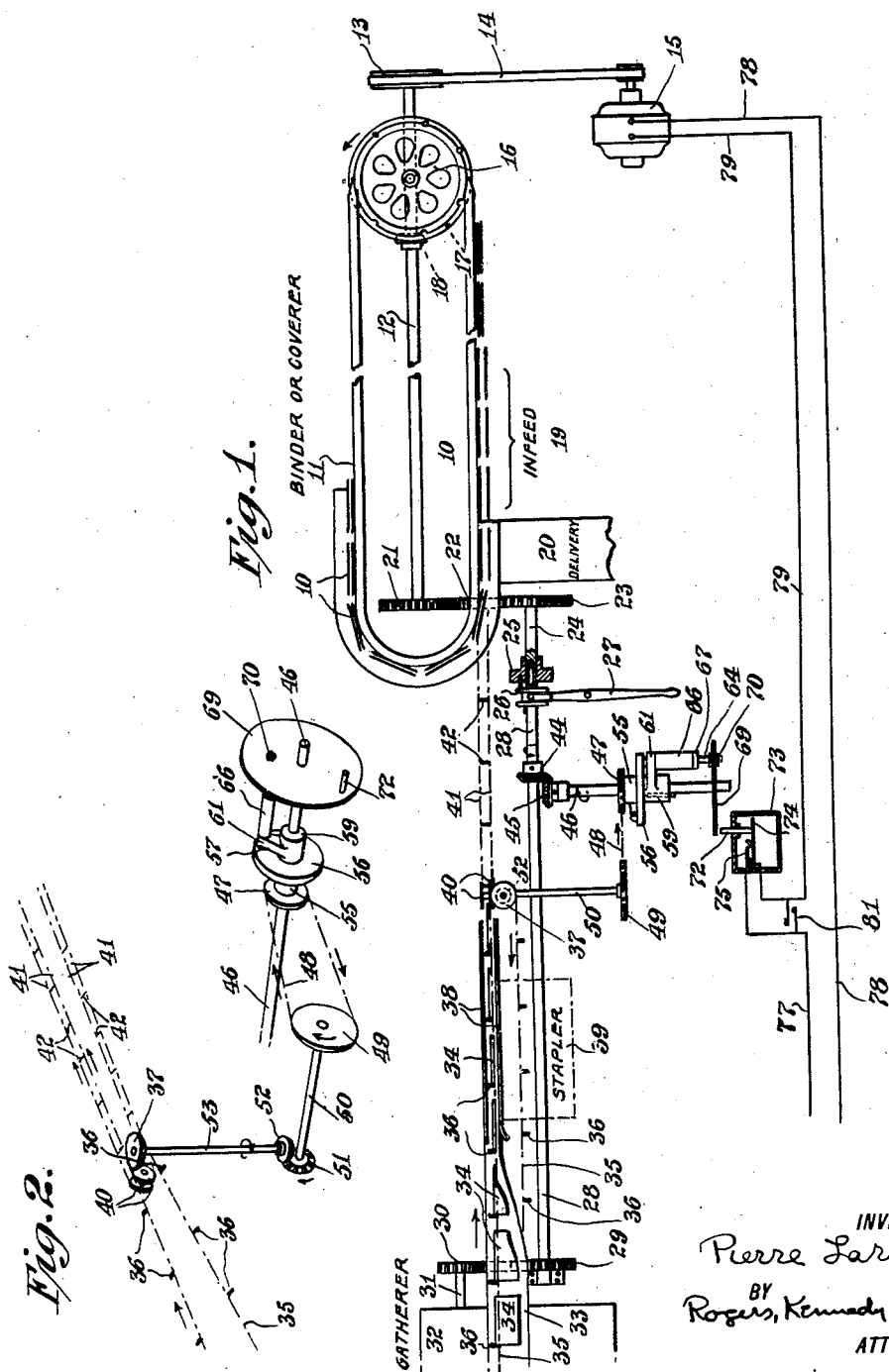


1,583,889

BOOK BINDING OR COVERING APPARATUS

2. Sheets-Sheet 1



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May 11, 1926.

1,583,889

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BOOK BINDING OR COVERING APPARATUS

Filed May 1, 1925

2 Sheets-Sheet 2

Fig. 3.

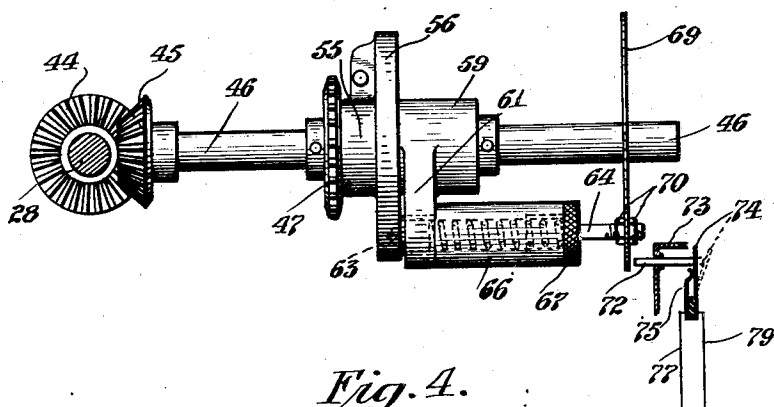


Fig. 4.

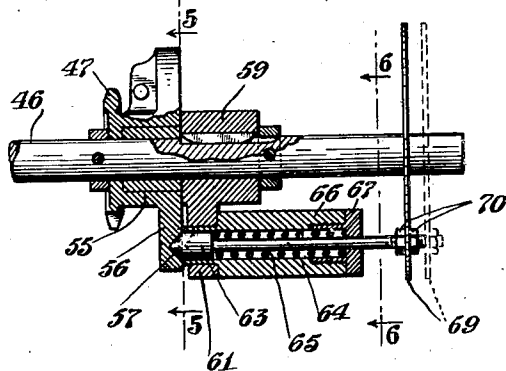


Fig. 5.

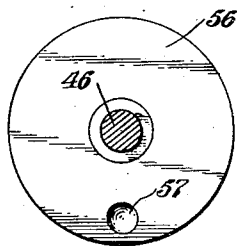
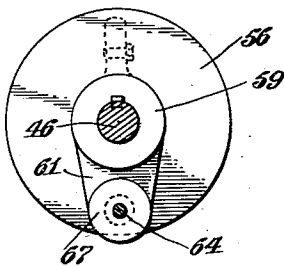


Fig. 6.



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UNITED STATES PATENT OFFICE.

PIERRE LARIVIÈRE, OF CHAMPLAIN, NEW YORK, ASSIGNOR OF ONE-HALF TO THE SHERIDAN IRON WORKS, OF NEW YORK, N. Y., AND ONE-HALF TO T. W. & C. B. SHERIDAN COMPANY, OF CHAMPLAIN, NEW YORK, BOTH CORPORATIONS OF NEW YORK.

BOOK BINDING OR COVERING APPARATUS.

Application filed May 1, 1925. Serial No. 27,242.

This invention relates to bookbinding or covering apparatus, and more particularly to certain auxiliary contrivances for preventing difficulties or breakages, and giving more perfect coordination. Among the objects of the present invention is the general improvement of operation and reduction of delays in machines of the kind referred to. It is a further object by minimizing breakages and interference with the progress of the machine to reduce the cost of upkeep and operation, including the labor cost, of a bookbinding machine, and to increase substantially the output. Other and further objects and advantages of the present invention will be explained in the hereinafter following description of one form or embodiment thereof or will be apparent to those skilled in the subject. To the attainment of such objects and advantages the present invention consists in the novel bookbinding or book covering apparatus and the novel features of combination, operation, arrangement, structure and detail herein illustrated or described.

Specifically the present invention is shown as applied to a combination apparatus including a machine for gathering, assembling or collating the signatures or components of pamphlets or other books, and a connected machine for attaching together or binding the assembled books or signature groups, and sometimes applying covers thereto. Reference may be had to prior patent of Bredenberg 1,177,600 of April 4, 1916 as showing a signature gathering machine; at the delivery of which the signature groups are delivered in succession, and as an example of a binding or covering machine reference may be had to Bredenberg Patent 1,248,252 of November 27, 1917, this well known type involving an endless train of book clamps, arranged to receive the successive signature groups or books and carry them progressively to the devices or instruments for effecting the binding or covering operations. While the last mentioned patent shows means for binding signature groups by the trim-and-glue method, as well as means for applying and gluing covers to

the books, and bending or breaking them into shape, the present invention is equally well applicable, to a combination apparatus wherein the books are merely glued and covered in the clamp train, and are bound or secured together by stapling mechanism or other means arranged at an earlier point in the travel of the book, between the gathering machine and the clamp train. In either such combination, or other similar combinations occasional difficulties are inevitably presented by accidental displacement or lack of coordination in respect to the signature groups passing progressively through the gathering machine or delivery thereof to the clamp train of the binding or covering machine. The misplacement or rumpling of the signatures or clogging of the books may have the effect of blocking or holding the conveyor or chain by which the books are moved along. The combination being power driven the frequent result has been the breakage of the conveyor or chain and the shutting down of the machine for an extended period to enable repairs. The present invention involves a yielding driving connection or clutch whereby, on such occurrences, the connections which drive the gathering machine, or the conveyor advancing the books therefrom will become automatically disconnected. The present invention therefore consists of a combination including as one of its elements a self unclutching clutch. Such clutch moreover is preferably of a type which may reengage or re clutch only in a given position, so as to preserve the proper synchronism in the gathering and delivery of books with the feeding thereof to the clamp train, and the travel of the latter. Therefore, to obviate re clutching after each cycle of operation, the present invention embodies means operated by the self unclutching action to prevent re clutching, and while this may take different forms, it is herein shown as comprising means for disconnecting power from the entire apparatus, or at least from the clamp train as well as the gathering and transferring means. By this useful combination when clogging or other accident occurs as de-

scribed, the special clutch yields and opens, thus immediately relieving the gatherer or conveyor and preventing breakage, this action being accompanied immediately or promptly by the disconnection of power, leaving the entire machine idle. The attendant thereupon has merely to correct the difficulty or remove the clogging signatures and restart the power operation, whereupon the special clutch reengages on the next rotation, leaving the various parts of the machine in proper synchronism.

In the drawings Fig. 1 shows a diagrammatic plan view of an apparatus embodying the principles of the present invention, this combination showing at the extreme left the delivery portion of a gathering machine corresponding with said prior Patent 1,177,600, and at the right a clamp train corresponding with said prior Patent 1,248,252, and with conveying or transferring means by which the signature groups or books issuing from the gathering machine are tilted upright, conveyed along, and fed into the clamp train.

Fig. 2 is a perspective view of certain parts of Fig. 1, showing the interrelation of the conveyor chains by which the books are fed from the gatherer and fed into the clamp train, also the special clutch and connections therefrom to the gatherer conveyor chain.

Fig. 3 is a left elevation on a larger scale of the clutch device.

Fig. 4 is a central vertical section of the same.

Figs. 5 and 6 are front elevations partly in section taken respectively on the lines 5-5 and 6-6 of Fig. 4.

Referring to Fig. 1 of the drawings a train of clamps 10 is shown traveling around a frame or guide 11, of the same general nature as that shown in said prior Patent 1,248,252. The clamps which stand opposite to the delivery and to the infeed of the machine are shown open, so as to deliver a completed book and receive a new one to be bound or covered, and the remaining clamps are closed, holding the train of books passing through the successive operations. This machine, including the train of clamps, may be driven by a longitudinal shaft 12 which is shown having a pulley 13 at a suitable point driven by a belt 14 from a motor 15, which may be an electric motor. The connected train of clamps may be driven by a large horizontal sprocket wheel 16, the shaft of which carries a bevel gear 17 driven by a bevel pinion 18 on the shaft 12. The infeed point of the machine is marked 19, and the delivery 20 may be in the nature of a chute or other outfeed.

It will be observed that in the illustrated embodiment the clamp train mechanism takes its motion directly from the source of power 15. Preferably the gathering ma-

chine, and the intermediate connections, take their power in turn from the clamp train mechanism, thus rendering it more easy and certain to insure synchronism. The train of connections from the shaft 12 may for example be as follows. A gear 21 on the shaft is shown in mesh with an intermediate gear 22 which in turn meshes with a gear 23 on a counter shaft 24. The gears 21 and 23 may be of equal size so that shaft 24 will make one rotation for a single rotation of shaft 12, and this amount of rotation may correspond with a single cycle of action, or the travel of a book for a distance equal to the spacing of the books. The counter shaft 24 may be the source of power for the balance of the mechanism to be described. A clutch may be introduced at this point comprising a clutch member 25 on the counter shaft 24 and a clutch member 26 controlled by a lever 27 and sliding on a shaft 28 in alinement with shaft 24. When the clutch 25, 26 is closed to the shafts 24 and 28 constitute in effect a single shaft. The clutch is indicated as a one-point clutch so that the parts can only engage when the shafts are in proper relation. The lever 27 may be thrown by hand to uncouple the gathering mechanism from the clamp train when desired, or well known automatic means may be employed to throw the lever and open the clutch upon a failure of action in the gatherer or elsewhere.

The counter shaft 28 is shown extending to the left and near its extremity it carries a gear 29 engaging a gear 30 on an operating shaft 31; these elements 29, 30 and 31 corresponding substantially with elements α^2 , X'' and X^2 of said Patent 1,177,600. The gatherer 32 is herein shown only by outline as the prior patent or other prior structures may be referred to for details. The delivery support or plate 33 of the gatherer serves to guide and support the series of signature groups 34 issuing from the gatherer. It will be understood that these signature groups are progressively accumulated as they pass through the gatherer, their progress being effected by a conveyor chain 35 provided with outstanding pins or fingers 36 which engage with the books and move them forwardly. While the books or signature groups issue flatwise from the gatherer they are preferably turned upright during their travel, namely by reason of the twisted character of the delivery support 33, as illustrated. The sprocket chain 35 carries the books along toward the clamp train mechanism, until the chain passes around a horizontal sprocket wheel 37 and thence back to the gathering mechanism. Upright guides 38 give lateral support to the advancing signature groups. The figure diagrammatically shows the position of a stapling mechanism 35. This may be any

one of a number of well known structures, adapted to drive staples through the lower edges of the advancing books in the guides 38. The use of a stapler is optional, since as before explained the binding may be done in the clamp train.

The succession of books advanced by the pins of the conveyor or chain 35 are preferably delivered to a second conveyor which takes them in charge and feeds them into the clamps of the clamp train. Thus referring to Figs. 1 and 2 the vertical sprocket wheels 40 are shown around which pass parallel sprocket chains 41 carrying driving pins 42 at suitable intervals. This chain is preferably driven from the clamp train mechanism, and corresponds with the in-feeding chain of said Patent 1,248,252. The details form no part of the present invention and may be ascertained from the prior patent. Each book is supposed to be advanced toward the clamp train at a lower level and then along an upward incline so as to pass under the delivery point and thence upward and forward into the advancing corresponding clamp of the clamp train.

While the gripper mechanism of the gatherer 32 may be driven by the shaft 31 the conveyor chain 35 by which the accumulating books are advanced through the gatherer and from the gatherer to the point where the infeed conveyor 41 takes them in charge is shown as driven in the following manner. A bevel gear 44 fast on the shaft 28 is shown engaging a bevel gear 45 on a cross shaft 46, which makes one rotation for one cycle of action. A sprocket wheel 47 normally turns with the shaft 46, and this is connected by a sprocket chain 48 with a second sprocket wheel 49 on a cross shaft 50 which, as seen in Fig. 2, carries a bevel gear 51 engaging a bevel gear 52 on an upright shaft 53 carrying at its upper end the driving sprocket 37 for the conveyor chain 35.

The mechanism as thus far described constitutes a complete book gathering, binding and covering apparatus, with all parts of the machinery moving in exact unison. The successive books conveyed along by the pins of the conveyor 35 are engaged by the pins of the conveyor 41 and moved in proper synchronism into the clamps of the clamp train. There has not so far been described however any provision or safety device to prevent breakage of the conveyor chain 35 in case of defective operation in the gatherer or clogging of the advancing books as they travel between the upright guides 38 or elsewhere. The clutch lever 27 can be thrown to disconnect entirely the gatherer and its outfeed conveyor chain, but this is not automatic and therefore is insufficient for the purposes of the present invention. I will now describe the safety device with which the present in-

vention is more particularly concerned, this being shown on a small scale in Figs. 1 and 2 and on a larger scale in Figs. 3 to 6.

The sprocket wheel 47 is not permanently fast upon the cross shaft 46 but is formed with or attached to a sleeve 55 loosely surrounding the shaft 46. This sleeve is also formed with a flange or disk 56, taking part in the clutching or coupling actions to be described. An automatic unclutching is desirable and for this purpose the clutch disk 56 is shown formed with a conical recess 57 near its periphery adapted to be engaged by a cooperating clutch member to be described.

Mounted fast on the shaft 46 is a collar 59 and this, adjacent to the disk 56, is formed with an extension or arm 61, formed near its extremity with a perforation adapted to receive a clutch member in the form of a pin or stud 63 having a conical end adapted normally to be engaged in the conical recess 57. The pin 63 may be termed a pawl, engaging the recess 57, and the arm 61 a pawl arm. Normally the pin or pawl 63 is pressed forcibly into engagement with the recess in the disk 56, so as to give effective engagement between the shaft 46 and the sprocket wheel 47, for the purpose of driving the gatherer conveyor chain, the engagement however being of a yielding nature, so that if the chain shall be held by clogging or otherwise the pin can disengage the recess, leaving the chain disengaged and free, and preventing breakage.

This advantageous arrangement is such that after automatic uncoupling or unclutching, as described, the parts, when re-coupled, will be in proper phase, since there is only a single pin 63 and a single recess 57. In effect this is a one-point clutch, introduced at a particular point in the mechanism, giving a special result, as described. Obviously the members of the safety clutch could be reversed, the pin member connected with the sprocket wheel 47, and the disk member with the shaft 46. I prefer however the arrangement shown, for reasons that will appear.

In order to provide for a yielding pressure of the clutch pin 63 into engagement with the recess 57 the pin is shown having a longitudinal stem 64 surrounded by a strong coil spring 65. These parts are contained within a barrel or sleeve 66 rigidly attached or formed with the pawl arm 61. The spring is confined by a screw cap or plug 67 which may be adjusted to vary the pressure of the spring and thereby determine the amount of resistance to uncoupling.

With no other mechanism than as described the clutch pin 63 could travel round and round with the shaft 46 and at each rotation would reengage and again disengage the conical socket or recess 57. I have there-

fore provided means for preventing reengagement of these members, as will be described. Indeed in the illustrated combination it is desirable to completely stop the operation of the gatherer after the safety contrivance has caused cessation of operation of the conveyor 35, upon clogging of books. For this purpose the disengaging movement of the clutch members 63, 57 may be utilized to stop the rotation of the shaft 28, for example by throwing the clutch 25, 26, or preferably by stopping the motor 15 and thereby closing down the operation of the clamp train as well as the gatherer, since normally there is no advantage in continuing the operation of the clamp train mechanism during repairs or readjustments at the gatherer.

In order to carry out these purposes I have shown a concentric ring or plate 69 rigidly attached to the stem of the clutch pin 63, this disk or ring cooperating with the switch to be described. Fig. 4 shows the clutch pin and ring in normal position in full lines and in displaced position in dotted lines. The ring is shown secured to the stem 64 by means of nuts 70, permitting adjustment of position. When the gatherer conveyor chain is clogged and causes the clutch pin 63 to yield as described, the ring 69 will contact and press a switch pin 72, located in proper relation for this purpose. Any form of electric switch can be used for shutting off power from the motor 15. Diagrammatically the switch pin 72 is shown enclosed in a box 73 containing a movable contact 74 and a cooperating contact 75. The line wire 77 extends to the contact 75. The other line wire 78 extends to the motor 15. A wire 79 extends from the contact 74 to the motor.

From the above description it will be understood that the objects of this invention are accomplished, because, upon clogging of the books or conveyor chain 35, the clutch pin or pawl 63 will promptly yield, disengaging the recess 57, thus taking all strain from the conveyor chain, while the displacing movement of the pin causes the opening of the circuit and thereby cessation of operation of the motor 15, so that within a fraction of a cycle the clamp train and gatherer will come to rest. Upon removal of the obstruction and restarting of operations the clutch 63, 57 will reengage in proper phase and the entire apparatus will resume, with minimum loss of time. The restarting may be by restoring the current to motor 15, for example by temporarily closing a switch 81, shown diagrammatically in Fig. 1; this starting the clamp train and shafts 28 and 46, and as soon as pin 63 reengages socket 57, the switch 73, 74 closes and normal operations are resumed.

The present invention may in some cases

be useful in connection with either a gathering machine, or a binding or covering machine, as well as with a combination thereof.

I have now described a book binding or covering apparatus embodying the principles and attaining the purposes of the present invention; but as many illustrated matters of arrangement, combination, form, and structure may be variously modified without departing from the principles involved, it is not intended to limit the invention to such matter except so far as specified in the appended claims.

What is claimed is:

1. A book binding or covering apparatus comprising in combination, a gathering mechanism delivering signatures in successive groups, a train of traveling clamps receiving and holding the successive signature groups during the binding or covering operations on the edges thereof, a conveyor transferring the successive signature groups from the gathering mechanism to the successive clamps of said clamp train, a power means advancing the train of clamps and having connections driving the gathering mechanism and transferring conveyor in synchronism with the clamp train, and an automatically acting clutch in said connections operating to unclutch upon excessive resistance, and to re clutch only in correct synchronism, and having means preventing re clutching except at will.

2. A book binding or covering apparatus comprising in combination, a gathering mechanism delivering signatures in successive groups, a train of traveling clamps receiving and holding the successive signature groups during the binding or covering operations on the edges thereof, a conveyor transferring the successive signature groups from the gathering mechanism to the successive clamps of said clamp train, a power means advancing the train of clamps and having connections driving the gathering mechanism and transferring conveyor in synchronism with the clamp train, and an automatically acting clutch in said connections operating to unclutch upon excessive resistance, and to re clutch only in correct synchronism, and having means preventing re clutching except at will, consisting of a device shutting off power to the clutch itself.

3. Apparatus as in claim 2 and wherein the means preventing re clutching consists of a device shutting off power to the gathering mechanism, clamp train and conveyor.

4. A book binding or covering apparatus comprising in combination, a gathering mechanism delivering signatures in successive groups, a train of traveling clamps receiving and holding the successive signature groups during the binding or covering operations on the edges thereof, a conveyor transferring the successive signature groups

from the gathering mechanism to the successive clamps of said clamp train, a power means advancing the train of clamps and having connections driving the gathering mechanism and transferring conveyor in synchronism with the clamp train, and a safety one-point clutch in said connections operating automatically to unclutch upon defective handling of signatures, and to re-clutch only in correct synchronism, and having means preventing reclutching except at will. 10

In testimony whereof, I have affixed my signature hereto.

PIERRE LARIVIÈRE.