

M. O. CLAUSS.
SKEIN BINDING MECHANISM.
APPLICATION FILED MAY 14, 1920.

1,401,519.

Patented Dec. 27, 1921.

4 SHEETS—SHEET 1.

Fig. 1.

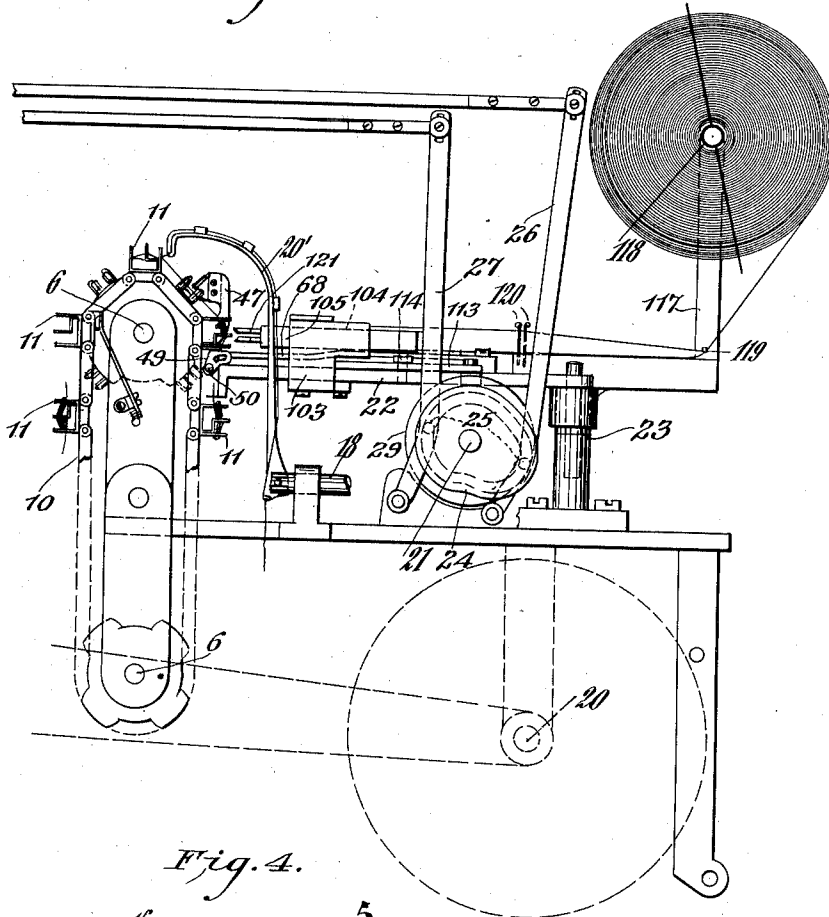


Fig. 4.

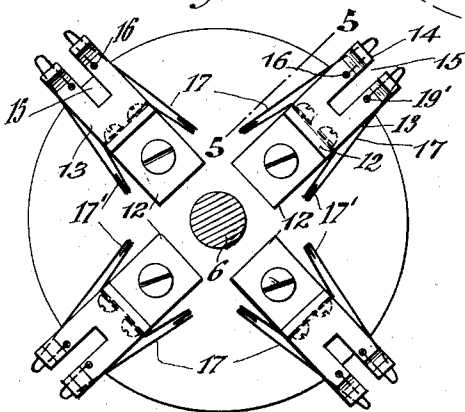
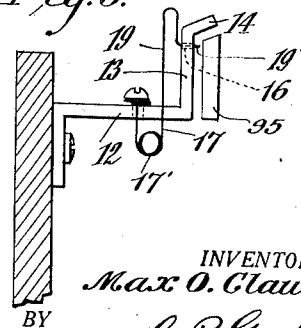


Fig. 5.



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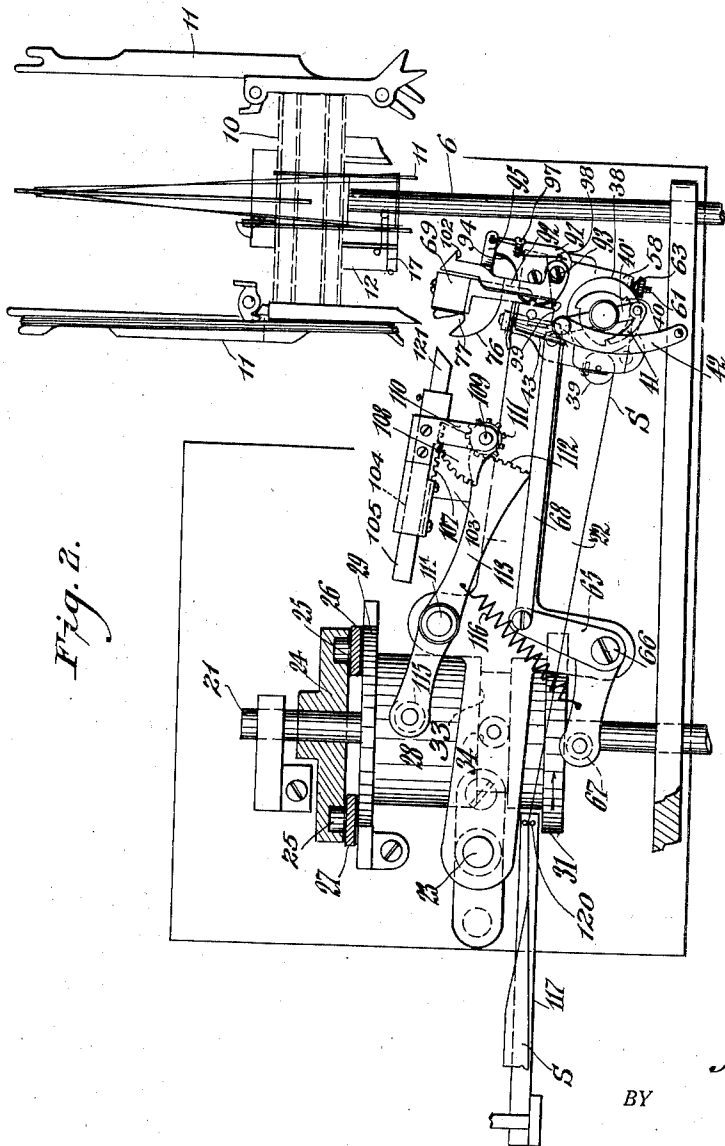


Fig. 2.

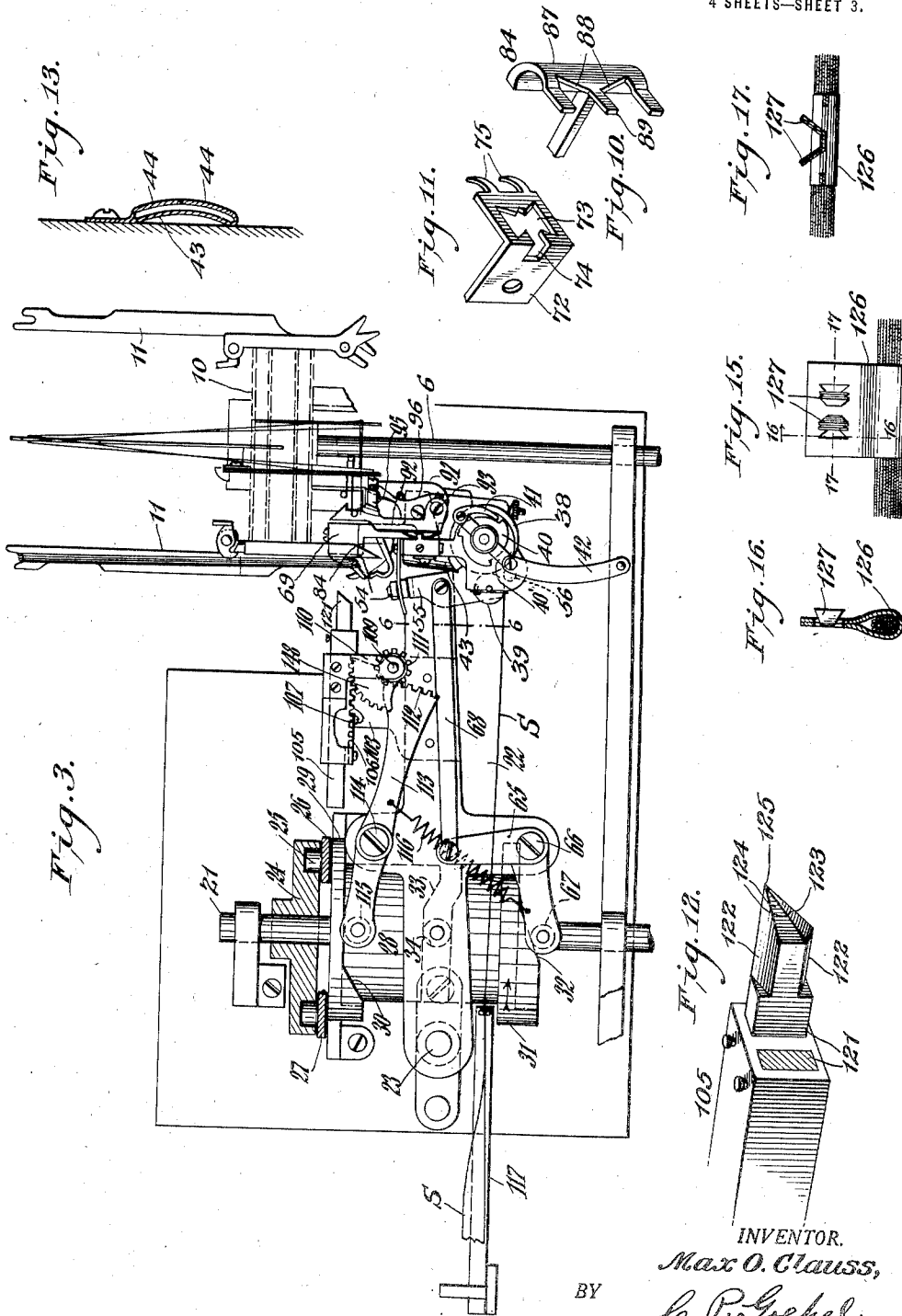
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4 SHEETS—SHEET 3.



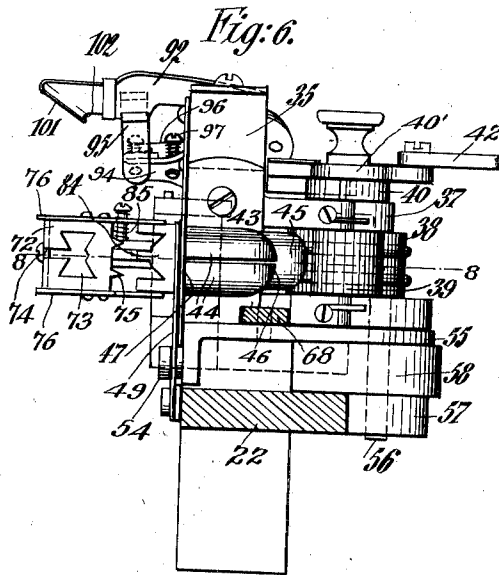
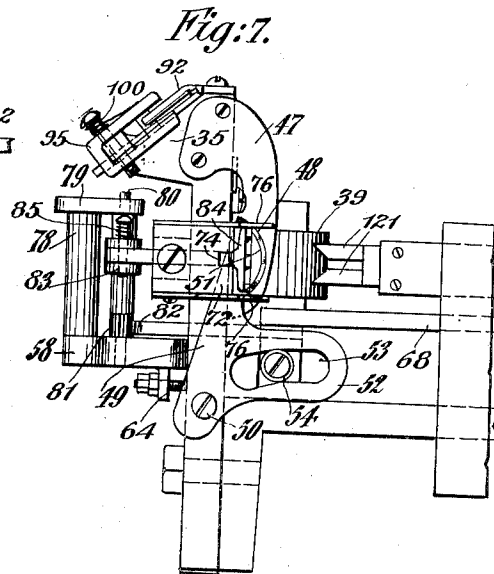
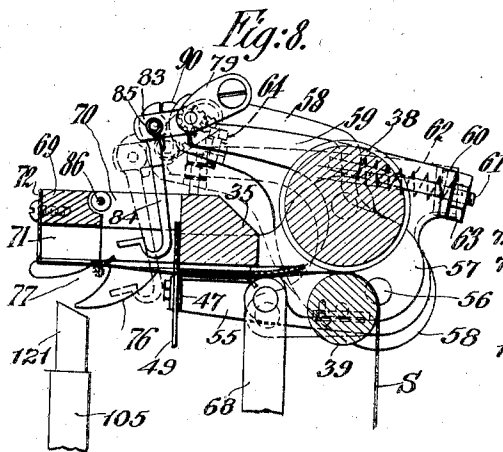
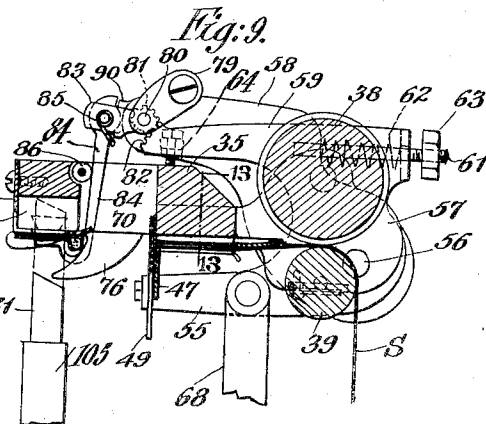
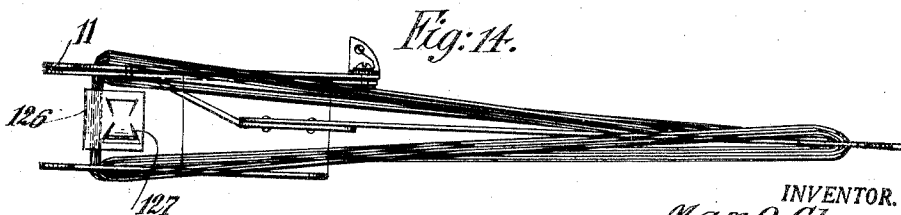
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4 SHEETS—SHEET 4.



INVENTOR.
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BY *C. P. Goeffel*
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UNITED STATES PATENT OFFICE.

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SKEIN-BINDING MECHANISM.

1,401,519.

Specification of Letters Patent.

Patented Dec. 27, 1921.

Application filed May 14, 1920. Serial No. 381,283.

To all whom it may concern:

Be it known that I, MAX OTTO CLAUSS, a citizen of the Republic of Germany, and a resident of the borough of Bronx, city of New York, and county and State of New York, have invented certain new and useful Improvements in Skein-Binding Mechanism, of which the following is a description.

This invention relates to an improved skein binding mechanism, and generically considered contemplates the provision of means for automatically applying a flexible binder and securely attaching the same in place upon a part of the skein.

More particularly the present invention provides an automatic mechanism for this purpose which is primarily designed for use in combination with a skein winding mechanism of the character shown and described in my prior application for patent, filed September 18, 1919, Serial No. 324,530, wherein a plurality of skeins are successively wound upon spaced holders mounted upon an endless carrier.

In one practical embodiment of the skein binding mechanism I propose to provide means for automatically feeding a flexible binding strip, preferably of paper, in position to be applied to the skein and cutting off a predetermined length of the flexible binding strip, means operating to fold the severed length of the binding material upon itself around a part of the skein, and means subsequently actuated to securely fasten the ends of the flexible binder to each other.

It is also an important object of my invention to provide simple and effective means for gripping and holding the skein thread extending between spaced skeins on the endless carrier and severing said thread between the skeins.

I have also provided improved means for feeding the flexible binding strip into position to be folded around the skein, whereby the strip is prevented from buckling on itself in case it should catch on the skein threads.

A prominent resultant advantage of my improved skein binding mechanism resides in the fact that the two ends of the individual skein are securely bound or held to prevent loosening of the skein, and the flexible binder, preferably of paper, provides a convenient

indicator so that the user may readily locate the thread ends, which is frequently a matter of considerable difficulty, especially in the case of skeins of black or other dark colored threads.

With the above and other objects in view, my invention consists in the provision of an improved skein binding mechanism as above characterized, and in the form, construction and relative arrangement of the several elements thereof, as will be hereinafter more fully described, illustrated in the accompanying drawings, and subsequently defined in the subjoined claims.

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

Figure 1 is a front elevation illustrating one embodiment of my improved skein binding mechanism.

Fig. 2 is a top plan view showing the binding mechanism in its normal position with respect to the skein holders.

Fig. 3 is a similar view showing the binder in operative position at an intermediate point in the binding operation.

Fig. 4 is a detailed elevation of the thread gripping means.

Fig. 5 is a sectional view taken on the line 5-5 of Fig. 4.

Fig. 6 is a sectional view on an enlarged scale taken on the line 6-6 of Fig. 3.

Fig. 7 is a side elevation of the parts shown in Fig. 6.

Fig. 8 is a horizontal section taken on the line 8-8 of Fig. 6, showing the parts in full lines in their normal relative position, and in dotted lines in an intermediate position.

Fig. 9 is a similar view showing the folding and clamping means for the flexible binding element and the binder fastening member at the end of the binding operation.

Fig. 10 is a detailed fragmentary perspective view of the folding and clamping member for the binding element.

Fig. 11 is a perspective view of the bearing plate for the flexible binding element.

Fig. 12 is a similar view partly broken away, of the binder fastening member.

Fig. 13 is a detail section taken on the line 13-13 of Fig. 9.

Fig. 14 is an elevation showing a skein having a binder applied thereto.

Fig. 15 is an enlarged detail elevation of a binder as applied to the skein.

Fig. 16 is a section taken on the line 16—16 of Fig. 15, and,

Fig. 17 is a section taken on the line 17—17 of Fig. 15.

As above stated, my present invention is designed for use in combination with a skeining machine in which a plurality of skein holders are mounted upon an endless carrier. This endless carrier, as herein illustrated, is designated by the numeral 10, while the individual spaced holders mounted upon this carrier are indicated at 11. The detail form and construction of the skein holders is not essential to a clear understanding of the present invention, but these holders are preferably of the construction shown and described in my copending application for patent, filed December 23, 1919, Serial No. 346,837. The manner of winding the thread upon the individual holders to form the skeins likewise forms the subject matter of a third co-pending application filed August 1, 1919, Serial No. 314,647, while the specific skein winding mechanism is described and claimed in my prior application first above referred to. The means for automatically imparting a step by step movement to the endless carrier to successively bring the holders into position to receive the skein windings is likewise fully disclosed in a fourth co-pending application filed December 23, 1919, Serial No. 346,836. These several mechanisms and constructions will not, therefore, be herein further described in detail. For the purposes of this explanation it will suffice to state that the endless carrier 10 is in the form of one or more link chains, and traverses operating sprockets mounted upon vertically spaced shafts 6. Power is intermittently transmitted to the upper carrier shaft through the medium of the mechanism disclosed in my application last above referred to, and this power transmitting means also operates to impart rotation to the binder shaft 21 in timed relation to the step by step movements of the carrier. The counter-shaft 20 is driven from a motor or other convenient source of power, and corresponds to the operating shaft, which actuates the flier operating mechanism shown in application Serial No. 324,530.

In my present invention I have illustrated only the flier arm 20' and the actuating shaft 18 for said arm.

In the adaptation of the binding mechanism forming the subject matter of the present application to a skeining machine embodying the several mechanisms of my prior applications, as above identified, I provide upon the upper sprocket of the endless chain carrier for the skeins, a plurality of spaced

diametrically opposed brackets 12, which project from the side face of the sprocket in parallel relation to the shaft 6, and have their end portions angularly bent outwardly in a radial direction, as at 13, each bracket terminating in an angularly projecting flange 14. The portions 13 and 14 of each bracket are centrally slotted as at 15, and the arm at each side of the slot is provided with an opening 16 therein. To the horizontally disposed portion of each bracket one end of a pair of wire springs 17 is securely fixed, each of said springs having a portion bent upon itself and projecting inwardly from the bracket at one side thereof, and formed with a coil 17'. From the coil the wire spring extends outwardly adjacent to the angular portion 13 of the bracket, as shown at 19, and is then again bent upon itself and inwardly extended. The free end portion of the wire spring 19' is angularly bent and normally projects through one of the openings 16 of the bracket. These wire springs are adapted to clamp or grip the thread extending between spaced skeins on the carrier, and hold the same against the bracket arm 13 while the thread is being cut. The operation of this thread gripping means and the cutting mechanism will be more fully disclosed in detail in the following description.

The thread cutting and skein binding mechanism are operatively mounted upon one end of a supporting arm 22. This arm at its other end is loosely mounted for turning or pivotal movement upon a vertical post 23, which is suitably fixed to a convenient part of the frame structure of the machine. Thus it will be understood that this arm, together with the mechanism carried thereby, is adapted for bodily swinging movement in a horizontal plane.

Upon the binder operating shaft 21 a cam disk 24 is fixed, said disk having a cam track in its inner face to receive studs or pins 25 on the vertically disposed levers 26 and 27 respectively. These levers are pivotally mounted at their lower ends, and at their upper ends are operatively connected to a bundling mechanism (not shown), which collects the bound and finished skeins, and secures the same together in bundles, each containing a predetermined number of skeins. This bundling mechanism constitutes no part of the present application, but forms the subject matter of a copending application, Serial No. 387,968, filed June 10, 1920.

There is also fixed upon the binder shaft 21 a cylindrical member 28, upon one end of which a flange 29, having a cam face 30, is formed. A similar flange 31, provided with the cam face 32 is also formed upon the opposite end of the member 28. Between these cam flanges the member 28 is provided with a circumferentially extending cam groove or track 33. A roller 34, mounted upon the un-

der side of the arm 22 is engaged in this cam track, whereby the desired horizontal pivotal movement is imparted to said arm.

Upon the other end of the arm 22 a standard 35 is fixed. The standard is formed with vertically spaced laterally projecting arms 37, between which a peripherally knurled feeding roller 38 is disposed, said roller having a vertically disposed spindle mounted in the arms 37 of the standard. At one side of the roller 38 a paper strip guide roller 39 is also rotatably mounted between the arms 37. To the upper end of the spindle of the feed roller 38 a ratchet disk 40 is fixed and an arm 40' is loosely mounted upon the spindle above this disk, and extends in diametrically opposite directions. Upon one end of this arm a spring pressed pawl 41' is pivotally mounted and yieldingly held in operative contact with the periphery of the ratchet disk. The other end of the arm 40' is pivotally connected by means of the link 42 to a fixed part of the machine frame. Upon the standard 35 a paper strip guide 43 is suitably secured. This guide, as herein shown, is in the form of a transversely curved plate having its edge portions 44 bent over upon the body of the plate, and slightly spaced from the latter in parallel relation thereto. The end of the body portion of the plate at one end of the guide extends beyond the corresponding ends of the outer portions 44 of the guide, and is curved inwardly toward the periphery of the feed roller 38, as shown at 45. The ends of the outer portion 44 of the guide facing the feed roller are slightly bent or turned in an outward direction, as at 46, so that the paper strip indicated at S may move freely over the extended end 45 of the guide and between the body thereof and the outer portions 44, without interruption.

It will be apparent that as the paper binding strip is fed between the parallel transversely curved portions of the guide 43, said strip will be transversely bowed or curved in conformity thereto.

To the front vertical edge of the standard 35 a shear blade 47 is fixed, said blade having a cutting edge 48 curved in concentric relation to the transversely curved guide 43. A movable cutting blade 49 is pivotally mounted on the standard 35 at its lower end, as at 50, and at its upper end is provided with the curved cutting edge 51 adapted to cooperate with the cutting edge of the fixed blade 47. This pivoted cutter 49 is formed with a laterally projecting arm 52, having a cam slot 53. This slot receives a roller 54 mounted upon the end of a plate 55. This plate is loosely engaged upon the vertically disposed pivot rod 56, which is rotatably mounted on one of the arms 37 and the additional arm 57 formed upon the

standard 35. Between the arm 57 and the plate 55 one end of a plate 58 is engaged, and securely fixed to the vertical rod 56. This plate extends forwardly at one side of the standard and the loosely mounted plate 55 is formed with an arm 59 which overlies the forward extension of the plate 58. One end of said arm is provided with an angularly disposed lug 60 through which the threaded end of a rod 61 fixed in the plate 58 is loosely engaged. A coiled expansion spring 62 surrounds said rod between the plate 58 and the lug 60. A nut 63 is threaded on the rod 61, whereby the tension of the spring 62 may be properly adjusted. Upon the forward end of the plate 58 an adjustable stop screw 64 is mounted, and is adapted to engage the standard 35 to limit the pivotal movement of said plate in one direction.

The superposed plates 55 and 58 are actuated through the medium of a bell crank lever 65, pivotally mounted, as at 66, upon the arm 22. One arm of this lever is provided with a roller 67 to operatively engage the cam face of the flange 31 on the rotary operating member 28. The other arm of said bell crank lever is pivotally connected by means of the rod 68 to the plate 55.

The standard 35 is also formed with a horizontally disposed forwardly projecting arm 69, and adjacent to the standard this arm is provided with an opening 70, while one side of the arm is formed with a recess 71 in line with said opening. An angular bearing or supporting-plate 72 for the paper binding strip, is fixed at one of its ends to the arm 69, while the other end thereof overlies the open side of the recess 71. This latter end of the angular bearing plate is provided with an opening 73 therein conforming in shape to the cross sectional contour of the binding strip fastening member, to be subsequently referred to. At the juncture of the two angular portions of the plate 72 a slot 74 is centrally formed therein, and communicates at one of its ends with the opening 73. Upon the free end of said supporting plate spaced prongs or projections 75 are formed and curved inwardly toward the opening 70. These curved projections serve as directing or guide means for the transversely curved paper strip as it moves over and upon the end portion of the plate 72, having the opening 73 therein. To the upper and lower sides of the arm 69 plates 76 are secured, each of said plates having curved portions projecting from one side of the arm 69 above and below the plate 72. These plates are provided with forwardly opening notches or recesses 77 for the purpose of receiving a part of the thread skein in the manner to be presently related.

The plate 58 is provided upon its forward

end with a vertical post 78 and to the upper end of this post a horizontal plate 79 is fixed. In the plates 79 and 58 the upper and lower ends, respectively, of a vertically disposed spindle 80 are journaled, and this spindle at its lower end is formed or provided with a gear segment 81 with which rack teeth 82 on the forward end of the arm 59 coact. The spindle 80 adjacent its upper end is provided with a laterally projecting bifurcated lug 83, in which the shank of the paper strip folding member 84 is pivotally mounted. This folding member is yieldingly held in a normal position by means of a coil spring 85, arranged upon the pivot pin which is fixed in the lug 83. In operation the shank of the folding member 84 rides against an anti-frictional roller 86 mounted in the arm 69 at the outer side of the opening 70 therein. This member at its free end is provided with a relatively broad hook shaped portion 87 extending between the spaced plates 76, which serve as guides therefore. The end of this hook shaped portion of the member 84 is provided with vertically spaced notches or recesses 88 separated by a central finger 89. These recesses are each approximately of the same shape as one side of the opening 73 in the plate 72. The shank of the member 84 at its pivoted end abuts against a stop plate 90, which limits the movement of said member to its normal position under the action of the spring 85.

The upper end of the standard 35, is provided with an inclined face upon which a plate 91 is fixed. On this plate a thread cutting element 92 is pivoted at one of its ends, as at 93. The lower end of the plate 91 is formed with a forwardly projecting arm or extension 94 upon which a substantially U-shaped member 95 is pivotally mounted, the arms of said member projecting upwardly in parallel relation to the plate 91. The thread cutting member 92 is normally engaged between the ends of the U-shaped member 95, and is yieldingly held in such position by means of the wire spring 96, the intermediate portion of which is coiled around a stud 97 fixed in the plate 91. One end of this spring engages an angularly projecting finger 98 on the thread cutting element 92 at one side of its pivot 93, and at the other side of said pivot the element 92 is provided with a stop lug 99 to engage the plate 91 and limit the movement of the thread cutting element to its normal position. The wire spring is extended from the coil upon the opposite side of the stud 97, and is coiled as at 100, around the pivot of the member 95, the terminal of the wire spring being engaged with one of the arms of said member to urge the same in an outward direction.

The forward end of the cutting element

92 has its front edge obliquely inclined, and provided with an angular flange 101, at the lower inner end of which said element is formed with the shoulder 102, which is sharpened to a knife edge, and is adapted to cut the thread in a manner to be presently disclosed.

A binder fastening member 105 is mounted to have reciprocating movements in a guide channel 104 formed in the upper end of an upright rising from the bracket 103 secured to the arm 22. The open side of the guide channel is closed by the face plate 106, which is slotted to receive a toothed rack 107 secured upon one side of the member 105. This rack is engaged by the segmental gear 108, which is fixed upon the vertical shaft 109 journaled at its lower end in the bracket 103, and at its upper end in an arm 110. A pinion 111 is also fixed upon the shaft 109, and is engaged by the gear teeth 112 formed upon one end of a lever 113, which is fulcrumed, as at 114, intermediate of its ends upon the arm 22. The other end of this lever carries a roller 115 to engage the cam face 30 on the flange 29. The lever 113 is connected to the bell crank lever 65 by means of a coil spring 116, which yieldingly holds the rollers 115 and 67 in contact with the cam faces 30 and 32 respectively.

Upon a suitable support 117 fixed to the machine frame the roll of flexible binding material 118 is mounted. This material preferably consists of a paper strip of the requisite width, which is drawn from the roll around a horizontally projecting guide pin 119 and then between spaced vertical guide pins 120 on the support 117. The paper strip then passes around the guide roller 39, and is positively fed in a forward direction by the knurled surfaces of the roller 38.

Assuming that the parts of the mechanism are positioned as seen in Fig. 2 of the drawings, at the proper time in the operation of the machine the binder operating shaft 21 is rotated, and the cam track 33 coacting with the roller 34 shifts the arm 22 to the position seen in Fig. 3. In such movement of the arm and the mechanism mounted thereon, that portion of a completely wound skein extending between the spaced parts of the skein holder located at one side of the upper driving sprocket for the endless carrier is received in the notches or recesses 77 of the plates 76.

It will be understood that the paper binding strip overlies the opening 73 in the plate 72, and the skein strands are therefore positioned upon this paper strip when disposed within the notches 77. At the same time the obliquely inclined flange 101 on the cutting element 92 engages the thread, extending between the skein above referred to and the

next skein, which is in the process of formation at the upper side of the carrier sprocket. Simultaneously with the engagement of the flange 101 upon the thread, the spaced arms of the member 95 engage the ends of the wire springs 17 which project through the openings 16 in one of the brackets 12, and force the downwardly extending upper end portions of the respective springs away from the bracket arms at opposite sides of the slot 15. The flange 101 bearing upon the thread forces the thread downwardly between the parts of the bracket and the opposed portions of the springs 17 until the cutting edge or shoulder 102 of the element 92 moves over or in advance of the thread. The cam face 32 of the flange 31 now engages the roller 67 on the bell crank lever 65, and through the medium of the connecting rod 68 the plate 55 and the plate 58 are pivotally moved together as a unit, said plates being connected to each other through the medium of the rod 61 and spring 62. In the initial movement of these plates the roller 54 on the plate 55 operating in the cam slot 53 actuates the movable knife blade 49 which coacts with the cutting edge 48 of the shear blade 47, and severs the end portion of the paper binding strip which projects beyond or forwardly of the guide 43. During the unitary movement of the plates 55 and 58 the shank of the folding member 84 moves through the opening 70, thus projecting the hooked end 87 of said member between the projecting portions of the plates 76. When the stop screw 64 engages the standard 35 the pivotal movement of the plate 58 is arrested. The continued movement of the rod 68, however, causes the plate 55 to move relatively to the plate 58. Accordingly it is seen that the teeth 82 on the arm 59 of the plate 55 coacting with the teeth 81 on the vertical spindle 80 will effect a rotation of said spindle and thus move the member 84 connected to the upper end of the spindle laterally and in a forward direction, and finally cause a reverse movement of said member to engage the curved or hooked part thereof over the skein, which is positioned in the notch 77, and dispose the notches or recesses 88, in the end of the hook, in registering relation with the opening 73 in the plate 72. In this manner it will be seen that the paper binding strip, which has been severed, is bent over upon itself by the initial movement of the hooked end 87 of the folding member, and that the ends of the paper binder are finally brought together and clamped by the spaced prongs of the hook 87 upon each other and over the opening 73 in the plate 72.

It only remains to complete the binding of the skein to securely fasten the ends of the folded paper binder together, and for this purpose I have provided a simple and novel form of clenching or fastening means.

As shown in Fig. 12 of the drawings, the member 105 at its operating end is provided with the transversely spaced longitudinally extending cutting bits or points 121, each of which has its inner side face at each longitudinal edge thereof beveled or chamfered, as at 122. Each cutting bit is further provided with the obliquely inclined cutting edge 123, and the beveled surfaces 124, which converge toward one side or edge of the bit, and together with the inclined longitudinal surface 122, meet in the piercing point 125.

In the next operation these cutting bits are caused to act upon the superposed ends of the paper binder in the following manner:

The cam face 30, engaging the roller 115 on the end of the lever 113 rocks said lever upon its fulcrum 114, and through the medium of the pinion 111 engaging the toothed end 112 of said lever, actuates the gear segment 108. This gear segment coacting with the rack 107 moves the binder fastening member 105. The cutting bits 121 of said member pass through the corresponding recesses 88 in the hooked end of the folding member 84, and the points 125 of said bits pierce the ends of the folded binder strip, and the edges 123 of said bits cleanly cut through the paper. The cross sectional form of each bit approximately conforms to the shape of one side of the opening 73 so that spaced perforations are formed through the ends of the binder. The punched out portions of the paper remain connected to the strip, but are bent toward each other upon one side of the binder, thus clenching or securely fastening the ends of the skein embracing binder strip to each other. After this operation the member 105 is withdrawn or retracted from the opening 73, in the plate 72. The roller 67 of the bell crank lever 65 moves upon the low portion of the cam face 32, so that the folding member 84 will return to its normal position, after which the walls of the cam track 33 coacting with the roller 34 reverses the pivotal movement of the arm 22, and returns said arm to its normal position. In this return movement of the arm with the binding mechanism to normal position it will be apparent upon a comparison of Figs. 2 and 3, that the link 42, being connected at one of its ends to a fixed part of a machine frame, will turn the arm 40', and the pawl 41 connected to this arm, by engaging one tooth of the ratchet disk 40, rotates the paper strip feeding roller 38 in the direction indicated by the arrow, and effects a positive feed of the paper binding strip through the guide 43, over the opening 70, and upon the plate 72 over the opening 73 therein. Of course in the movement of the binding mechanism to operative position in relation to the skein the arm 40' is moved with relation to the ratchet disk, which remains sta-

tionary while the pawl 41 moves idly upon the periphery of the disk.

It is to be noted that there is no interference with this return movement of the binding mechanism by reason of the fact that the clenched portion of the paper binder projects inwardly through the opening 73, since the plate 72 is provided with the slot 74, which communicates with this opening, and in which the clenched tongues of the binder are readily accommodated in such return movement of the binder mechanism with relation to the skein.

During the several steps of the binding operation the formation of the next skein at the upper side of the carrier is completed, and in the return movement of the binder mechanism to normal position, the spaced parts of the member 95 move away from the terminal ends of the springs 17, so that said springs return to their normal positions, and securely grip or clamp the thread strand against the spaced parts of the bracket 12. As the binder mechanism returns, knife edge 102 of the element 92 which has been projected beyond the thread strand extending between the two carriers then engages the thread strand and cuts or severs the same, the cutting knife being forced downwardly into the slot 15 of the bracket by the action of the wire spring 96. Thus it will be seen that in each return movement of the binding mechanism to normal position, the bound skein will be separated from the next skein in the series, the formation of which has just been completed. In the continued operation of the machine, a step movement is now imparted to the carrier, and this last formed skein is moved into position to receive a binder, after which the several steps of the binding operation above described, are repeated.

From the above description it will be understood that the ends of the thread, constituting each individual skein, are securely bound or held, so that the loosening or unraveling of the skein is prevented.

In Fig. 14 of the drawings I have illustrated a completed skein, with the binder applied thereto, from which it will be observed that the effective use of the binder is rendered possible principally by reason of the fact that I have devised an improved method of winding the skein, and an improved holder to receive the skein winding, as set forth in my several copending applications above identified. Nevertheless, it is not to be understood that I consider the subject matter of the present application as necessarily limited in its application and use to such novel improvements in the art, the improved binding mechanism may also be used in conjunction with other skein winding methods and skein supporting devices. However, it may be here stated that

a binder applied in the manner heretofore described, to a skein formed in the manner disclosed in my prior application Serial No. 314,647, affords a convenient means for indicating the location of the crossed ends of the skein winding, and which may be readily grasped between the fingers to securely hold the thread ends while the several superposed series of skein loops are separated into a single series of elongated simple loops.

Referring to Fig. 14, the binder is indicated at 126, and it will be noted that the medial portion thereof embraces or surrounds that portion of the series of main or primary looped strands of the skein which extend between the spaced loop receiving parts of the body member of the holder 11. The ends of the paper binder are effectually held against separating movement, which would release the binder strip from the skein, by means of the bent or clenched tongues 127 which project from one side of the binder at an angle with relation to the plane of the connected ends of the paper strip. The paper strip, being comparatively wide, and preferably of white color, may be readily located without difficulty. Heretofore such skeins have been bound by means of a very fine metal wire, and it was a matter of some difficulty and consumed considerable time to locate this wire binder so that it could be removed and the thread ends separated from the loops. This was particularly true where the thread was of a dark color. The present improvement completely obviates such difficulty and inconvenience to the purchaser, and also provides a very inexpensive binding for the skein.

From the foregoing description considered in connection with the accompanying drawings, the construction, mode of operation and several advantages of my improved skein binding mechanism will be clearly understood. I have herein disclosed the embodiment of the invention which I have found to give highly satisfactory service in practice. This mechanism is relatively simple in its construction, positive and reliable in the operation of its several parts, and not liable to get out of order. In so far as I am aware, I believe it to be entirely new in the art to automatically apply a paper binder to a thread skein in the manner heretofore disclosed. Accordingly, it will be understood that while I have illustrated in the accompanying drawings, one practical embodiment of the invention, the mechanism is susceptible to many minor modifications in the form, construction and arrangement of its several parts, and I therefore, reserve the privilege of adopting all such changes and modifications within the spirit and scope of the invention as claimed.

I claim:

1. In combination with means for successively forming a series of skeins from a continuous thread, mechanism for applying a binder to the skein, means for effecting a relative bodily movement between the skein and binding mechanism, means for actuating the binding mechanism at the end of such relative movement in one direction to secure the binder to the skein, and means automatically operable upon such relative movement in the opposite direction to sever the thread strand extending between the adjacent skeins.
2. In combination with means for successively forming a series of skeins from a continuous thread, mechanism for applying a binder to the skein, means for effecting a relative bodily movement between the skein and binding mechanism, means for actuating the binding mechanism at the end of such relative movement in one direction to secure the binder to the skein, and means carried by the binding mechanism and automatically operable upon such relative movement in the opposite direction to sever the thread strand extending between the adjacent skeins.
3. In combination with means for successively forming a series of skeins from a continuous thread, mechanism for applying a binder to the skein, means for effecting a relative bodily movement between the skeins and binding mechanism, means for automatically actuating said mechanism at the end of such relative bodily movement in one direction to apply the binder to a skein, thread-gripping means, and means automatically operating to effectively engage the gripping means with the thread strand extending between adjacent skeins upon the relative movement of the skeins and bundling mechanism in opposite direction, and to also sever the thread strand during such relative movement.
4. In combination with means for successively forming a series of skeins from a continuous thread, mechanism for applying a binder to the skein, means for bodily shifting said mechanism into and out of operative position with relation to the skeins, thread-gripping means, an element movable with the binding mechanism adapted to engage a thread strand extending between the adjacent skeins in the movement of said mechanism to its operative position and dispose the thread strand in position to be gripped, means movable with the binding mechanism and coacting with the gripping means to permit of the positioning of the thread strand, means for actuating the binding mechanism to apply a binder to a skein, said gripping means being released in the reverse bodily movement of said mechanism to its normal position, and said element having a cutting edge to subsequently sever the thread strand between the adjacent skeins.
5. In combination with means for successively forming a series of skeins from a continuous thread, mechanism for applying a binder to the skein, means for bodily shifting said mechanism into and out of operative position with relation to the skeins, thread-gripping means, an element movable with the binding mechanism adapted to engage a thread strand extending between the adjacent skeins in the movement of said mechanism to its operative position and dispose the thread strand in position to be gripped, means movable with the binding mechanism and coacting with the gripping means to permit of the positioning of the thread strand, means for actuating the binding mechanism to apply a binder to a skein, said gripping means being released in the reverse bodily movement of said mechanism to its normal position, said element having a cutting edge to subsequently sever the thread strand between the adjacent skeins, and means for automatically feeding a binder in the latter movement of said mechanism into position to be subsequently applied to a skein.
6. Skein binding mechanism including paper strip feeding means, an apertured plate upon which the strip is fed to a position to receive a part of the skein thereon, means for severing a portion of the paper strip, means for folding the severed portion of the strip upon itself to embrace and bind the skein strands and to retain the folded binder upon said plate, and means subsequently operable and adapted to be projected through the opening in said plate to bend portions of the engaged ends of the binder, and thereby unite the binder ends to each other.
7. Skein binding mechanism including paper strip feeding means, an apertured plate upon which the strip is fed to a position to receive a part of the skein thereon, means for guiding and transversely flexing the paper strip in the feeding movement thereof, means for severing a portion of the paper strip, means for folding the severed portion of the strip upon itself to embrace and bind the skein strands and to retain the folded binder upon said plate, and means subsequently operable and adapted to be projected through the opening in said plate to bend portions of the engaged ends of the binder, and thereby unite the binder ends to each other.
8. A skein binding mechanism including paper strip feeding means, means for guiding the paper strip to position to receive a part of the skein thereon, means for severing a portion of the paper strip, means for folding the severed portion upon itself to embrace and bind the skein strands, a com-

mon actuating means for the paper strip cutting means and the folding means, and additional means for bending parts of the engaged ends of the folded binder to thereby
5 unite the binder ends to each other.

9. In combination with means for successively forming a series of skeins from a continuous thread, means for applying a binder to the skein, means for actuating
10 the binding mechanism, thread-gripping means, means for positioning the thread strand extending between adjacent skeins for effective engagement by said thread-gripping means, and means operable after
15 the skein has been bound to sever the thread strand held by said gripping means.

10. In combination with means for successively forming a series of skeins from a continuous thread, mechanism for applying
20 a binder to the skein, means for automatically feeding the binders for application to the successively formed skeins, means for actuating the binding mechanism, thread-gripping means, means for positioning the
25 thread strand extending between adjacent skeins for effective engagement by said thread-gripping means, and means operable after the skein has been bound to sever the thread strand held by said gripping means.

30 11. In combination with means for successively forming a series of skeins from a continuous thread, a skein binding mechanism, means for effecting a relative bodily movement between the skeins and the binding
35 mechanism, means for automatically operating said mechanism at the end of such movement in one direction, thread-gripping means, means to engage the thread strand extending between adjacent skeins
40 during such relative movement and position the strand for engagement by said gripping means, and means operable in the relative movement of the skeins and binding mechanism in the opposite direction to sever the
45 strand.

12. In combination with means for successively forming a series of skeins from a continuous thread, a skein binding mechanism, means for effecting a relative bodily move-
50 ment between the skeins and the binding mechanism, means for automatically operating said mechanism at the end of such movement in one direction, thread-gripping means, means to engage the thread strand
55 extending between adjacent skeins during such relative movement and position the strand for engagement by said gripping means, means operable in the relative movement of the skeins and binding mechanism
60 in the opposite direction to sever the strand, and means automatically actuated during the latter operation to feed a binder to the binding mechanism.

13. Skein binding mechanism including
65 paper strip feeding means, means for en-

gaging and transversely flexing the paper strip in the feeding movement thereof to a position to receive part of the skein thereon, means for severing a portion of the paper strip, means for folding the severed
70 portion of the strip upon itself to embrace and bind the skein strands, and automatic means subsequently operable to bend portions of the engaged ends of the folded binder and thereby unite the binder ends to
75 each other.

14. Skein binding mechanism including means for feeding a flexible binder, means for transversely flexing the binder in the feeding movement thereof to a position to
80 receive a part of the skein thereon, means for folding the flexible binder upon itself to embrace and bind the skein strands, and automatic means subsequently operable to unite the engaged ends of the flexible binder
85 to each other.

15. A skein binding mechanism comprising means for feeding a flexible binder, a curved guide for flexing the binder transversely during the feeding movement there-
90 of to a position to receive a part of the skein thereon, means for folding the binder upon itself to embrace and bind the skein strands, and means for uniting the ends of the binder together.
95

16. In a skein binding mechanism comprising means for feeding a flexible binder, means for folding it upon itself to embrace and bind the skein strands, means for unit-
100 ing the ends of the binder, and a guide for flexing the binder transversely as it is fed into position to receive the skein strands.

17. In a skein binding mechanism comprising means for feeding a flexible binder, means for severing the binder, means for
105 folding the binder upon itself to inclose the skein strands, means for securing the ends of the binder together and an elongated, transversely curved guide through which the binder is fed into position to receive
110 the skein strands.

18. A skein binding mechanism for folding a flexible binder about a series of skein strands comprising bifurcated fingers to en-
115 gage the strands, a perforated plate adapted to be positioned on one side of the strands, means for feeding a flexible binder between the plate and the strands, an arm having a perforated end for engaging and folding the binder upon the strands so that the two free
120 ends will lie parallel with each other and means adapted to operate through the perforations in the arm and the plate to pierce the two ends of the binder to thereby unite them.
125

19. A skein binding mechanism comprising means for engaging a series of skein strands, means for feeding a flexible binder to one side of the strands, means for sever-
130 ing the binder, an arm for engaging the sev-

ered end of the binder and folding it around the skein strands so that the free ends of the binder lie parallel with each other, means for actuating the arm, and a punch
5 for perforating the ends of the binder to thereby unite them.

20. In combination with a skein forming mechanism having a skein holder provided with spaced, bifurcated skein-engaging fingers, a skein binding mechanism comprising
10 spaced, bifurcated skein-engaging fingers adapted to cooperate with the skein-engaging fingers of the holder to hold a series of skein strands between them, means for feed-
15 ing a flexible binder into position to be folded about the skein strands, means for folding the binder about the skein strands, and means for securing the ends of the binder together.

20 21. A skein binding mechanism comprising means for supporting a series of skein strands, means for feeding a strip or flexible binder to one side of the strands, means for severing the strip, an arm, means for sup-
25 porting and actuating the arm to impart thereto a pivotal and longitudinal movement to cause it to fold the binder about the

skein strands, and means for securing the ends of the binder together.

22. A skein binding mechanism compris- 30
ing a pivoted arm for supporting means for feeding a flexible binder into position to be folded about a series of skein strands, means for severing the binder, means for folding
35 the binder about the skein strands, means carried by the arm for actuating the severing means and the folding means, and a punch carried by the arm for perforating the ends of the binder to secure them to-
40 gether.

23. A skein binding mechanism compris- 40
ing spaced, bifurcated fingers for engaging a series of skein strands, means for feeding a flexible binder into position to be folded
45 about the skein strands, a curved guide for flexing the binder transversely as it is fed into position, means for severing the binder, an arm for engaging and folding the binder
50 about the skein strands, means for supporting and actuating the arm and means for se-

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

MAX OTTO CLAUSS.