

C. GITZENDANNER.

BOOKBINDING MACHINE.

APPLICATION FILED JAN. 25, 1919. RENEWED NOV. 29, 1920.

1,380,294.

Patented May 31, 1921.

3 SHEETS—SHEET 1.

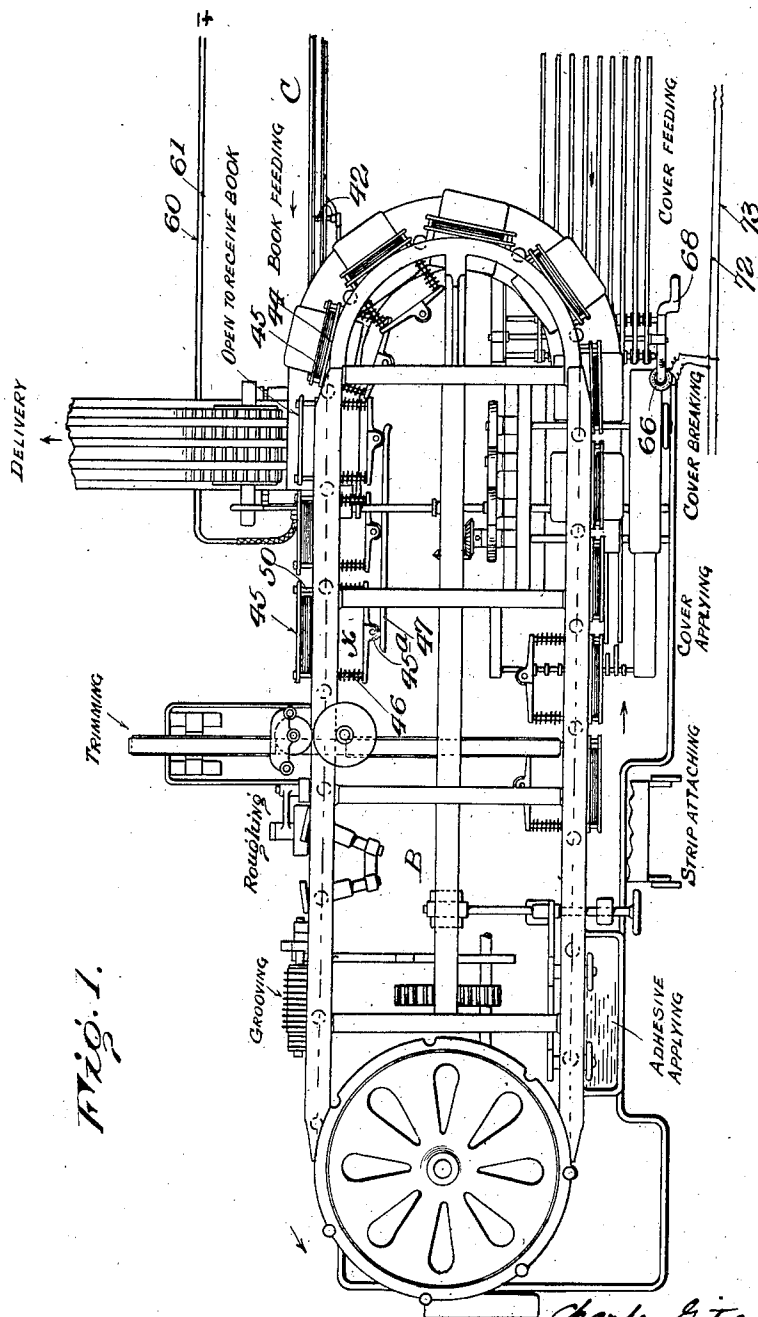


Fig. 1.

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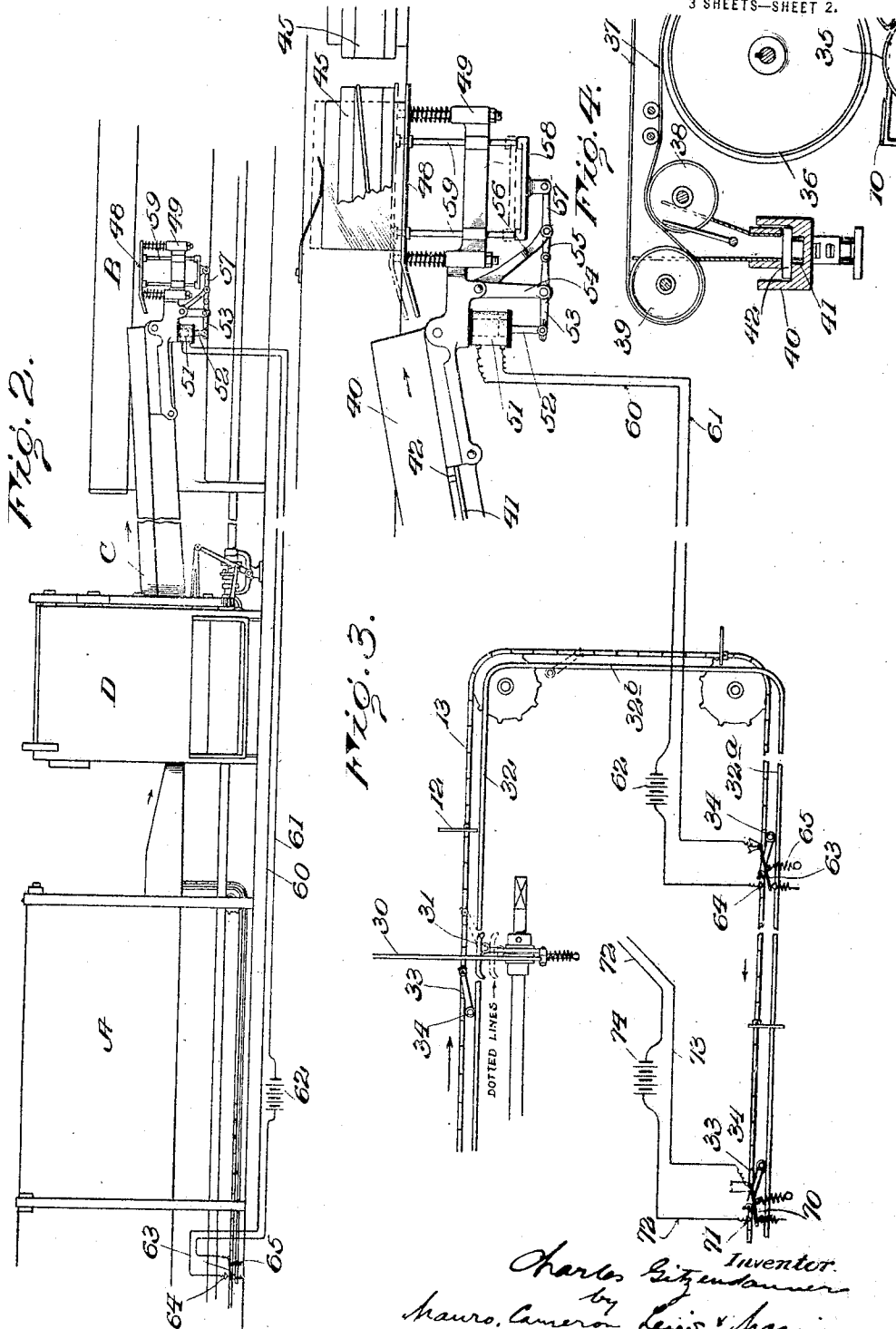
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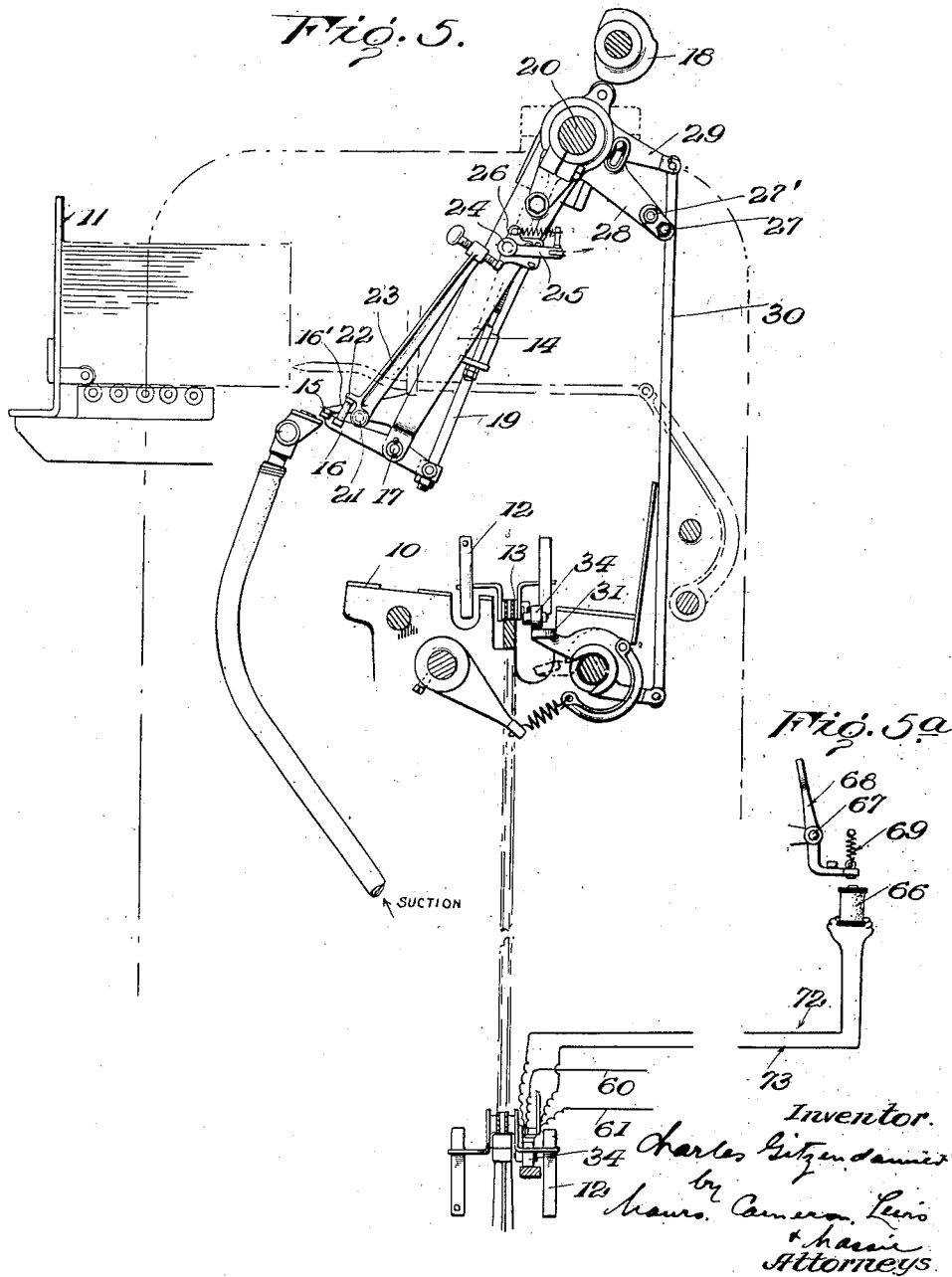
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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

CHARLES GITZENDANNER, OF BROOKLYN, NEW YORK, ASSIGNOR TO T. W. & C. B. SHERIDAN COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

BOOKBINDING-MACHINE.

1,380,294.

Specification of Letters Patent.

Patented May 31, 1921.

Application filed January 25, 1919, Serial No. 273,052. Renewed November 29, 1920. Serial No. 427,208.

To all whom it may concern:

Be it known that I, CHARLES GITZENDANNER, a citizen of the United States of America, and a resident of Brooklyn, New York, have invented a new and useful Improvement in Bookbinding-Machines, which invention is fully set forth in the following specification.

The present invention is an improvement in book-binding machines of the type shown in Bredenberg Patents Nos. 1,248,252 and Reissue 14,485, wherein groups of signatures, assembled in a gathering machine, are subsequently introduced into a train of traveling clamps in which they are held with their lower rear edges exposed to the action of the binding instrumentalities, after passing which the books are discharged into a suitable delivery.

It sometimes happens in gathering or book-assembling machines, wherein signatures are simultaneously fed from a plurality of sheet or signature sources to a common conveyer, that a signature will fail to be fed to the conveyer at some particular sheet or signature source (or a defective signature fed), whereupon the signature group that is short a signature, or into which the imperfect signature has entered, will be defective.

It has been heretofore proposed to separate such defective signature groups from the perfect books by providing mechanism, controlled by detecting devices associated with each sheet or signature source, for separating the defective books from the perfect books at the delivery. Machines of this type are illustrated in patents to Dexter No. 653,196, King No. 1,041,806, and Juengst No. 1,126,026, in each of which is provided a main conveyer to which sheets or signatures are fed from a plurality of sources of sheet or signature supply, and a detecting mechanism for each sheet or signature source. In the Dexter and Juengst machines, a procession of stops are moved with the said conveyer, said stops being operated by said detecting means, to separate the defective from the perfect books, and to distribute said books into two deliveries or piles.

While such a separating or switching construction is desirable, it has been found that, in a machine employing an endless train of clamps which carry the groups of signa-

tures past the binding instrumentalities (such as illustrated in Bredenberg Patent No. 1,248,252), this switching or separating of the good from the defective books may be profitably eliminated, the groups of defective signatures being fed to the train of traveling clamps with the perfect books, introduced into the appropriate clamps in the train, carried past the binding instrumentalities with the perfect books, and discharged into the same delivery with the perfect books.

The present invention resides particularly in preventing the binding instrumentalities from operating on the groups of defective signatures, this prevention being effected by suitable means controlled and operated by suitable detecting mechanism, associated with each of the sources of sheet or signature supply. Various means for effecting this object may be employed, but preferably the defective group is slightly elevated just before it is grasped by the appropriate clamp in the endless chain, with the result that the lower normally-projecting edge or back of the book is raised above the line of operation of the trimming, roughening, gluing, covering, and the other devices constituting the binding instrumentalities. The group of unbound defective signatures is discharged into a common delivery with the perfect books.

By means of such a construction for preventing the operation of the binding instrumentalities on the groups of defective signatures, the machine is greatly simplified, as the necessity for switching or separating devices, and the complicated means for operating the same (such as shown in the Dexter, King, and Juengst patents referred to), is removed.

Any suitable or desired detecting mechanism may be employed for preventing the operation of the binding instrumentalities on the defective group, either of the "feeler" variety, as shown in the Dexter or King patents, or of the "calipering" variety as disclosed in the Juengst Patents 1,126,026 and 761,496. Preferably a plurality of stops or pivoted members are carried by the main conveyer (as in Dexter), one of said stops or members being "set" or otherwise operated upon the absence of a signature, or the presence of a defective signature, so that, at an appropriate time corresponding

to the moment when the defective group is being grasped by its clamp, said "stop" or member so set operates, through suitable mechanical or electrical connections, to slightly elevate said defective group. The result is that the clamp closes on the defective group which has been elevated so that its back edge is above the normal line of movement of that of the perfect books, whereupon the binding instrumentalities cannot act on the same.

I have shown herein, and preferably use, means for tripping the cover-feed mechanism. These means are preferably controlled by the stop that controls the elevation of the group of defective signatures, and operates at an appropriate time to prevent the feed of a cover to said group.

While the invention has been illustrated herein as embodied in a machine of the "perfect binding" type, *i. e.* one in which the backs of the books are trimmed, roughened, glued, and cover applied, the invention may be also advantageously employed in association with covering machines employing an endless train of clamps, but in which the signature-groups are stapled or wire-stitched before such groups are introduced into the clamps.

The invention will be better understood by reference to the accompanying drawings, illustrating one embodiment of the inventive idea, and wherein—

Figure 1 is a plan view of a book-binding and covering apparatus embodying the present invention;

Fig. 2 is a diagrammatic elevation, indicating a signature-gathering or assembling mechanism in association with the book-binding and covering apparatus of Fig. 1 and showing the application of the present invention;

Fig. 3 is an enlarged detail showing one electrical embodiment of the inventive idea;

Fig. 4 is a detail;

Fig. 5 is a transverse section through one form of gathering machine, with various parts omitted, showing one form of detecting mechanism preferably employed; and

Fig. 5^a is a detail.

Referring to the drawings, wherein like reference numerals indicate like parts, A indicates any suitable or usual form of gathering or assembling machine in which sheets or signatures are assembled in book form. Preferably there is employed, however, the gathering machine described and illustrated in the application of Charles Gitzendanner Sr. No. 271,892, filed January 18, 1919.

The groups of signatures are fed from this gathering machine to a book-binding and covering machine B preferably of the type illustrated in Bredenberg Patent No. 1,248,252, dated Nov. 27, 1917, wherein the

signature groups are fed into an endless train of traveling clamps from an infeed trough C along which they are progressed while supported on their rear edges, as fully described in said patent. Inasmuch as the signature groups at the end of the gathering machine are resting flatwise on table 10 (Fig. 5), suitable means are provided for receiving said groups in that position, turning the same and depositing them on their rear edges in the infeed trough C. Any suitable means may be employed for this purpose but preferably there is employed the so-called "rotary delivery" D described and illustrated in the said Gitzendanner application and in Fig. 4 herein.

The gathering machine of the Gitzendanner application, which is preferably employed, is provided with a plurality of sources of sheet or signature supply, as hoppers 11, from which the lowermost sheets or signatures are simultaneously withdrawn and deposited on table 10, preferably slightly inclined, and along which they are progressed in the usual manner by pins carried by endless conveyer 13. The withdrawing means are preferably of the well known swinging gripper type comprising an arm 14 provided with a fixed jaw 15 and having a movable jaw 16 pivoted thereto at 17. Said movable jaw is moved toward said fixed jaw by a cam 18 operating through rod 19 in the well known manner described in Gitzendanner Patent No. 1,203,109. The whole gripper construction is rocked from shaft 20 in any suitable or usual manner.

Preferably the detecting mechanism for preventing the operation of the binding instrumentalities on defective signature groups is carried by said gripper arm 14, and preferably the detecting mechanism used is that disclosed in said Gitzendanner application. That detecting mechanism employs a bell-crank lever pivoted at 21 and having a short arm 22 and a long arm 23. Said bell-crank lever is rocked on its pivot by the engagement of a stud 16', carried by movable jaw 16, with a similar stud carried by the short arm 22. Pivoted on said gripper arm 14 at 24, near the upper end of the long arm 23 of the bell-crank lever, is a detecting or contact finger 25 which, during the normal operation of the machine (*i. e.* when signatures of a desired thickness are being withdrawn by the grippers) is moved by said bell-crank lever through an intermediate member 26, also pivoted at 24, to pass through the opening between two abutments 27 and 27'. These abutments are mounted on an arm 28 carried by a sleeve encircling shaft 20, and said arm 28 is adjustably connected to a second arm 29. When arm 28 is moved, arm 29 accordingly moves therewith; and, if no signature is seized by the gripper jaws, or if one that is

too thin or too thick is seized, the finger 25 will engage one or the other of said abutments (the upper abutment in the event no signature is seized or one that is too thin, and the lower in case one that is too thick is seized); thus swinging the free end of arm 29 upwardly and, through rod 30, opening a trap-door 31 (Figs. 3 and 5) opposite the hopper where said defect occurred. One of said trap-doors is associated with each hopper or source of signature supply, and the same are normally flush with the surface of a track or way 32 (Fig. 3) on which rest stops or pivoted members 33, one of which is pivoted on the conveyer 13 just to the rear of each pair of signature-progressing pins 12. Preferably the free end of each of these stops or members 33 is provided with a roller 34, said roller running freely along said track or way 32 and over the trap-doors 31.

Accordingly, when one of said trap-doors is opened, the roller 34 on the next pivoted member 33 passes therethrough and said roller continues to move along the inside of the track or way to the end thereof. At an appropriate moment, said roller, through suitable mechanism, operates to elevate the defective group as it is seized by its clamp in the binding machine B, thus preventing the operation of the binding instrumentalities thereon.

As will be observed from an inspection of Fig. 3, said track or way is provided with two parallel reaches, the lower of which is designated 32^a, and a vertical connecting reach 32^b, all closely paralleling the path of movement of conveyer 13. The point where the conveyer 13 passes downwardly (Fig. 3) is at the end of the table 10 of the gathering machine proper. As said defective group passes from the table 10 on its way to the clamp in the binding machine, the roller 34 continues its progress along the reaches 32^a and 32^b until the defective group rests on leveling table 48 (Fig. 3) at which moment said roller 34 operates, through suitable mechanism, to prevent the binding instrumentalities from engaging the defective group.

After the book leaves the gathering machine proper, it passes to the rotary delivery D (Figs. 2 and 4), where it is removed laterally from the table 10 by means of lift-rollers 35 (Fig. 4) cooperating with large rollers 36. The books pass around the large rollers 36 to which they are held by feed belts 37, finally passing down between rollers 38 and 39 and being deposited on their rear edges in an infeed trough or way 40 along which they are fed by a chain 41 provided with pushers 42 that engage the books and progress them to the binding machine.

This binding machine preferably consists of an endless train or book clamps, each

clamp consisting of an inner member 44 and a movable outer or presser-member 45. Each clamp member 45 is mounted to separate from and approach to its complementary clamp member 44, for discharging, receiving and clamping the books; and a powerful spring device 46 is provided for each clamp to hold it closed firmly upon the book until the clamp is opened, as by rail 47.

As each book reaches the top of the inclined trough 40, under the influence of its pusher 42, it commences to enter cornerwise in the open book-clamp and finally comes to a point above a stationary leveling table 48 adjustably secured at the top of a stationary bracket 49. The clamp guide rod 50 pushes the book forward with the clamp until the automatic closing of the same (due to the termination of the rail 47) causes the book to be firmly grasped between the clamp members—which occurs before the book has passed beyond the position in which it is supported on the leveling table.

If the signature group is defective, it is the object of the invention to prevent the operation thereon of the binding instrumentalities indicated on Fig. 1. As is well understood in the art, and as fully described in Patent No. 1,248,252, these binding devices operate on the lower exposed edges of the groups that project from the clamps. In the particular embodiment of the inventive idea here disclosed, the defective group is elevated as it rests on the leveling table 48 so that, when the clamp closes, the edges of the signatures of the defective group, which are normally operated on by the binding instrumentalities, will be out of range of the same; that is to say, the defective group will be clamped in such an elevated position that the binding means cannot perform their normal functions.

The elevation of the leveling table may be effected in various ways, one simple and preferred method being to utilize an electromagnet 51 suitably secured to the machine-frame adjacent said table. As herein shown, the core or plunger 52 is connected to one arm of a lever 53 pivoted to arm 54, the other arm of said lever being connected to one arm 55 of a second lever pivoted to bracket 56. The other arm 57 of said second lever is connected to a cross-piece 58 which carries two rods 59 on which the leveling table is mounted. When the magnet is energized, the table will be elevated, through the described connections, to the dotted line position shown in Fig. 3, thus elevating the defective group to the dotted line position shown.

The energization of the magnet at the proper time when the defective group is resting on the leveling table is effected by means of the roller 34 closing a circuit through the magnet 51, conductors 60 and

61, and a suitable source of electrical energy 62. The circuit is closed by roller 34 engaging a contact piece 63 and moving the same into engagement with terminal 64.

5 The contact piece is normally held in the position shown in Fig. 3 by spring 65.

The duration of the elevation of the leveling table 48 is brief, being simply sufficient to extend over the period of the closing of the clamp.

10 At an appropriate time after the circuit is closed by the stop 34 to elevate the defective group on the leveling table, said pivoted stop or member 34 preferably closes a second circuit through an electromagnet 66 (Fig. 5^a) which rotates a shaft 67 on which is mounted the trip of the cover-feeder which may be, and preferably is, the well known Cross feeder. This trip is usually in the form of a pivoted lever 68 which controls the operation of the feeder and which may be also operated manually. The electromagnet is energized to swing the lower end of the lever against the tension of spring 69, thus tripping the feeder so that no cover will be fed. The circuit through magnet 66 is closed by the action of stop 34 elevating contact piece 70 (Fig. 3) into engagement with a terminal 71 connected to conductor 72. The circuit is completed through conductor 73, connected to contact piece 70 and a source of electrical energy, as battery 74.

35 As clearly indicated in Fig. 1, the defective group travels a certain distance after it is elevated at the leveling table 48 until it reaches the cover-applying point; and the cover travels a certain distance from the cover supply to the cover-applying point. The magnet should be energized to trip the feeder, for example, when the defective group has reached a point which is the same distance from the cover-applying point as the cover supply is from that point, provided the cover and the defective group are traveling at the same speed. The time when the cover-feeder magnet is energized would vary in different machines.

50 Preferably the track or way 32 terminates just beyond the circuit-closing point 70—71, whereupon the roller 34 assumes a position such that it will again ride on the non-operative side of the track or way.

Let us assume that the group X (Fig. 1) is a defective group. It will be observed that the clamp is about to close inasmuch as roller 45^a is near the end of the track. The defective group is elevated in the clamp at this time and the clamping will be effected as soon as the roller passes the end of the rail. Thereupon the defective group will be carried past, but out of the range of operation of, the trimming, roughening, grooving, adhesive-applying, strip-attaching, cover-applying, and cover-breaking de-

vices (when the invention is used with a machine of the "perfect binding" type) and will be finally discharged, by the opening of the clamp, into the delivery with the good books, the unbound signatures of the defective group being thereafter picked out from among the good books by an operator; the cover-feed mechanism being preferably tripped, as above indicated, at the appropriate time.

75 While, for the purpose of clearness, one expression of the inventive idea has been herein described and illustrated in considerable detail, it is to be understood that the invention is not limited thereto, but that the inventive idea is susceptible of various electrical and mechanical expressions within the scope of the appended claims. Further, it is to be understood that, while the preferred use of the invention is in association with a machine of the "perfect binding" variety, it may also be used advantageously with simple covering machines wherein the groups of signatures are secured together, as by stapling or wire-stitching, before the book enters its clamp.

It is to be understood that by "imperfect" signature, as the term is hereinbefore used, is meant one that is too thick, too thin, more than one; or a torn or reversed signature, etc.; and by "defective signature group" is meant one into which a signature such as designated has been included, or a group that lacks one or more signatures.

What is claimed is:—

100 1. In combination, a traveling clamp, a leveling table over which said clamp moves and on which signature-groups rest, means for assembling signatures into groups from a plurality of sources of sheet or signature supply including a main conveyer provided with a plurality of stops or trips carried thereby, means for introducing a group of signatures into said clamp, detecting means associated with each signature source and operating to set one of said stops or trips should an imperfect signature be seized, and means controlled by said set stop elevating said table when a defective group is resting thereon and just before the clamp closes on said group.

115 2. In combination, a traveling clamp, a leveling table over which said clamp moves and on which signature-groups rest, means for assembling signatures into groups from a plurality of sources of sheet or signature supply including a main conveyer provided with a plurality of pivoted stops or trips carried thereby, means for introducing a group of signatures into said clamp, detecting means associated with each signature source and operating to set one of said stops or trips should an imperfect signature be seized, and means controlled by said set stop elevating said table when a defective 130

group is resting thereon and just before the clamp closes on said group.

3. In combination, a traveling clamp, a leveling table over which said clamp moves and on which signature-groups rest, means for assembling signatures into groups from a plurality of sources of sheet or signature supply including a main conveyer provided with a plurality of stops or trips carried thereby, means for introducing a group of signatures into said clamp, detecting means associated with each signature source and operating to set one of said stops or trips should an imperfect signature be seized, and electrical means controlled by said set stop elevating said table when a defective group is resting thereon and just before the clamp closes on said group.

4. In combination, a traveling clamp, a leveling table over which said clamp moves and on which signature-groups rest, means for assembling signatures into groups from a plurality of sources of sheet or signature supply including a main conveyer provided with a plurality of stops or trips carried thereby, means for introducing a group of signatures into said clamp, detecting means associated with each signature source and operating to set one of said stops or trips should an imperfect signature be seized, an electromagnet mounted adjacent said table, an electric circuit including said magnet and a source of electrical energy and adapted to be closed by a set stop or trip when a defective signature group is resting on said table and just before the clamp closes on said group, and lever connections between said magnet and table.

5. In combination, a traveling clamp, a leveling table over which said clamp moves and on which signature-groups rest, means for assembling signatures into groups from a plurality of sources of sheet or signature supply including a main conveyer provided with a plurality of stops or trips carried thereby, means for introducing a group of signatures into said clamp, detecting means associated with each signature source and operating to set one of said stops or trips should an imperfect signature be seized, means controlled by said set stop elevating said table when a defective group is resting thereon and just before the clamp closes on said group, a cover-feed mechanism, and means controlled by said set stop for tripping said cover-feed to prevent a cover being fed to said defective signature group.

6. In combination, a traveling clamp, a leveling table over which said clamp moves and on which signature-groups rest, means for assembling signatures into groups from a plurality of sources of sheet or signature supply including a main conveyer provided with a plurality of pivoted stops or trips carried thereby, means for introducing a

group of signatures into said clamp, detecting means associated with each signature source and operating to set one of said stops or trips should an imperfect signature be seized, means controlled by said set stop elevating said table when a defective group is resting thereon and just before the clamp closes on said group, a cover-feed mechanism, and means controlled by said set stop for tripping said cover-feed to prevent a cover being fed to said defective signature group.

7. In combination, a traveling clamp, a leveling table over which said clamp moves and on which signature-groups rest, means for assembling signatures into groups from a plurality of sources of sheet or signature supply including a main conveyer provided with a plurality of stops or trips carried thereby, means for introducing a group of signatures into said clamp, detecting means associated with each signature source and operating to set one of said stops or trips should an imperfect signature be seized, electrical means controlled by said set stop elevating said table when a defective group is resting thereon and just before the clamp closes on said group, a cover-feed mechanism, and means controlled by said set stop for tripping said cover-feed to prevent a cover being fed to said defective signature group.

8. In combination, a traveling clamp, a leveling table over which said clamp moves and on which signature-groups rest, means for assembling signatures into groups from a plurality of sources of sheet or signature supply including a main conveyer provided with a plurality of stops or trips carried thereby, means for introducing a group of signatures into said clamp, detecting means associated with each signature source and operating to set one of said stops or trips should an imperfect signature be seized, an electromagnet mounted adjacent said table, an electric circuit including said magnet and a source of electrical energy and adapted to be closed by a set stop or trip when a defective signature group is resting on said table and just before the clamp closes on said group, lever connections between said magnet and table, a cover-feed mechanism including a trip-lever, an electromagnet for swinging said lever, and a circuit including said magnet, said circuit being adapted to be closed by said set stop.

9. In combination, an endless series of book-conveying clamps, binding instrumentalities arranged in association therewith and adapted to operate on the groups of signatures in said clamps, means for assembling signatures into groups including a main conveyer carrying a plurality of stops or trips, means for introducing said groups into said clamps, means for detecting the

presence of an imperfect signature as the groups are being assembled, said means operating to render one of said stops or trips operative, and mechanism controlled by said set stop and operating on the group into which a defective signature enters to prevent the operation of the binding instrumentalities on said group.

10. In combination, an endless series of book-conveying clamps, means for applying covers to the books in said clamps, means for assembling signatures into groups including a main conveyer carrying a plurality of stops or trips, means for introducing said groups into said clamps, means for detecting the presence of an imperfect signature as the groups are being assembled, said means operating to render one of said stops operative, and mechanism controlled by said set stop for preventing the feed of a cover to said defective signature group.

11. In combination, an endless series of book-conveying clamps, binding instrumentalities arranged in association therewith and adapted to operate on the groups of signatures in said clamps, means for assembling signatures into groups including a main conveyer carrying a plurality of stops or trips, means for introducing said groups into said clamps, means for detecting the presence of an imperfect signature as the groups are being assembled, said means operating to render one of said stops or trips operative, a leveling table over which said clamps move and on which signature groups rest, and mechanism controlled by said set stop and elevating said table when a defective group is resting thereon just before the clamp closes on said group.

12. In combination, an endless series of book-conveying clamps, binding instrumentalities arranged in association therewith and adapted to operate on the groups of signatures in said clamps, means for assembling signatures into groups including a main conveyer carrying a plurality of stops or trips, means for introducing said groups into said clamps, means for detecting the

presence of an imperfect signature as the groups are being assembled, said means operating to render one of said stops or trips operative, an electromagnet mounted adjacent said table and adapted to elevate the same, and an electric circuit including said magnet and a source of electrical energy and adapted to be closed by a set stop or trip when a defective signature group is resting on said table and just before the clamp closes on said group.

13. In combination, an endless series of book-conveying clamps, binding instrumentalities arranged in association therewith and adapted to operate on the groups of signatures in said clamps, means for assembling signatures into groups including a main conveyer carrying a plurality of stops or trips, means for introducing said groups into said clamps, means for detecting the presence of an imperfect signature as the groups are being assembled, said means operating to render one of said stops or trips operative, a cover-feed mechanism, and means controlled by said set stop for tripping said cover-feed mechanism to prevent a cover being fed to said defective signature group.

14. In combination, an endless series of book-conveying clamps, binding instrumentalities arranged in association therewith and adapted to operate on the groups of signatures in said clamps, means for assembling signatures into groups including a main conveyer carrying a plurality of stops or trips, means for introducing said groups into said clamps, means for detecting the presence of an imperfect signature as the groups are being assembled, said means operating to render one of said stops or trips operative, a cover-feed mechanism including a trip-lever, an electromagnet for swinging said lever, and an electrical circuit including said magnet, said circuit being adapted to be closed by said set stop.

In testimony whereof I have signed this specification.

CHARLES GITZENDANNER.