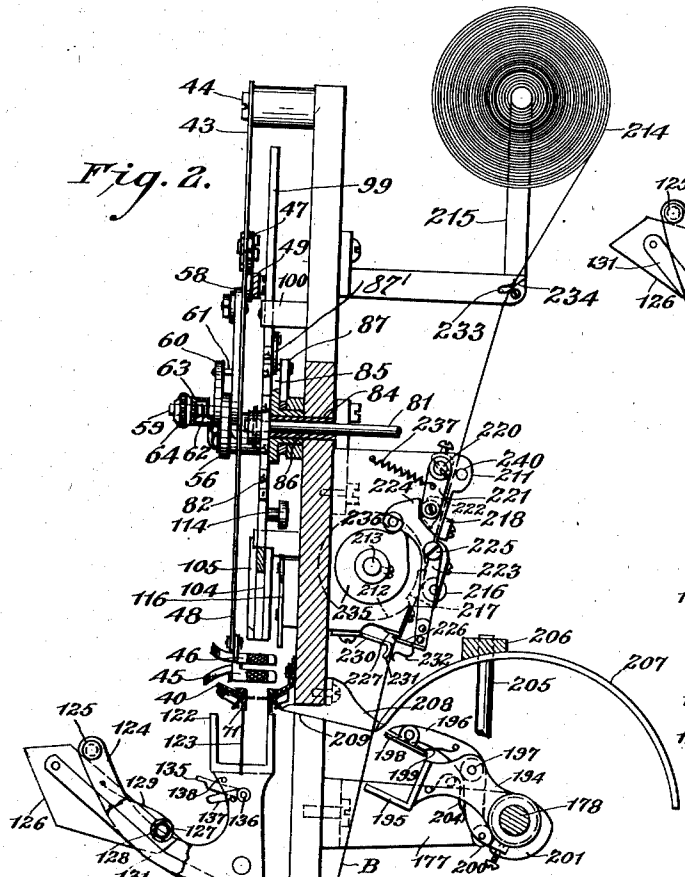


Fig. 6.

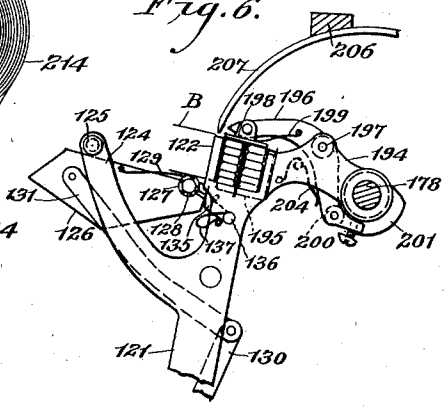


Fig. 7.

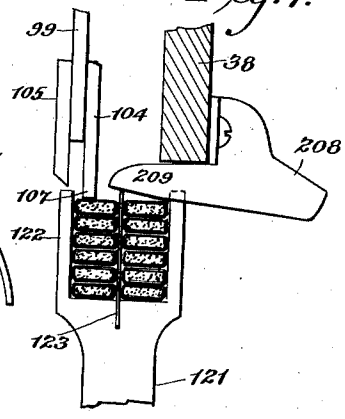


Fig. 9.

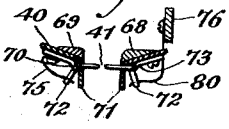


Fig. 5.

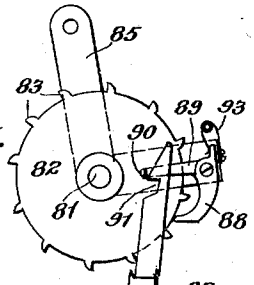
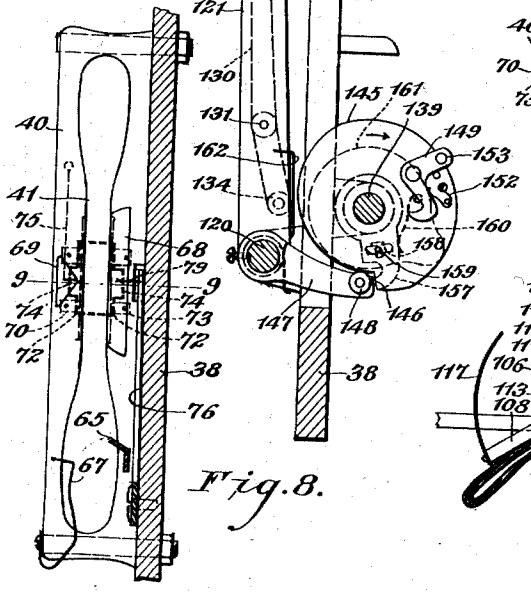
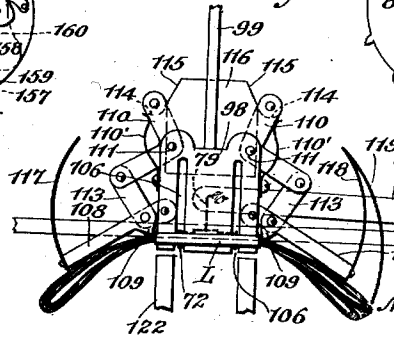


Fig. 8.





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6 SHEETS—SHEET 3.

Fig. 3.

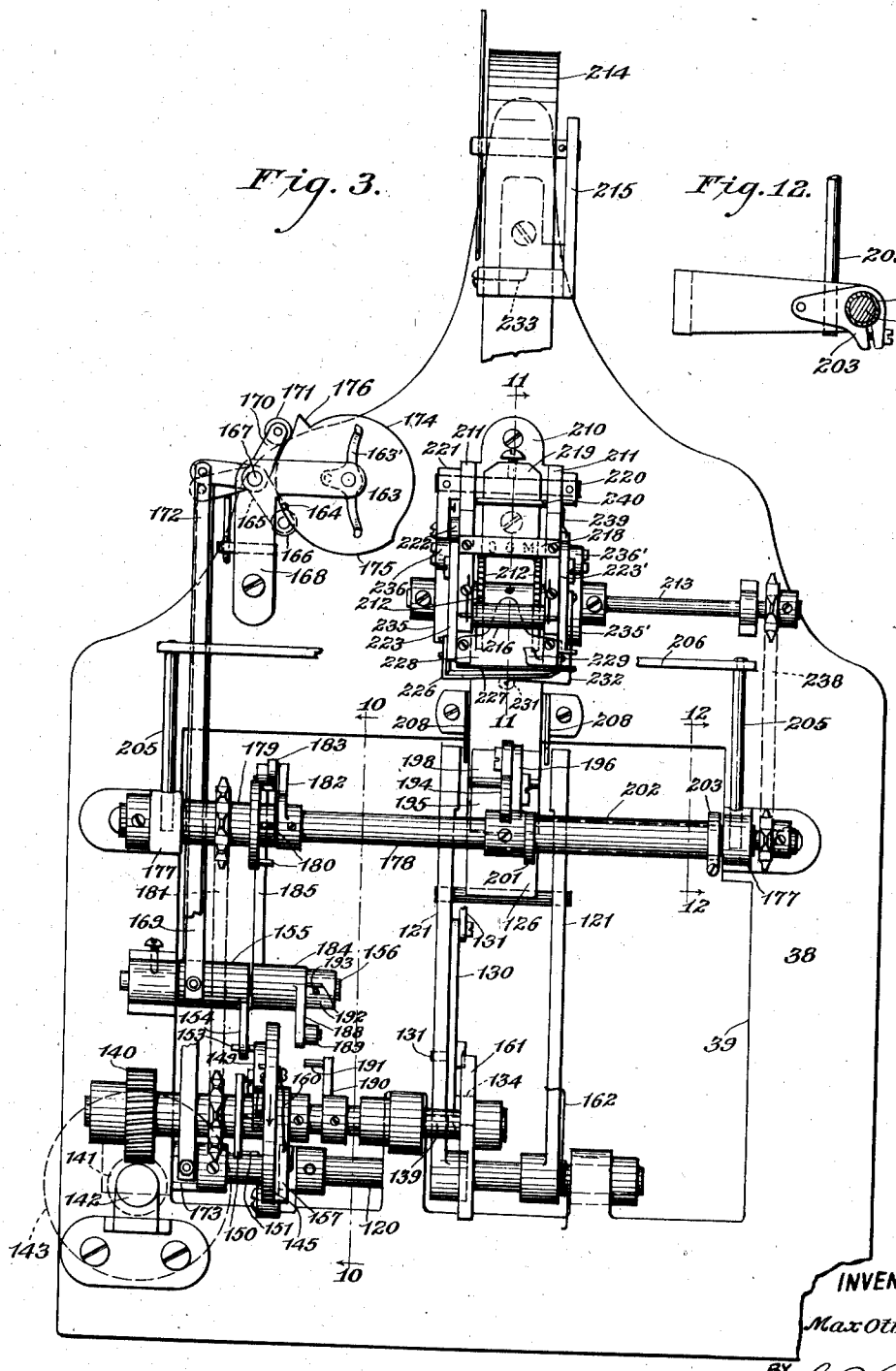


Fig. 12.

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Fig. 4.

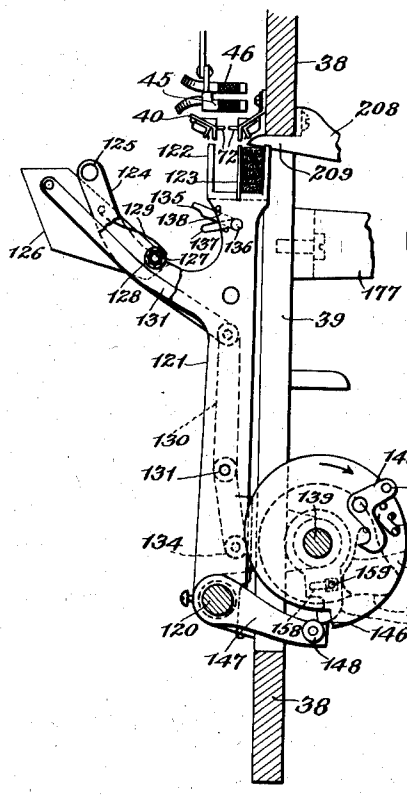


Fig. 10.

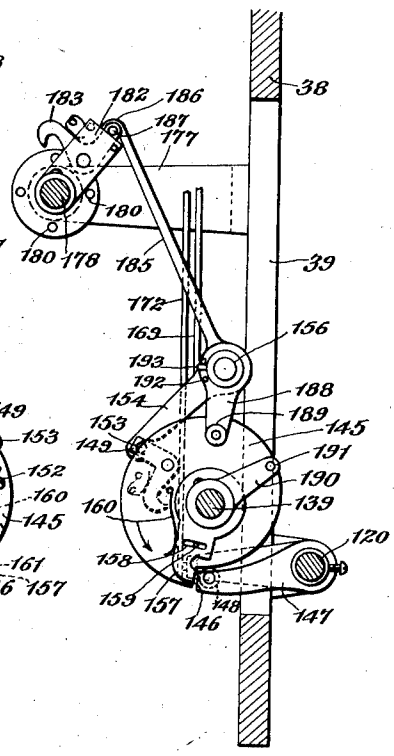
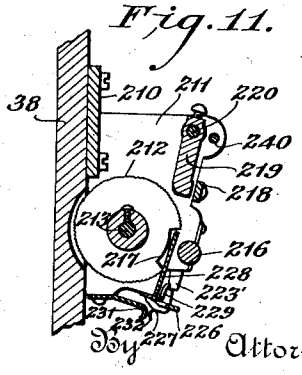


Fig. 11.



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ARTICLE COLLECTING AND BUNDLING MECHANISM.

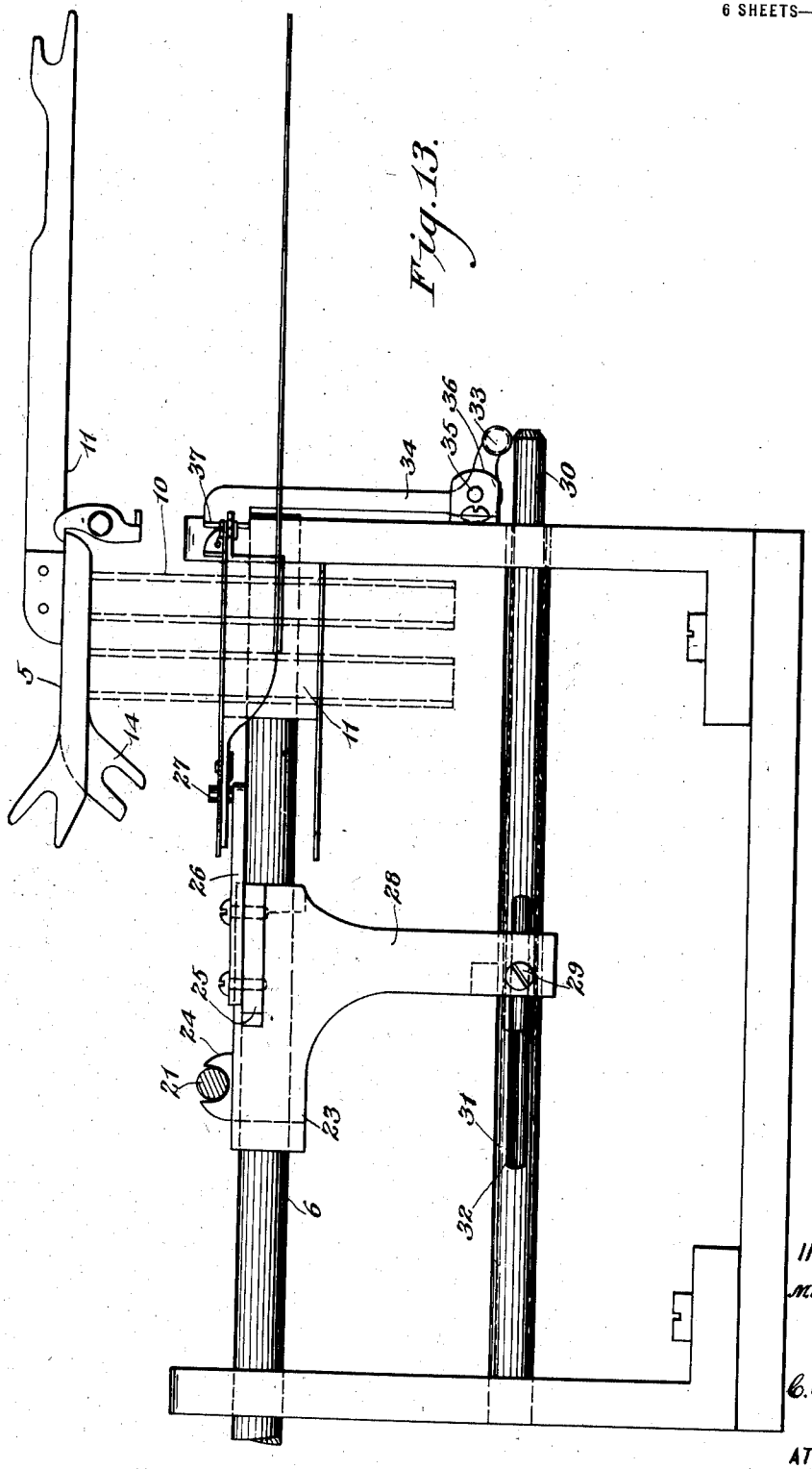
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6 SHEETS—SHEET 5.

Fig. 13.



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6 SHEETS—SHEET 6.

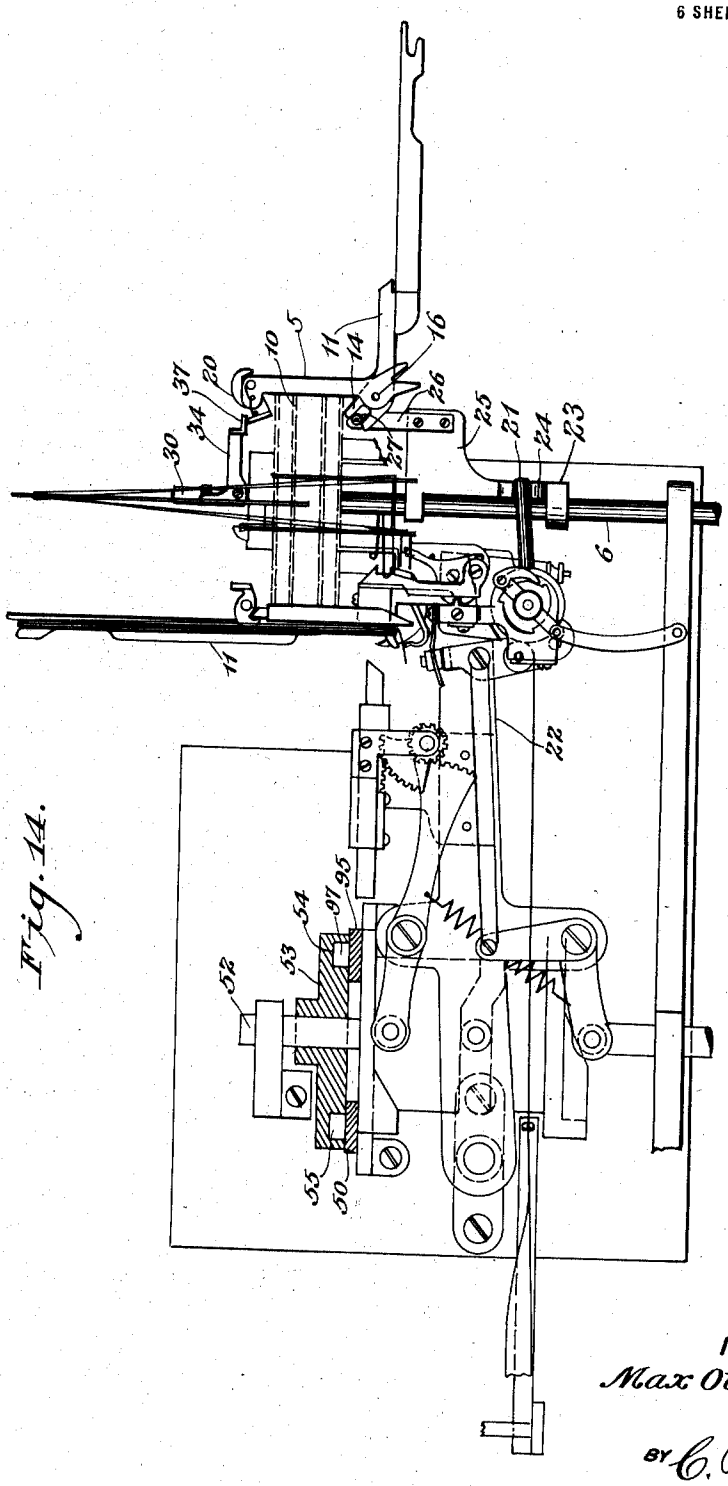


Fig. 14.

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UNITED STATES PATENT OFFICE.

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ARTICLE COLLECTING AND BUNDLING MECHANISM.

1,401,520. Specification of Letters Patent. Patented Dec. 27, 1921.

Application filed June 10, 1920. Serial No. 387,968.

To all whom it may concern:

Be it known that I, MAX O. CLAUSS, a citizen of Germany, and resident of the borough of Bronx, in the city, county, and State of New York, have invented certain new and useful Improvements in Article Collecting and Bundling Mechanism, of which the following is a description.

This invention relates to article collecting and bundling mechanism, and more particularly to means for automatically collecting thread skeins, and compactly securing a predetermined number of skeins in a bundle.

Generically considered, the invention comprehends a mechanism for the above purpose which is of relatively simple construction, and primarily designed for use in combination with a skein forming mechanism, such as I have disclosed in my prior application, filed September 18, 1919, Serial No. 324,530.

To the above end I have devised a mechanism which is primarily characterized by synchronously actuated means for transferring the skeins from an intermittently movable skein carrier to a holder and arranging the skeins in superposed relation, means for delivering the superposed skeins from the holder to a discharge member and simultaneously applying a flexible binder around the skeins.

Among the salient features of the invention are means for automatically positioning the individual labels surrounding the skeins in alinement with each other as the skeins are brought into superposed relation; means for feeding a paper binding strip, providing an identifying mark thereon, and severing a predetermined length of the strip; means for applying an adhesive to one end of the binder; an integrator controlling the final bundle discharging operation and a skein actuated means controlling the operation of said integrator.

One of the detail objects of the invention is to provide effective and reliable means for holding the strands of the individual skeins in compact relation during their transference to the skein holder.

It is another important object to provide improved means for automatically positioning the holder to receive several series of superposed skeins to be bound into a single bundle.

In general the invention contemplates the provision of a bundling mechanism for skeins which will be positive and reliable in its operation, not liable to get out of order, and by means of which considerable manual labor and expense incident to the employment of numerous operatives are eliminated.

With the above and other objects in view, the invention consists in the improved bundling mechanism, and in the form, construction and relative arrangement of its several parts, as will be hereinafter more fully explained, illustrated in the accompanying drawings, and particularly pointed out in the appended claims.

In the accompanying drawings, wherein I have illustrated the preferred embodiment of the invention, and in which similar reference characters designate corresponding parts throughout the several views:

Figure 1 is a front elevation showing the skein bundling mechanism in its operative relation to the endless skein carrier.

Fig. 2 is an enlarged side elevation, partly in section, looking from the right in Fig. 1.

Fig. 3 is a rear elevation.

Fig. 4 is a fragmentary view similar to Fig. 2, showing the position of the skein holder to receive the second series of superposed skeins.

Fig. 5 is an enlarged detail elevation illustrating the operation of the skein depressing plunger, and the manner in which the operation of the integrator is controlled.

Fig. 6 is a detail view showing the skein holder moved to a position to transfer the skein bundle to the discharge member, and the manner in which the adhesive is applied to one end of the paper binder.

Fig. 7 is a detail sectional view illustrating the manner in which the superposed skeins are compressed by means of the plunger, and showing the guide means for exerting a continuous compressing action on the skeins as they are carried to the discharge member.

Fig. 8 is a detail plan view of the receiv-

ing table upon which the individual skeins are positioned, and from which they are subsequently moved into the skein holder.

Fig. 9 is a detail transverse section taken on the line 9—9 of Fig. 8.

Fig. 10 is a sectional view taken on the line 10—10 of Fig. 3.

Fig. 11 is a section taken on the line 11—11 of Fig. 3.

Fig. 12 is a section taken on the line 12—12 of Fig. 3.

Fig. 13 is a detail elevation illustrating the means for acting on the individual skein holders to position the skein for transference to the bundling mechanism, and,

Fig. 14 is a top plan view of the skein positioning means.

In the illustrated embodiment of the invention the intermittently movable endless chain carrier 7 is preferably constructed and actuated in the manner disclosed in my pending application, Serial No. 346,836, filed December 23, 1919. Upon this carrier the individual skein holders are mounted in spaced relation to each other. In a second pending application, Serial No. 346,837, filed December 23, 1919, I have fully illustrated and described the detail construction of these holders. Therefore, for the purposes of the present explanation it will suffice to state that each holder comprises a body member 5 and a thread loop holding member 11. These members are pivotally connected to each other, as at 16, and the member 11 is formed at its pivoted end with an angularly disposed notched arm 14. Upon the opposite end of the other member 5 a pivoted latch element 20 is mounted, and is adapted to coact with the member 11 to hold the latter in its normal thread loop receiving position. Upon these holders the thread is automatically wound into skeins in the manner set forth in a fourth pending application, Serial No. 314,647, filed August 1, 1919.

For a more particular understanding of the details of the skein winding mechanism, reference may be had to my first mentioned application.

In a fifth application, Serial No. 381,283 filed May 14, 1920, I have disclosed a mechanism for disconnecting the adjacent connected skeins on the carrier, and binding the strands of the individual skeins so as to prevent separation of the thread ends and the loosening of the skein loops. As therein shown, the binding mechanism is mounted for bodily oscillating movement in a horizontal plane upon a pivoted plate 22. To the end of this plate upon which the binding mechanism is supported, a longitudinally projecting rod 21 is suitably fixed. This rod extends over the upper carrier shaft 6, and is engaged with a notched or bifurcated lug 24 projecting upwardly from a slide member 23, the ends of which surround the carrier shaft and have free axial movement thereon. This slide is formed with a lateral projection 25, to which a trip bar 26 is fixed, said bar having a roller 27 on one end, which is adapted for engagement in the notch or recess of the angular arm 14 on the skein loop holding member 11.

The slide 23 is further provided with a depending arm 28, the lower end of which is connected by means of the screw or pin 29 to a rod 30, which is supported within a tubular rod 31 and has free longitudinal sliding movement relative thereto. The tubular rod is formed with the longitudinal slot 32, through which the pin or screw 29 extends. It will be understood that the tubular rod 31 is supported in spaced parts of the frame structure of the machine, and in the movement of the slide 23 in one direction, the rod 30 is projected beyond one open end of the rod 31 and into engagement with the angular end 33 of a vertically disposed lever 34, which is pivoted, as at 35, in the bracket 36 fixed to the machine frame. The upper end of this lever is formed with an angularly disposed lug or lip 37, which is adapted to engage one end of the latch element 20, and disengage it from the loop holding member 11. This action takes place substantially at the same time that the roller 27 on the trip bar 26 enters the notch or recess of the arm 13 of the holder 11. Thus it will be seen that in each oscillating movement of the plate 22 carrying the skein binding mechanism, so as to dispose said mechanism in operative relation to a skein, the slide 23 is shifted, and the member 11 of a holder on the opposite side of the axis of the carrier which contains a completed and bound skein, is moved to a position at right angles to the member 5. This operation is clearly illustrated in Fig. 14. When the binding mechanism returns to its normal position, the movement of the slide 23 is reversed, and the holder member 11 is returned to a position in parallel relation to the member 5, and held against movement with respect thereto, by means of the latch element 20. During this interim the skein is removed from the holder member 11, and transferred to the collecting and bundling mechanism, which I shall now proceed to describe in detail.

Upon a vertically arranged frame plate 38 and immediately above an opening 39 therein, a laterally-projecting skein supporting table or shelf 40 is secured. The table 40 is formed with a slot 41 extending longitudinally thereof for substantially its entire length, and having a relatively narrow intermediate portion 41 and the widened or enlarged end portions 42. Upon the table 40 and over the longitudinal slot therein, the individual skeins are successively drawn

after their removal from the projected holder members 11. For this purpose I provide a lever 43 fulcrumed at its upper end upon the frame plate 38, as at 44. The lower end of this lever is provided with a laterally projecting relatively fixed gripping jaw 45, and immediately above this fixed jaw a movable jaw 46 is pivoted at one of its ends upon said lever. There is also fulcrumed upon one side of the lever 44 at a point intermediate of its ends, a bell crank 47, one arm of which is connected to the movable gripping jaw 46 by means of the rod 48. The other arm of this bell crank is connected by means of the rod 49 to the upper end of a lever 50, which is pivotally mounted at its lower end upon a convenient part of the machine frame, as at 51. 52 designates the binder operating shaft, as shown in my prior application, Serial No. 381,283, and upon said shaft the operating member 53 is fixed. As herein shown, this operating member is provided in one face with a cam track 54 which receives a stud or pin 55 projecting from the lever 50.

In order to render the pivoted lever 43 sufficiently rigid when the connections 47 and 48 operated to actuate the movable gripping member 46 so that the thread skein may be securely gripped, I provide a horizontally disposed arm 56, secured at 57, upon the face of the frame plate. The free end of this arm is pivotally connected by means of the link 58 to the lever 43. Upon the pivot stud 59 connecting the link 58 to the arm 57, a plate 60 is loosely engaged at one of its ends; at its other end the plate 60 carries a pin 61 which is adapted to be loosely received in an aperture in the link 58. A spring 62 surrounds the pivot rod 59 and is housed within a cap 63 against which an adjustable nut 64, threaded upon the pivot pin, bears. By adjusting this nut the tension of the spring 62 may be properly regulated, so as to increase or decrease frictional resistance to the pivotal movement of the link 58 on the arm 56. Thus when the rod 49 is actuated by the cam element 53, the gripping jaw 46 and the operating parts therefor, carried by the lever 43, will be operated while said lever remains stationary, so as to securely grip the thread skein between the fixed jaw 45 and the movable jaw 46. In the continued movement of the rod 49 to the left under the action of the cam element 53 the frictional resistance at the pivot connection 59 is overcome, and the lever 43 is swung or oscillated, whereby the skein is withdrawn from the holder member 11 and is carried over upon the receiving table 40.

At the right-hand end of the table 40, and at the inner side of the slot 41 an angularly disposed lug 65 is secured to the frame plate, while to the outer edge of the table one end of a wire spring 67 is secured. This spring overlies the upper surface of the table, and extends longitudinally thereof inwardly of the outer edge of the slot 41. The free end portion of this spring is angularly bent in an outward direction and bears against the under side of the table 40. As the skein is drawn over the table in the movement of the lever 43, the lug 65 acts to crowd or force the skein outwardly and beneath the tensioning spring 66, which applies a tension to the end of the skein, and holds the same closely upon the table surface.

Along the inner edge of the narrow central portion 41 of the slot in the table, a rib 68 is secured upon the upper surface of the table, which, it will be noted, is inclined inwardly and downwardly from its longitudinal edges to the opposite edge of the slot. A lug 69 of substantially triangular form is also secured upon the upper surface of the table at the center of the outer edge of the slot. The oppositely inclined edges 70 of this lug, in conjunction with the rib 68 at the opposite edge of the slot, serve to straighten out the skein should it be drawn over the table at an angle with respect to the axis of the slot therein, and cause the skein to assume a position in parallel relation to said slot.

Each skein is provided with a tubular label L, which surrounds the medial portion of the skein loops, and holds the skein strands at such medial portion in a more compact relation than at the looped ends of the skein which overlie the enlarged ends 42 of the slot in the table.

The table along the opposite edges of the central portion 41 of the slot is provided with depending longitudinal flanges 71. Upon the upper side of the table at its central portion, and at each edge of the slot, a rod 72 is mounted in suitably spaced bearings 73 for rocking movement. The medial portion of each rod is formed with an angularly and downwardly projecting crank 74. The ends of the rods 72 extend inwardly toward each other through vertical slots formed in the flanges 71. A spring 75 extends longitudinally along the under side of the table, and is fixed at one of its ends thereto, the other or free end of the spring bearing against the crank 74 of the rod 72 at the outer side of the slot, and thus yieldingly holding the ends of said rod in a horizontal position.

A lever 76 is pivoted upon the frame plate 38, as at 77, immediately above the table 40, and has an arm 78 extending upwardly from the pivot 77. To the other end of the lever 76 one end of a wire 79 is fixed, said wire having an angular spring portion 80 bearing upon the crank 74 of the rod 72 at the inner side of the slot. Upon one end of a shaft 81 rotatably mounted in the plate 38 an integrator disk or wheel 82 is fixed,

said disk having spaced teeth 83 on its periphery corresponding in number to the number of skeins which are to be bound into a bundle. Preferably an indicating number is embossed or otherwise delineated upon the face of the disk 82 adjacent each of the teeth thereon.

The shaft 81 is provided with a bearing sleeve 84 (Fig. 2) which is fixed in the frame plate. A bell crank lever 85 is loosely mounted upon this sleeve and is provided with a hub 86, upon which an arm 87 is loosely engaged at one of its ends. Upon an arm of the bell crank lever 85 a dog 88 is pivoted, and is provided with an arm 89 extending inwardly from its pivoted end over one side of the disk 82, said arm terminating in an outwardly projecting lug 90. This lug is adapted to be received within a notch or recess 91 formed in one edge of the upwardly extending end portion 78 of the lever 76. A spring 92 bears at one of its ends against the part 78 of the lever, and acts to normally hold the notched upper end of said lever part in operative engagement with the lug 90 to retain the dog 88 in inoperative position out of engagement with the periphery of the integrator disk 82, to which position said dog is normally urged by means of the spring 93.

The upwardly extending arm of the lever 85 is operatively connected by the rod 94 to a lever 95, pivoted at its lower end, as at 96. This lever carries the pin or stud 97, which is engaged in the cam track 54 at the diametrically opposite side of the shaft 52 with respect to the pin 55 on the lever 50.

A vertically reciprocable hammer or plunger 98 is mounted above the table 40, and is provided with an upwardly extending rod 99 loosely received in the spaced guides 100 fixed to the frame plate 38. To this rod a lever 87 is pivotally connected by means of the link 87′ (Fig. 2). This lever 87 is loosely engaged upon the sleeve or hub extension 86 of the bell crank lever 85, and it is provided with a longitudinally projecting lug 101, which is normally engaged against the under side of a pin 102 fixed in the arm of the lever 85 upon which the dog 88 is carried. A spring 103 connects the other arm of the lever 85 with the lever 87. This construction permits the plunger to yield and thus to have a downward movement, the extent of which varies according to the number of skeins piled one upon the other in forming the skein bundle. In the oscillation of the bell crank lever in one direction under the action of the cam element 53, the pin 102 coacting with the lug 101, causes a unitary movement of the bell crank lever and the arm 87, so that the plunger 98 is positively moved upwardly.

The plunger 98 consists of parallel plates 104 and 105 secured to the lower end of the plunger rod 99. These plates are provided with parallel slots 106 to accommodate the ends of the rods 72, which extend across the slot 41 in the table 40. The rear plate 104 of the plunger at the outer sides of the slots 106, projects slightly below the lower edge of the front plate 105, as indicated at 107, for a purpose which will be presently explained.

Between the plates 104 and 105 at the opposite sides of the plunger, and adjacent the lower end thereof, the arms 108 are pivotally mounted at one of their ends, and adjacent to its pivoted end each of said arms is provided with a downwardly projecting tooth or lug 109. Between the plunger plates at the upper end thereof, the levers 110 are pivoted, as at 111. These levers are yieldingly held in a normal position by the springs 110′. The arms 112 of the respective levers are each connected by toggle links 113 to the respective arms 108. The other or upwardly projecting arm of each lever 112 carries a roller 114, and these rollers are adapted to engage the inclined edges 115 of a plate 116 secured to the frame plate 38. To the free end of the arm 108, projecting from the left-hand side of the plunger 98, an upwardly extending curved plate 117 is secured. A similar plate 118 is also fixed to the free end of the other arm 108, and this plate has secured to its upper end, a second plate 119, which is also curved, and extends downwardly in divergent relation to the plate 118. The lower ends of these plates project slightly below the lower edges of the arms 108, and contact with the ends of the skein across the entire width thereof, so as to insure the passage of the skein through the slot in the table 40, and obviate liability of the individual skein strands being caught and held by the edges of said slot. The plate 119 engages the extreme end of the skein at the right-hand side of the table, to which skein end the binder has been applied, and where the skein loops are more or less widely expanded. As the skein loops at the other or left-hand end of the skein are closely assembled, the single plate 117 will be sufficient to insure the depression of this end of the skein through the slot. These arms 108 carrying the skein engaging plates are positively operated in the downward movement of the plunger which engages the medial portion of the skein, to which the tubular label L is applied by the contact of the rollers 114 with the inclined edges 115 of the plate 116. It will thus be seen that through the means of the toggle link connections between the levers 110 and the arms 108, the said arms are forced downwardly through the slot in the table, and the plates secured to the ends of said arms engaging the ends of the skein, force the skein ends

downwardly through the slot and below the plane of the central portion of the skein, as clearly shown in Fig. 5 of the drawings.

Upon the front side of the frame plate 38, at the lower end of the opening 39 therein, a horizontal shaft 120 is journaled in suitable bearings, and upon this shaft the lower ends of the parallel vertically disposed bars 121 are fixed. The upper end of each of said bars is provided with a fork or bifurcation 122, which is centrally divided by the web 123 to provide separate compartments. Each of the bars 121 adjacent its upper end, is provided with a laterally projecting upwardly curved arm 124, the ends of said arms being connected by a rod 125. Upon this rod a paste box 126 is mounted in suspended relation thereto for free turning movement. The box 126 is provided at one end with a paste applying roller 127, having spaced teeth 128 at one of its ends. This roller is yieldingly held against a casual turning movement by the spring 129. A lever 130 is fulcrumed intermediate of its ends, as at 131, upon one of the bars 121, and one end of said lever is connected to the outer end of the paste box 126 by means of the link bar 132.

The lower end of the lever 130 carries a roller 134 for engagement with an operating cam, to be presently referred to. The paste applying roller 127 is actuated in the oscillating movement of the paste box in one direction by means of a tappet 135, pivoted at 136 upon one of the bars 121, and normally held by means of the spring 137 against a stop pin 138, fixed in said bar.

Upon the rear side of the frame plate 38 a horizontal shaft 139 is rotatably mounted, and a loose sleeve 139′ on one end of said shaft has a worm gear 140 secured thereon, which is engaged with the worm 141 secured upon a motor shaft, indicated at 142. This shaft carries a sprocket wheel 143, which is connected by a drive chain to a similar sprocket on the operating shaft of the skein winding mechanism. Upon the shaft 139 a cam 145 is fixed, said cam being provided with a shoulder 146. The periphery of this cam is adapted for engagement with a roller 148, mounted upon one side of the rear end of an arm 147, fixed upon the shaft 120, and projecting through the opening 39 in the frame plate 38. Upon one face of the cam 145 a clutch dog 149 is pivotally mounted, and is adapted to engage any one of an annular series of pins 151, carried by the disk 150, which is fixed on the sleeve 139′. The clutch dog is normally urged into locking engagement with the pins 151 by means of the spring 152, and one end of said clutch dog carries a pin 153, which is adapted to be engaged by a trip hook 154 on one end of a sleeve 155, which is loosely mounted on an arbor 156, fixed at one of its ends upon the rear side of the frame plate 38. Upon the opposite side of the cam 145 a detent 157 is mounted for limited movement about the shaft 139 with respect to said cam, said detent having a slot 158 to receive a pin 159 fixed in the cam 145. The outer end of the detent is adapted to be projected beyond the shoulder 146 on the cam by means of the spring 160.

A second cam 161 is also fixed on the shaft 139, and is adapted to coöperate with the roller 134 on the lever 130 to oscillate the paste box 126 to cause the roller 127 to apply paste to a binder, as shown in Fig. 6. The skein holder carrying the paste box is projected in a forward direction to the normal position seen in Fig. 2, by means of the spring 162, which surrounds the shaft 120, and has one of its ends engaged with one of the bars 121.

The clutch means for the cam 145, as above described, is controlled and operated by means of the following mechanism. Upon the shaft 81 at the rear side of the frame plate 38 a cam disk 163 is fixed, and this disk, adjacent to its periphery, is provided with a pin 164 to engage a roller 166 mounted upon one arm of an angular lever 165, which is fulcrumed upon the pin 167 between the frame plate and a bracket 168. A vertical bar 169 is pivotally connected at its upper end to the other arm of this lever, and the lower end of this bar is connected to the sleeve 155. It will thus be apparent that when the pin 164 comes into contact with the roller 166, the sleeve 155 will be oscillated upon the arbor 156, and the trip hook 154 will be disengaged from the pin 153 on the clutch dog 149, so that said dog will be urged by the spring 152 into position to engage one of the clutch pins 151, thereby locking the cam 145 to the sleeve 139′ for rotation therewith. This cam, by its coaction with the roller 148 on the arm 147, imparts a swinging movement to the skein holder. A spring 163′ engaging the cam disk 163 operates as a brake to prevent casual rotation of the shaft 81.

A second angular lever 170 is mounted upon the pin 167, and one arm of this lever carries a roller 171 with which the periphery of the cam disk 163 contacts. The other arm of this lever is connected by the rod 172 to an arm 173 fixed to the shaft 120. The low portion 174 of the cam disk 163 is engaged with the roller 171 while the skein holder is in the position seen in Fig. 2, and the high portion 175 of said cam disk is engaged with the roller while the skein holder is in the position seen in Fig. 4. It will be apparent that when this high portion of the cam disk contacts with the roller, the shaft 120 will be oscillated in its bearings to move the skein holder rearwardly, and position the outer compartments of the forks

122 beneath the slot in the table 40. At one end of this high portion of the cam disk said disk is formed with an outwardly projecting support or lug 176. During the time that the cam portions 174 and 175 are engaged with said roller, the shoulder 146 on the cam 145 is engaged with the roller 148 on the arm 147. When the projection 176 strikes the roller 171, a further oscillation is imparted to the shaft 120, and the arm 147 is moved to lower the roller 148 below the shoulder 146. As soon as the end of the arm 147 is first lowered by the cam portion 175 below the lower end of the detent 157, said detent is forced over the end of said arm by means of the spring 160, thereby locking the arm 147, and consequently the shaft 120, against a reverse movement until the clutch means for the cam 145 is released, and said cam rotated to bring its periphery into contact with the roller 148. These operations, namely, the locking of the cam 145 to the sleeve 139′, and the further rotation of the shaft 120 to lower the arm 147, occur practically at the same time.

In the bearing arms 177 on the rear side of the frame plate 38 the ends of a shaft 178 are journaled. A sleeve 179 is loosely engaged upon one end of this shaft and carries the annular series of spaced clutch pins 180. This sleeve is constantly rotated by a drive chain connection 181 with the sleeve 139′. An arm 182 is fixed upon the shaft 178, and upon this arm the spring pressed clutch dog 183 is pivotally mounted. Upon the arbor 156 a sleeve 184 is loosely mounted, and upon one end is provided with an upwardly extending trip arm 185, terminating in a hook 186 adapted to coact with the pin 187 on the clutch dog to hold said dog out of engagement with the clutch pin 180. Upon the other end of the sleeve 184 a downwardly extending arm 188 is formed, and carries a roller 189. The roller is adapted to be engaged by a pin 191 fixed in the arm 190, which is secured upon the shaft 139. The rocking movement of the sleeve 184 is limited by the spaced pins 192 projecting from one end of the sleeve, and contacting with the opposite sides of a stop pin 193. It will thus be understood that when in the rotation of the shaft 139, the pin 191 strikes the roller 189, the clutch dog 183 is released, so that it will engage one of the pins 180, and thereby lock the sleeve 179 to the shaft, so that rotation will be transmitted to said shaft.

Upon the central portion of the shaft 178 a forwardly and upwardly projecting arm 194 is fixed, and terminates in a bundle receiving support 195. Upon this arm a lever 196 is fulcrumed intermediate of its ends, as at 197, and to one end of said lever a clamping plate 198 is pivoted. With this clamping plate a spring 199 coacts. Upon the other end of the lever 196 a roller 200 is mounted, and this roller is adapted for engagement with a fixed cam 201, said cam being preferably formed on the end of a sleeve 202 surrounding the shaft 178. This sleeve is adjustably secured in a clamp 203 at its other end, the clamp being fixed to one of the bearing arms 177. The roller 200 is yieldingly held in contact with the periphery of the cam 201 by means of a spring 204, which is fixed at one of its ends to the arm 194, and bears at its other end against the lever 196.

In the bearing arms 177 the lower ends of the vertical rods 205 are fixed, said rods being connected at their upper ends with a horizontal bar 206. Upon this bar the curved paper strip folding plate 207 is secured. Guides 208 are fixed to the rear side of the frame plate 38 at the upper edge of the opening 39 therein, and extend rearwardly toward the plate 207. These guides are formed with the forwardly projecting fingers 209, which serve to exert a final compressing action upon the superposed skeins during the rearward movement of a skein holder, and prevent the relative longitudinal shifting movement of the skeins.

A plate 210 is secured to the frame plate 38 above the guides 208, and is provided with spaced side flanges 211. Between these flanges spaced paper strip feeding disks 212 are fixed upon a shaft 213. The paper strip is drawn from a roll indicated at 214, mounted upon the supporting arm 215 between the knurled edges of the disks 212 and a spring pressed roller 216, which applies a tension to the paper strip so that the feed disks will have the requisite frictional pressure on the strip to assure the proper feed thereof. The disks 212 at corresponding points, are provided with the peripheral recesses 217. A metal bar 218 is secured to the edges of the flanges 211 above the paper feed disks, and is provided with a suitable identifying mark or characters, preferably embossed thereon, to be impressed in the paper strip. The impression is produced through the medium of a metal block 219, fixed upon a shaft 220, journaled in the upper ends of the flanges 211, and depending from said shaft. The paper strip extends downwardly between this metal block and the inner side of the bar 218. Upon one end of the shaft 220 an arm 221 is secured, and carries a roller 222, with which a lug 224 formed on one end of a lever 223 is adapted to engage. This lever is fulcrumed intermediate of its ends, as at 225, upon one of the flanges 211, and at its lower end carries a cutting blade 226, which is adapted to coact with a fixed cutting blade 227, secured at one end to the other of said flanges. The fixed blade is formed with an upwardly extending paper strip guide plate 228 which extends above the central portion

of the tension roller 216. Upon this guide plate a guide finger 229 is secured at one side thereof, and guides the paper strip between the cutting blades. The plate 230, fixed to the lower edges of the flanges 211, is provided with a downwardly turned flange 231 below the paper cutting blades, and with this flange the end of the wire spring 232 coacts to temporarily hold the severed section of the paper strip and prevent the same from falling. This spring is carried by a second pivoted lever 233′, mounted on the other of the flnages 211. As shown in Fig. 2, this severed section B of the paper strip extends below the curved plate 207 and the bundle receiving support 195 at the front open side of said support. Thus when the skein holder is moved rearwardly to transfer the bundle of skeins to said support, the medial portion of the paper binder B for the bundle is forced rearwardly against the rear wall of the support, and the upper end of the binder strip is pulled downwardly against the resistance of the tension spring 232.

In order to insure that the paper strip as it is drawn from the roller 214 will be properly fed, so as to provide a binder of the requisite length, a tension spring 233 also exerts a pressure upon said strip as it is moved over a horizontal guide arm 234 on the support 215.

Upon the shaft 213 cams 235 and 235′ are fixed, and coact with rollers 236 and 236′ on the upper ends of the levers 223 and 223′ respectively. The roller 222 on the arm 221 is at all times held in contact with the lug 224 by means of the coil spring 237. Thus when the peripheral projection of the cam 235 strikes the roller 236, said lever will be rocked on its pivot to move the cutting blade 226, and thereby sever the lower portion of the paper strip, and at the same time rock the shaft 220 to force the block 219 against the paper strip, and cause the letters or other characters on the bar 218 to be impressed in the paper. It will be understood that the other lever 223′, is simultaneously actuated, so that the spring 232 is moved therewith into resilient gripping engagement with the upper end of the binder strip to clampingly hold the same against the flange 231. The lever 223′ is returned to its normal position by means of a spring 239, which bears at its free end against the upper pivoted end of said lever. At the time these operations take place, the recesses 217 in the edges of the feed disks 212 are opposite the tension roller 216, so that the downward feed of the paper strip is momentarily arrested. The upper ends of the flanges 211, rearwardly of the shaft 220 are connected by a rod 240, which guides the paper strip downwardly between the bar 218 and the presser block 219. Rotation is transmitted to the shaft 213 from the shaft 178 by means of the sprocket chain 238, or other equivalent driving connection.

Having above described the construction and arrangement of the several parts of the mechanism, the operation will be understood as folows:

The skeins are successively wound upon the spaced holders mounted on the endless carrier in the manner disclosed in my prior applications, Serial Nos. 324,530 and 346,836, above referred to, from a continuous thread, an individual binder being applied to the looped strands of each skein, and the thread extending between adjacent skeins being severed, as disclosed in my application, Serial No. 381,283, and simultaneously with the binding of the loops of one skein at one side of the carrier, the skein holder at the opposie side of the carrier is actuated in the manner above explained, by the movement of the slide 25, so that the skein is extended laterally from the endless carrier to a position where it may be easily removed from the holder. The cam element 53, during the bodily movement of the binding mechanism to operative position, opens the gripping jaw 46, and moves the lever 43, to the right, through the medium of the operating elements 49 and 50 to the position seen in Fig. 1, where the end of the skein is disposed between the fixed jaw 45 and the upper movable jaw 46. In the continued rotation of the cam element 53 as the binding mechanism is actuated, the jaw 46 is first forced downwardly to a closed position, so that the skein end is gripped between the jaws 45 and 46 with sufficient pressure to cause the removal of the skein from the holder 11 when the lever 43 is shifted to the left, which movement occurs immediately after the skein is gripped. The skein falls downwardly, and is drawn over the table 40, and is guided into a position immediately overlying the slot in said table by the several guide elements associated with the table, in the manner heretofore described. After the formation of the skeins, and in the intervals between the intermittent movements of the carrier, the tubular labels L are slipped over the movable arm of the skein holder and the loops thereon, and this label is positioned over the narrower portion 41 of the slot in the table, and immediately above the ends of the rods 72. The cam element 53 now actuates the lever 95 and connection 94 to move the bell crank lever 85 to the left, so that the plunger 98 is yieldingly forced upon the central portion of the skein, to which the label is applied. As the skeins are piled one upon the other in the holder compartments, the plunger has a lessening downward movement, the spring 103 permitting the lever 87 to yield relatively to the lever 85. In this downward movement of the plunger the rollers 114 on the levers 110 engage the inclined edges 115 of the plate 116, and through

the toggle link conditions 113 the arms 108 are forced downwardly through the slot in the table. The lugs or projections 109 on said arms are respectively brought into contact with the opposite ends of the label L, and serve to properly position said label with respect to the plunger, so that when a series of the skeins are disposed in superposed relation, the labels will be evenly alined. In this downward movement of the arms the metal plates 117, 118 and 119 engage the ends of the skein at the opposite edges of the slot in the table, and force the two ends downwardly through the slot to a position below the plane of the central portion of the skein.

The bars 121, having the skein receiving forks 122 on their upper ends, are disposed in the position seen in Fig. 2 of the drawings, so that in the continued downward movement of the plunger the skein will be received in the compartments between the rear arms of the forks and the vertical webs 123. The central portion of the skein inclosed within the label L bears against the ends of the rods 72, thereby rocking the rods, and forcing the ends downwardly against the action of the springs 75 and 80. The crank 74 of one of said rods bearing upwardly against the spring 80, actuates the lever 76, and thereby disengages the upwardly extending notched arm 78 of said lever from the lug 91 of the dog 88, so that said dog is permitted to move into contact with the periphery of the integrator disk 82. Accordingly, it will be apparent that in the reverse movement of the lever 85 this dog engaging one of the teeth on the periphery of said disk, will move the disk one step. The pin 102 on said lever, contacting with the lug 101 on the arm 87, acts to reverse the movement of the plunger 98 and to position the same above the table 40. It will be understood that in the downward movement of the plunger the ends of the rods 72 are accommodated in the slots 106 of the plunger plates. In the upward movement of the plunger the arms 108 are returned to their normal horizontal positions by the springs 110′, which are fixed at one of their ends to the plunger, and bear at their other ends against the upper ends of the levers 110. After the dog 88 moves the integrator disk 82 one step, the lug 90 rides over the upper end of the lever arm 78, which has returned to its normal position, and into the notch 91 thereof, so that said dog is again held in an inoperative position out of contact with the periphery of the disk.

The above operation is repeated, until six of the skeins have been piled in superposed relation within the rear compartments of the holding forks 122. After the last of these six skeins has been placed in position, in the operation of the integrator disk 82, and the rotation of the shaft 81 upon which said disk is fixed, the high portion 175 of the cam disk 163 on said shaft is brought into contact with the roller 171 on the bellcrank levers 170, so that a rocking movement is imparted to the shaft 120 through the rod connection 172, and the arms 121 are swung inwardly to position the outer compartments of the skein receiving forks 122 beneath the slot or opening in the table 40. Therefore, it will be apparent that in the succeeding operations of the mechanism for removing the skeins from the individual holders, and piling said skeins in superposed relation, a second series of six skeins will be arranged in the holder forks 122. It is to be observed that as the front plate 105 of the plunger at the outer sides of the slots 106 terminates above the lower edge of the rear plate 104, said front plate will not contact with the arms of the forks 122, while the rear plate 104 of the plunger will depress the uppermost skein in the series below the upper end of the fork arm. The inner or first series of six skeins which have been arranged in the holder forks are held compressed by the forwardly projecting fingers 209 of the guide plates 208. In this manner it will be apparent that the two superposed series of skeins which make up the skein bundle, are very tightly or compactly assembled.

After the second series of six skeins have been transferred to the receiving forks of the bundle holder or carrier, as will be indicated on the face of the integrator disk 82, the pin 164 strikes the roller 166, so that the clutch for the cam 145 is permitted to operate, owing to the release of the clutch dog 149, and engage one of the pins 151. Simultaneously a further rocking movement is imparted to the shaft 120 by the engagement of the lug or projection 176 with the roller 171, so as to lower the arm 147 to a position permitting the high portion of the cam 145 to ride upon the roller 148, carried by said arm, the arm being locked against an upward movement by the detent member 157 carried by the cam in the manner above described, until such coaction between the periphery of the cam and the roller 148 takes place. In the rotation of the cam 145 the shaft 120 is further rotated to swing the arm 121 carrying the skein bundle rearwardly through the opening 39 in the frame plate to the position seen in Fig. 4, in which position the forwardly projecting flange of the angular seat 195 is received between the forked ends of the bars 121 beneath the skein bundle. In this movement of the skein bundle the lower edges of the guides 208 continue to exert a pressure upon the upper skeins in the two superposed series, until they are positioned beneath the presser plate 198, which is yieldingly urged into contact with

the uppermost skeins by the spring 199. Thus it will be seen that the compressing pressure on the superposed skeins is maintained. At the proper time after the skein bundle has thus been positioned in the support 195 on the discharge arm 194, the pin 191 engages the roller 189, and the clutch dog 183 is released, so as to lock the loosely mounted sleeve 179 to the shaft 178, thereby imparting rotation to said shaft, so that the arm 194 is moved upwardly beneath the curved plate 207. It is, of course, understood that in the previous skein bundling operation the paper strip from the roll 214 has been fed downwardly, and a length of the strip severed, to provide a binder B, which has been folded around the skein bundle in the transference of the latter from the forks 122 to the support 195, and then the adhesive is applied to one end of the flexible binder, which is also bent inwardly and upwardly over the skein bundle by the paste-applying roller 127 when the rear end of the paste box 126 is moved upwardly from the position shown in Fig. 6 by the further action of the cam 161 upon the roll 134. Therefore, in the rotation of the shaft 178 and the upward movement of the arm 194, the forward edge of the curved plate 207 bends the other end of the binder strip inwardly and downwardly upon the surface to which the glue or other adhesive has been applied. In this manner the flexible binder is tightly secured around the bundle of skeins so that they will be closely held in compact relation. The shaft 178 makes one complete revolution, so that the support 195 is moved to a position rearwardly of the shaft, and below the rear end of the curved plate 207. When the support 195 has reached this position the roller 200 comes in contact with the periphery of the cam 201, whereby the lever 196 is actuated to release the presser plate 198 from engagement upon the skein bundle. The bundle then drops by gravity from the support upon a suitable directing plate or chute, and is discharged from the machine. During the revolution of the shaft 178 and the discharge of the bound bundle of skeins, the paper strip is fed downwardly and another binder length cut therefrom before the hooked end of the trip arm 185 again engages the pin 187 of the dog 183, and disconnects the shaft 178 from the rotating sleeve 179.

From the foregoing description considered in connection with the accompanying drawings, the construction, manner of operation and several advantages of the improved bundling mechanism will be fully understood.

While I have devised a mechanism which is primarily adapted for use in conjunction with the several inventions disclosed in my several pending applications, hereinbefore referred to, it is, nevertheless, to be understood that this mechanism for binding a multiplicity of skeins into a compact bundle may be readily adapted for use in connection with other machines, and in the operation of which the skeins, after being formed, may be collected and arranged by hand in the receiving and carrying forks of the bundling mechanism.

It will be appreciated that by means of my present improvement considerable labor and expense may be saved in the bundling and packing of skeins for shipment. In practice it has been found that the mechanism herein described is very reliable and positive in its operation, and may be operated with great rapidity to form the skeins into neat and compact bundles.

I have herein referred to a skein bundle consisting of twelve skeins, which is the usual number bound in bundles for shipment to the retailer, but it will be apparent that by resorting to certain obvious changes a greater or less number of the skeins may constitute a bundle.

It is also to be understood that while I have herein shown and described one satisfactory and preferred embodiment of my invention, the mechanism is, nevertheless, susceptible of exemplification in numerous other alternative structures, and I accordingly reserve the privilege of adopting such legitimate changes as may be fairly embodied within the spirit and scope of the invention as claimed.

I claim:

1. A skein bundling mechanism having in combination, means for feeding the skeins one at a time to the bundling mechanism, a pair of gripping jaws adapted to grip one end of a skein, means for actuating the jaws to place the skeins in position to be arranged in a bundle, means for holding the skeins, means for superposing the skeins one upon the other in a bundle, and means for applying a binder to the bundle of skeins.

2. A skein bundling mechanism having in combination, means for feeding the skeins one at a time to the bundling mechanism, a pair of gripping jaws adapted to grip one end of a skein, means for actuating the jaws to place the skeins in position to be arranged in a bundle, means for receiving the skeins, a yieldingly supported plunger for arranging the skeins in superposed relation, and means for applying a binder to the bundle of skeins.

3. A skein bundling mechanism having in combination, means for feeding a series of skeins one at a time to the bundling mechanism, a pair of jaws for gripping the end of a skein and moving it into position to be arranged in a bundle, means for supporting and actuating the pair of jaws, a holder for containing a plurality of series of super-

posed skeins, means for inserting the skeins in the holder, means for shifting the holder during the skein inserting cycle of operations, and means for applying a binder to the bundle of skeins.

4. A skein bundling mechanism having in combination, means for feeding a series of skeins one at a time to the bundling mechanism, means for placing the skeins in position to be arranged in a bundle, a skein holder having a plurality of compartments, means for inserting the skeins in the compartments, means for shifting the holder during the operation of filling the compartments, and means for applying a binder to the bundle of skeins.

5. In combination with skein forming mechanism, means for securing a plurality of the skeins together into a bundle, and means for transferring the skein to the bundling mechanism, including means for arranging two series of skeins in superposed relation to provide a bundle of rectangular form.

6. A skein bundling mechanism having in combination, means for feeding the skeins one at a time to the bundling mechanism, a lever mounted for swinging movements, a pair of gripping jaws carried by the free end of the lever, means for actuating the jaws to grip one end of the skein and to swing the lever to place the skein in position to be arranged in a bundle, a holder for receiving the skeins, a plunger mounted to be moved varying distances for arranging the skeins in superposed relation, and means for applying a binder to the bundle of skeins.

7. A skein bundling mechanism having in combination, means for feeding the skeins to the bundling mechanism, a holder having a plurality of compartments for receiving the skeins, means for inserting the skeins in the holder, means for counting the skeins inserted in the holder, means for shifting the holder when a predetermined number have been inserted in one compartment, and means for applying a binder to the skeins when a predetermined number thereof have been arranged in a bundle.

8. A skein bundling mechanism having in combination, means for feeding the skeins to the bundling mechanism, a holder having a plurality of compartments for receiving the skeins, means for placing the skeins in position over the holder, yieldingly mounted means for inserting the skeins in the holder, means for counting the skeins inserted in the holder, means for shifting the holder when a predetermined number of skeins have been inserted in one compartment, and means for applying a binder to the bundle of skeins.

9. A skein bundling mechanism having in combination, means for feeding the skeins to the bundling mechanism, a holder for receiving the skeins, means for placing the skeins in position to be inserted in the holder, means for inserting the skeins in the holder, a discharging member having an open side, means for moving the holder so that the bundle of skeins therein will be received in the discharging member, and means for actuating the discharging member to discharge the bundle of skeins.

10. A skein bundling mechanism having in combination, means for feeding a series of skeins to the bundling mechanism, a holder in which the skeins are arranged in a bundle, means for inserting the skeins in the holder, a discharging member having an open side, means for feeding a binder in front of the open side of the discharging member, means for moving the holder against the binder and into the discharging member to thereby partially wrap the binder about the bundle of skeins, means for applying paste to one end of the binder, and for folding it upon a bundle, means for actuating the discharging member, and means for folding the other end of the member upon the bundle during the discharging movement.

11. A skein bundling mechanism having in combination, means for feeding a series of skeins one at a time to the bundling mechanism, a holder having an open upper side for receiving the skeins, means for placing the skeins in position over the holder, yieldingly mounted means for inserting the skeins in the holder, a discharging member having an open side, means for moving the holder so that the skeins will be received in the discharging member, and means for applying a binder to the bundle of skeins during the transferring operation.

12. In combination with means for binding a plurality of skeins into a compact bundle, means for arranging the skeins in superposed relation, including a pivoted lever, skein gripping means carried by said lever, means for positioning a skein to be engaged by said gripping means, and means automatically operable to first actuate the gripping means and cause the same to effectively engage the skein, then swing said pivoted lever to position the skein with respect to the bundle binding mechanism, and finally actuate the gripping means to release the skein.

13. In combination with means for binding a plurality of skeins into a compact bundle, means for assembling the skeins in superposed relation to each other, including a pivoted lever, means mounted upon said lever and operable independently thereof to engage a skein, means for first operating said skein engaging means, and then shifting the pivoted lever to thereby move the skein to position with respect to the bundle binding mechanism, and finally releasing

the skein, and means for preventing the swinging movement of said lever prior to the effective engagement of the skein engaging means with the skein.

14. In combination with mechanism for binding a plurality of skeins into a compact bundle, including a movable holder for the skeins, means for positioning the skeins in said holder in superposed relation to each other, comprising skein gripping means, means for actuating said gripping means to cause the same to effectively engage the skein and for then imparting bodily movement to said gripping means to position the skein in said holder, and means for automatically changing the position of the holder with respect to the line of bodily movement of said gripping means to cause the skeins to be arranged in two superposed series, and thereby form a rectangular bundle.

15. In combination with mechanism for binding a plurality of skeins into a compact bundle, including a movable holder for the skeins, means for positioning the skeins in said holder in superposed relation to each other, comprising skein gripping means, means for actuating said gripping means to cause the same to effectively engage the skein and for then imparting bodily movement to said gripping means to position the skein in said holder, means for automatically changing the position of the holder with respect to the line of bodily movement of said gripping means to cause the skeins to be arranged in two superposed series, and thereby form a rectangular bundle, and mechanism for automatically imparting a further movement to the holder and for securing a flexible binder around the skein bundle during such movement of the holder.

16. In combination with mechanism for binding a plurality of skeins into a compact bundle, including a movable holder for the skeins, means for positioning the skeins in said holder in superposed relation to each other, comprising skein gripping means, means for actuating said gripping means to cause the same to effectively engage the skein and for then imparting bodily movement to said gripping means to position the skein in said holder, means for automatically changing the position of the holder with respect to the line of bodily movement of said gripping means to cause the skeins to be arranged in two superposed series, and thereby form a rectangular bundle, mechanism for automatically imparting a further movement to the holder and for securing a flexible binder around the skein bundle during such movement of the holder, a relatively movable discharging member to receive the skein bundle from said holder, and means for actuating said discharging member to discharge the bundle from the machine.

17. A skein bundling mechanism, including a movable holder, means for arranging a plurality of skeins in superposed relation in said holder, a relatively movable bundle discharging member, means for moving the holder to transfer the skein bundle to said discharging member, mechanism for automatically applying a flexible binder around the bundle during such transferring operation, and means for operating the discharging member to discharge the bound bundle of skeins from the machine.

18. A skein bundling mechanism, including a movable holder, means for arranging a plurality of skeins in superposed relation in said holder, a relatively movable bundle discharging member, means for moving the holder to transfer the skein bundle to said discharging member, means for maintaining the superposed skeins under compression, mechanism for automatically applying a flexible binder around the bundle during such transferring operation, and means for operating the discharging member to discharge the bound bundle of skeins from the machine.

19. In a skein bundling mechanism, a movable skein holder in which the skeins are adapted to be arranged in superposed relation, means for initially moving the holder after one vertical series of superposed skeins has been arranged therein, and maintaining said series of skeins under pressure while a second vertical series of superposed skeins is arranged in the holder, means operable to impart a further movement to said holder, said pressure means applying compressing pressure to both series of superposed skeins, mechanism for automatically securing a flexible binder around the central portions of the two series of superposed skeins in the latter movement of the holder, and means automatically operable to discharge the bound skein bundle at the end of the binding operation.

20. In a skein bundling mechanism, a movable holder to receive the skeins, means for successively positioning a plurality of skeins in superposed relation to each other within said holder, a plunger to exert a compressing pressure upon the superposed skeins, means for operating the plunger, as each skein is arranged in position in the holder, means for operating the skein-positioning means, a common actuating element for the skein-positioning means and the plunger, means for moving said holder after the skeins have been assembled therein, means for maintaining pressure upon the superposed skeins, and mechanism to automatically apply and secure a flexible binder around the skein bundle during such movement of the holder.

21. In a skein bundling mechanism, a movable holder to receive the skeins, means for successively positioning a plurality of

skeins in superposed relation to each other within said holder, a plunger to exert a compressing pressure upon the superposed skeins, means for operating the plunger, as each skein is arranged in position in the holder, means for operating the skein-positioning means, a common actuating element for the skein positioning means, and the plunger, means for moving said holder after the skeins have been assembled therein, means for maintaining pressure upon the superposed skeins, a movable discharge member to receive the bound bundle of skeins from the holder, mechanism to automatically apply and secure a flexible binder around the skein bundle during such movement of the holder, and means for actuating the discharge member to discharge the bundle from the machine.

22. In a skein bundling mechanism, a movable skein holder, means for successively positioning a series of skeins in superposed relation within said holder, each skein having a label encircling its medial portion, a plunger automatically operable upon each skein as it is arranged in the holder to exert a compressing pressure upon the superposed skeins, means carried by the plunger to aline the labels on the series of skeins with each other, menas for moving the skein holder with respect to the plunger, and means for automatically securing a flexible binder around the superposed skeins during such movement of the holder.

23. In a skein bundling mechanism, a skein holder mounted for swinging movement, in which a series of skeins are adapted to be arranged in superposed relation, a plunger to exert a compressing pressure upon the skeins as they are successively arranged in the holder, means for actuating said plunger, means for swinging the holder with respect to the plunger, and means for securing a flexible binder around the series of superposed skeins during such swinging movement of the holder.

24. In a skein bundling mechanism, a skein holder mounted for swinging movement, in which a series of skeins are adapted to be arranged in superposed relation, a plunger to exert a compressing pressure upon the skeins as they are successively arranged in the holder, means for actuating said plunger, means for swinging the holder with respect to the plunger, means for securing a flexible binder around the series of superposed skeins during such swinging movement of the holder, and additional means operable to automatically remove the bound bundle of skeins from the holder and discharge the same from the machine.

25. In a skein bundling mechanism, a skein holder mounted for swinging movement, and adapted to receive two series of skeins arranged in superposed relation to each other, a plunger to exert a compressing pressure upon the skeins in said holder, each of said skeins having a tubular label thereon, means carried by the plunger and operable in the compressing movement thereof to aline the labels on the superposed skeins with each other, means for actuating said plunger, means for swinging the holder with respect to the plunger mechanism for automatically securing a flexible binder around the skein bundle in the swinging movement of the holder, and additional means for discharging the bound bundle of skeins from the holder.

26. In a skein bundling machine, a horizontal table having a slot therein, a movable skein holder mounted beneath the table, means for singly positioning the skeins upon the table over the slot therein, a plunger operable through the slot in the table to depress the skeins through said slot into superposed relation upon each other within the holder, an integrator mechanism, a common actuating means for the plunger and the integrator mechanism, means normally rendering the integrator mechanism inoperative, and actuated by each skein as it is forced through the slot in the table, whereby said integrator mechanism is rendered operable, means for moving the skein holder with respect to the table, and mechanism for securing a flexible binder around the superposed skeins during such movement of the holder.

27. In a skein bundling mechanism, a horizontal table having a slot therein, a skein holder movably mounted beneath said table, means for singly positioning the skeins upon the table, a plunger operating to depress the skeins through said slot, and into the holder in superposed relation to each other, an integrator mechanism, means controlling the operation of the integrator mechanism, actuated by each skein as it is forced through the slot in said table, common operating means for the plunger and the integrator mechanism, means for imparting an initial movement to the holder to position the same with respect to the slot in the table whereby a second series of superposed skeins may be arranged therein, a discharge member, means for imparting further movement to the holder to position the skein bundle in the discharge member, mechanism for securing a flexible binder about the skein bundle during the latter movement of the holder, means operatively connected with the integrator mechanism for controlling the initial and final movements of the holder, and means for actuating the discharge member to discharge the bound bundle from the machine.

28. In a skein bundling mechanism, a holder mounted for swinging movement, and adapted to receive a plurality of superposed skeins constituting a skein bundle, a ro-

tatably mounted discharge member, means for swinging the holder to transfer the skein bundle therein to the discharge member, means for exerting a compressing pressure on the superposed skeins during such transfer movement, means for applying a flexible binder around the skein bundle while the skeins are under pressure, and means for rotating the discharge member to discharge the bound bundle of skeins from the machine.

29. In a skein bundling mechanism, a holder mounted for swinging movement, and adapted to receive a plurality of superposed skeins constituting a bundle, a rotatable discharge member, mechanism to swing the holder and transfer the skein bundle to said member, means for applying a flexible binder around the skein bundle during such transfer movement, cam actuated means movable with the discharge member for exerting a clamping pressure on the bundle of skeins, means for rotating said member to discharge the bundle, and means for securing the ends of the binder together during such discharging movement.

30. In a skein bundling machine, a skein holder mounted for swinging movement, adapted to receive a plurality of superposed skeins constituting a skein bundle, a rotatable discharge member, mechanism to feed a paper binding strip and position the same with respect to the discharge member, means for swinging the holder to transfer the skein bundle to said discharge member, and simultaneously engage the paper binding strip around the bundle of skeins, means automatically operable in the swinging movement of the holder to apply an adhesive to one end of the paper binding strip, and bend said end inwardly with respect to the other end of the strip, means for rotating said member to discharge the bundle, and means for bending the latter end of the paper binding strip during such discharging movement upon the end of the strip to which the adhesive is applied.

31. In a skein bundling mechanism, a holder mounted for swinging movement and adapted to receive a series of superposed skeins constituting a bundle, a rotatable discharging member, means for feeding a paper binding strip to position the same with respect to said discharging member, means for swinging the holder to transfer the skein bundle to the discharging member and simultaneously bend the paper strip around the bundle, a clamp carried by said member to apply a compressing pressure upon the skein bundle, means for rotating said discharging member, means for securing the ends of the paper strip to each other during such discharge movement, and cam actuated means for actuating the clamp to release the bound bundle of skeins.

32. In a skein bundling machine, a holder mounted for swinging movement, and adapted to receive a plurality of superposed skeins constituting a bundle, a rotatable discharge member, means for feeding a flexible binder to position the same with respect to the discharge member, cam means for swinging the holder to transfer the skein bundle to the discharge member, and thereby bend the binder around the bundle, cam actuated adhesive applying means carried by the holder and operable in the swinging movement thereof to apply an adhesive to one end of the binder and bend said end of the binder inwardly, means for rotating the discharge member, and a relatively fixed plate operable upon the other end of the binder strip during the discharge movement to bend the same upon the adhesive surface of the first end of the binder strip, and thereby secure the binder around the bundle.

33. In a skein bundling mechanism, a skein holder mounted for swinging movement, and adapted to receive a plurality of superposed skeins constituting the bundle, a rotatable discharge member, means for feeding a paper strip and severing a portion thereof to constitute a binder, means for supporting the severed section of the strip with respect to the discharge member, cam means for swinging the holder to transfer the skein bundle to the discharge member and bend the binder strip around the bundle, relatively fixed means for exerting a compressing pressure upon the superposed skeins during the transfer thereof, a clamp carried by the discharge member for maintaining such pressure upon the skein bundle, means automatically operable in the swinging movement of the holder to apply an adhesive to one end of the paper binder, means for rotating the discharge member, and a relatively fixed plate acting upon the ends of the binder strip during such discharge movement to adhesively secure the same to each other.

34. In a skein bundling mechanism, a skein holder mounted for swinging movement, and adapted to receive a plurality of superposed skeins constituting the bundle, a rotatable discharge member, means for feeding a paper strip and severing a portion thereof to constitute a binder, means for supporting the severed section of the strip with respect to the discharge member, cam means for swinging the holder to transfer the skein bundle to the discharge member and bend the binder strip around the bundle, relatively fixed means for exerting a compressing pressure upon the superposed skeins during the transfer thereof, a clamp carried by the discharge member for maintaining such pressure upon the skein bundle, means automatically operable in the swinging movement of the holder to apply an adhesive to one end of the paper binder, means for rotating the

discharge member, a relatively fixed plate acting upon the ends of the binder strip during such discharge movement to adhesively secure the same to each other, and a fixed cam to actuate said clamp at the end of the discharge movement, and release the bundle.

35. In a skein bundling mechanism, means for temporarily clamping a flexible binding strip at one end, means for moving a skein bundle against said strip to disengage the strip from said clamping means, means operable in such movement of the skein bundle to apply an adhesive to the other end of the binding strip, and means for moving the skein bundle at an angle to the direction of the first movement thereof, and for engaging the ends of the binding strip to adhesively secure the same together.

In testimony that I claim the foregoing as my invention, I have signed my name hereunder.

MAX OTTO CLAUSS.