

April 27, 1948.

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2,440,302

SEPARATING MACHINE

Original Filed April 5, 1935 2 Sheets-Sheet 1

Fig. 1

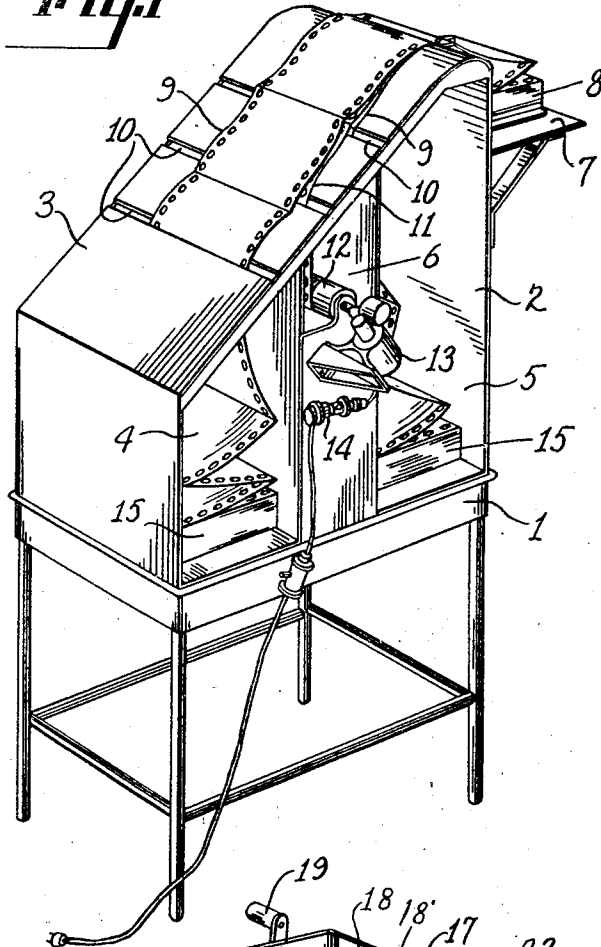
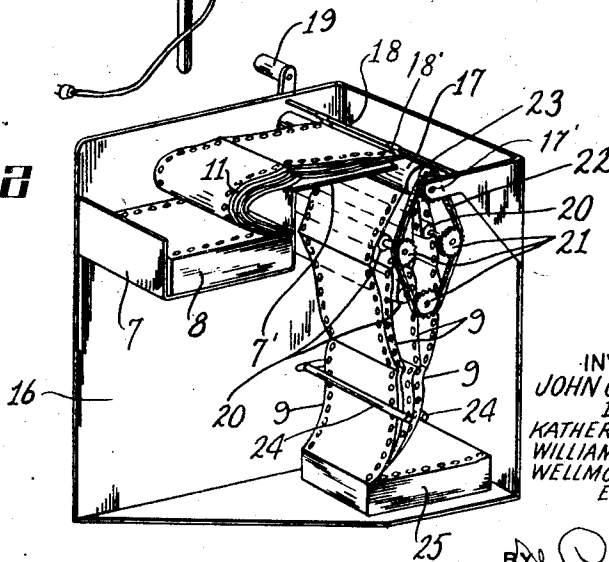


Fig. 2



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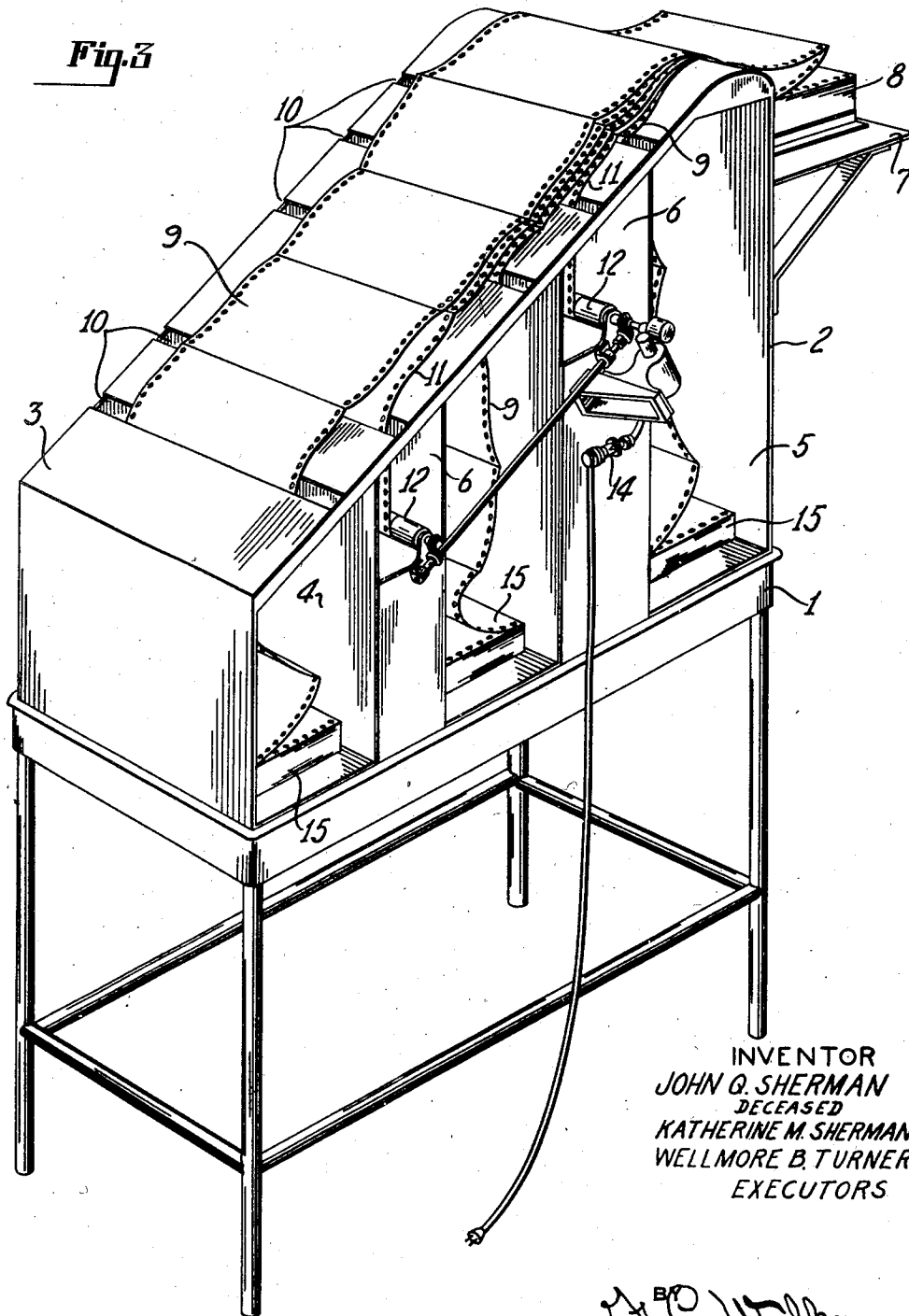
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Fig. 3



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2,440,302

SEPARATING MACHINE

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Original application April 5, 1935, Serial No. 14,854. Divided and this application August 1, 1941, Serial No. 405,093

36 Claims. (Cl. 271—2.1)

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This invention relates to assorting apparatus for manifolding material, and more particularly to a method of operation and mechanism for progressively separating alternating continuous interfolded strips of record and transfer material, and rearranging the separated strips into individual packets.

The use of continuous superposed strips of series connected forms interleaved with continuous strips of "one time" carbon material for production of manifold copies of written material has become quite extensive and common as a time saving expedient. Heretofore it has been the usual practice to collectively divide the strips transversely into successive sets of forms and interleaved sheets of transfer material which must be subsequently manually separated and assorted according to destination or use of the several copies. Much time of assembling and inserting the material in the writing machine is saved by the use of such continuous series connected forms, but, subsequently, considerable time is consumed in the manual separation of detached sets of forms and transfer material.

The present invention provides for high speed mechanical separation of the inscribed strips of connected forms and the interleaved transfer material, thus achieving a great saving in time and affording increased efficiency. Instead of distributing the separated copies of successive sets of forms as heretofore, the present method and apparatus enables consecutive copies of different sets of forms to be kept together by refolding the separated strips without dividing them into independent sheets or form portions. Thus, in a typical system wherein duplicate copies of each order are to be forwarded respectively to the warehouse, the packing department, the delivery department, sales department, accounting department, and a customer's copy enclosed with each shipment, by the present apparatus and method of separating the superposed inscribed record strips into separate packets copies for each department or purpose are kept in consecutive order whereby they are more easily handled, assured against loss or misplacement, and much time of the typist is saved.

The apparatus for performing the herein described method of separation may be embodied in various forms, of which but two have been illustrated.

The present is a division of copending application Serial No. 14,854, filed April 5, 1935, now matured into Letters Patent No. 2,275,475, to the benefit of the filing date of which the present

application is entitled, wherein generic claims to the present disclosure are contained and to which reference is made for further disclosure of this and analogous apparatus and method.

In the present disclosure the assembly of alternating superposed record and transfer strips are withdrawn from a single supply packet and are reformed by winding a part of the strips into roll formation, while the remaining strips are simultaneously refolded into either plural packets or into a single composite packet.

The separating apparatus may be associated directly with a writing machine, whereby the strips are immediately separated as they pass from such writing machine. Such apparatus preferably comprises a separate motor driven unit to which the inscribed manifolding material is transferred from the writing machine. In the event the material is marginally punched for pin wheel feeding devices, the separating apparatus may be provided with a pin type roller, the feeding pins of which engage in the marginally punched feed holes. It is found, however, that due to the interfolding of the several strips, by applying traction to a single interleaved transfer strip or to only one of the record strips all of the associated interfolded strips may be drawn in unison from the supply packet without other feeding means.

The object of the invention is to provide an assorting or separating apparatus for disassembling superposed interfolded strips of manifolding material which may be economically constructed and operated and which will be efficient and rapid in use, substantially automatic in action, and unlikely to get out of repair.

A further object of the invention is to provide an improved system for distribution of multiple copy inscribed forms, whereby corresponding copies of successive sets of forms will be maintained in sequence.

A further object of the invention is to provide an apparatus and method of operation whereby collectively interfolded strips of record and transfer material may be progressively separated and refolded and/or rolled into independent units.

A further object of the invention is to economize time and to facilitate distribution of multiple copies of inscribed forms.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention sought to be protected consists of the features of construction, the parts and combinations thereof, and the mode

of operation, or their equivalents, as hereinafter described and set forth in the claims.

Referring to the accompanying drawings, wherein is shown several forms of embodiment of the invention,

Fig. 1 is a perspective view of an assembled strip separating apparatus embodying the present invention, wherein the separated record strips are individually refolded into different packets.

Fig. 2 is a perspective view of another embodiment of the strip separating apparatus embodying the present invention, wherein plural record strips are collectively refolded into a single packet. In both embodiments the transfer material is shown being rewound into roll form, although it is to be understood that for special purposes one or more record strips may be wound into rolls or the transfer material may be folded into zigzag formation.

Fig. 3 is a perspective view of an assembled strip feeding apparatus embodying the structure of Fig. 1 extending so as to accommodate an additional record and transfer strip.

Like parts are indicated by similar characters of reference throughout the several views.

Referring to Fig. 1 of the drawings, 1 indicates a table or support of any suitable character, upon which is mounted the structure 2, having an inclined, transversely slotted top 3. The interior of the structure 2 is divided into separate compartments 4 and 5 to receive the separated record strips, and an intermediate compartment 6 in which the interleaved transfer material is received.

While for illustrative purposes a manifolding assembly of merely two record strips and a single interleaved transfer strip has been shown, it is to be understood that the structure 2 may be extended to any desired length to accommodate any necessary number of receiving compartments and corresponding guide slots, in accordance with the number of strips contained in the assembly. Adjacent to the higher end of the inclined top 3 of the structure is a shelf 7, upon which may be placed a supply packet 8 of interfolded record and transfer strips to be separated. The superposed alternating record and transfer strips are drawn from the packet 8 over the rounded upper end of the inclined guide table or top 3. The underlying record strip 9 is directed through the first or uppermost transverse slot 10 of the inclined top, and thence into the receiving compartment 5. The transfer strip 11 is directed through the next transverse slot 10 into the intermediate receiving compartment 6. The succeeding record strip, which in the present instance because of the minimum number of strips comprising the assembly is in fact also the topmost record strip, is directed through the final transverse slot 10 into the receiving compartment 4.

In the present instance no feeding device is shown having operative engagement with the record strips. However, the intermediate transfer strip 11 is attached within the compartment 6 to a winding roller 12, which is driven by an electric motor 13 through a speed reduction unit 14. The pull of the winding roller 12 upon the transfer strip 11 is sufficient to carry with it the accompanying record strips, due not only to frictional engagement thereof, but also because of the interlocking of the reversely folded strips in the supply packet 8 and serves to transmit the feeding motion from the transfer strip to the record strip. Thus, the feeding influence is directly applied to only one strip of the assembly, and the

others are caused to advance in unison therewith. As the transfer strip 11 is retrieved, it is wound upon the roller 12. At the same time, the record strips 9 being advanced through the slots 10 of the inclined top 3 reassume their original folds in the respective receiving compartments and are thus reformed into separate packets 15 therein. In the present form of embodiment, the increased size of the roll 12 as the transfer material accumulates thereon, merely causes the several strips to advance at increased speed. When the supply packet 8 has been exhausted, the individual packets 15 of separated strips are removed from the compartments 4 and 5 and the roll of transfer material is removed from the compartment 6. The latter material, if desired, may be reused by again interleaving it between other record strips, thus economizing in the use of transfer material.

In Fig. 2 there is illustrated an alternative form of strip separating apparatus, wherein there is mounted in the upper part of a cabinet or supporting structure 16 a rotary drive shaft 17 upon which is mounted a guide roller 17. The drive shaft may be motor operated, but in the present instance a crank handle 19 secured thereto enables manual actuation. Extending in parallel spaced relation with the roller 17 is a transverse rod 18 which carries guide fingers 18' overlying the strips passing the roller 17.

Mounted in the cabinet 16 below the level of the drive shaft and guide roller 17 are a plurality of relatively spaced rollers 20, upon which certain of the strips of material are wound. Each roller 20 carries a sprocket wheel 21 engaged by a chain belt 22 driven by a similar sprocket 23 upon the shaft of the guide roller 17. Thus, the strip winding rollers 20 are rotated in unison.

The packet 8 of alternating interfolded record and transfer strips is positioned upon the shelf 7 and the strips are collectively withdrawn from the packet over the guide 7' and roller 17 by the retractive influence of the winding rollers 20. In the present instance the interleaved strips of transfer material are shown attached to and retrieved upon the respective rollers 20 as these rolls are rotated. It is obvious, however, that strips of the assembly other than the strips of transfer material may thus be wound upon the rollers 20. The strips being collectively zigzag folded in the pack 8 are caused to unfold and advance in unison, although traction influence is applied to only a portion of the strips. The superposed record strips 9 from between which the transfer strips are retrieved are directed on opposite sides and between the rollers 20. Passing therebeyond these strips are collected together between spaced guide rods 24. The record strips thus collectively assembled are deposited in reversely folded or zigzag formation in a single packet 25 in the bottom of the cabinet.

Since the strips are advanced by the pulling influence of the rollers 20 as the material is wound thereon, the increase of peripheral speed as the material accumulates and the rolls grow in size causes the material to be drawn from the pack faster and faster. To accommodate such increasing travel speed, the guide roller 17 is preferably, but not necessarily, loose on its shaft and free for differential rotation. The transverse rod 18 and guide fingers 18' carried thereby serve to confine the assembly of strips to a definite path of travel about the guide roller 17. The increased size of the rolls 20 incident to accumulation of strip material thereon is immaterial and merely serves to gradually increase the speed of separa-

tion of the strips. The several strips are uniformly advanced at whatever speed by frictional contact of the several superposed strips with each other and by the interlocking engagement of the reverse folds of the several strips as they leave the initial packet.

Obviously, if separate packets of record strips are desired, instead of directing the record strips 9 collectively past the guides 24 into a single packet 25, the strips may be distributed over individual guides and each strip refolded into a separate packet, as amply disclosed in Fig. 1. Also, if so desired, the record strips or a part of them may be wound upon the rollers 20 and the transfer strips or any portion thereof may be advanced past the rollers and refolded into one or more packets 25.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute, the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

What is claimed is:

1. In a manifolding assembly separating apparatus, wherein an interleaved strip of transfer material is removed from between superposed record strips of an initially zigzag folded packet thereof, strip feeding means for collectively advancing both the record and transfer strips in unison past a separating position, a collecting roller for the transfer strip actuated in unison with the advancement of the strips upon which the transfer strip is wound, and a receiver for the record strips in which the strips are refolded into zigzag form.

2. The herein described method of removing interleaved transfer material from a manifolding assembly of alternating superposed strips of record and transfer material, including collectively advancing the superposed strips in unison past a separation point, winding the transfer material into roll form and refolding the record strips into zigzag formation in unison with their advancement.

3. An apparatus for separating a manifolding assembly of alternating superposed strips of record and transfer material, including a strip feeding means for collectively advancing the strips in unison past a separation point, a winding means for retrieving the transfer material in unison with its advancement, guide means for the record strips and a receiver therefor upon which the strips are folded into zigzag formation.

4. An apparatus for a manifolding assembly of alternating superposed strips of record and transfer material, including strip feeding means common to the plurality of strips, for advancing the strips in unison past a separation point, collecting means for the transfer material, and guide means by which the record strips are directed into

a single collective packet of record material only in unison with the advancement of the strips.

5. An apparatus for separating a zigzag interfolded packet of alternating superposed strips of record and transfer material, including feeding means for collectively advancing the plurality of strips in unison, guide means for directing the several strips through different paths of travel, winding means by which the transfer material is collected into roll formation, and additional guide means by which the record strips are directed into a collectively refolded zigzag packet formation.

6. An apparatus for separating alternating superposed strips of record and transfer material, including feeding means for advancing the strips in unison through divergent paths of travel, winding means in the path of the transfer material for collecting the transfer material into roll formation and guide means for directing the record material into packet formation.

7. An apparatus for separating an assembly of alternating superposed strips of record and transfer material, including feeding means for effecting advancement of the strips of record and transfer material in unison, a plurality of winding devices, one for each transfer strip, means for driving the winding devices to retrieve the transfer strips in separate rolls in unison with the advancement of the assembly, and guide means for directing the record strips into a single collective formation.

8. An apparatus for separating an assembly of alternating superposed strips of record and transfer material, including feeding means for effecting advancement of the strips of record and transfer material in unison, a plurality of winding devices, one for each transfer strip, means for driving the winding devices to retrieve the transfer strips in separate rolls in unison with the advancement of the assembly, and guide means for directing the record strips into packet formation.

9. An apparatus for separating an assembly of alternating superposed strips of record and transfer material, including strip feeding means, separate collecting devices for the respective strips of transfer material by which they are redispersed into separate formations, and collecting means by which the record strips are collectively redispersed into a single formation.

10. An apparatus for separating an assembly of alternating superposed record and transfer strips, including strip feeding means, strip winding means for a part of the strips, and guide means for directing the remainder of the strips into zig-zag folded packet formation.

11. An apparatus for separating alternating superposed record and transfer strips withdrawn from a single supply packet, including winding means for the transfer material and means for directing the record strips into zig-zag folded packet formation simultaneously with the winding of the transfer material.

12. An apparatus for separating alternating superposed record and transfer strips withdrawn from a single supply packet, including separate collecting means for the individual strips of transfer material and a common collecting means for the strips of record material.

13. An apparatus for separating alternating superposed record and transfer strips withdrawn from a single supply packet, including separate winding devices for the individual strips of transfer material and a common collecting means for

effecting a collective formation of the record strips.

14. An apparatus for separating a collectively interfolded packet of alternating transfer and record strips, including guide means by which the several strips of material are simultaneously directed into separate paths, a winding device in the path of at least one of the strips by which such strip is wound into roll formation, and a plurality of separate receiving compartments in the paths of other strips into which the corresponding strips are refolded into separate zigzag packets.

15. An apparatus for separating an assembly of alternating superposed strips of record and transfer material drawn from a single packet thereof, including winding means by which the transfer material is reformed into roll formation, a plurality of receiving compartments for the record material, and guide means for directing individual strips of record material into different receiving compartments of the plurality simultaneously with the winding of the transfer material.

16. The herein described method of separating a single assembly of alternating superposed strips of record and transfer material, including separately winding the strips of transfer material into plural formations and collectively interfold- ing the strips of record material into a single formation.

17. The herein described method of separating a single assembly of alternating superposed strips of record and transfer material, including the steps of simultaneously winding a part of said strips into roll formation and folding the remainder of the strips into zigzag packet formation.

18. The herein described method of separating a single assembly of alternating superposed strips of record and transfer material, including the steps of reforming a part of said strips into separate rolls and reforming the remainder of the strips into a single zigzag folded packet.

19. The herein described method of separating a packet of plural collectively interfolded strips, including applying feeding influence to less than the total number of strips for collectively advancing all the strips past a separation point, the remaining strips of the plurality being automatically advanced in unison with those subjected to the feeding influence, guiding different strips into different paths of travel beyond said separation point, and disposing of the separated strips in separate formations.

20. A machine for delevating carbon strips from interconnected continuous form stationery strips, comprising a frame, provided with a guide, over which manifold stationery may be led from a zigzag folded pack, feed mechanism mounted in said frame including winding spindles for alternate strips, and a platform disposed beneath said feed mechanism, whereon the unwound strips will refold in nested relation.

21. A machine for delevating carbon strips from superposed continuous form stationery strips, comprising a frame provided with a guide, a plurality of spaced spindles, having an end journaled in said frame and the other end free to wind up into rolls alternate strips led over said frame and permit the remaining strips to drop by gravity below said spindles with a marginal edge of all of the strips in the same plane, and driving means for rotating each of the spindles independently of the others in timed relation.

22. An apparatus for automatically separating alternating superposed record and transfer material strips, including motion transmitting means for collectively advancing the record and transfer material strips, guide means for directing the record and transfer material strips through separate paths of travel, a receiver into which each record material strip is folded in zigzag formation, winding means by which each transfer material strip is wound into roll formation, and motion transmitting means operative to simultaneously advance the strips and actuate the transfer material winding means.

23. A strip separating apparatus, wherein a plurality of superposed record strips and interleaved strips of transfer material are separated from each other and the record strips folded into zigzag formation and the transfer strips wound into roll formation, including strip feeding means common to the assembly of record and transfer strips for advancing said strips in unison, a plurality of separate relatively spaced winding reels for the transfer strips relative to which the record strips are advanced through separate paths into zigzag formation, and driving means synchronizing the operation of the transfer strip winding reels with the strip feeding means.

24. A strip separating apparatus, including a strip feeding device for collectively advancing a plurality of continuous superposed record strips through relatively spaced paths of travel into zigzag folded formation and for simultaneously advancing interleaved strips of transfer material through paths of travel intermediate those of the record strips, a winding device for each transfer material strip upon which the transfer material strips are retrieved, and drive means for operating the strip feeding device and the winding reels in synchronism.

25. The method of separating an assembly of continuous superposed strips of record material and interleaved strips of transfer material, including collectively advancing the record and transfer strips in unison, directing the record and transfer strips in separate alternating paths of travel, winding the transfer strips into separate rolls, and folding the record strips into zigzag formation.

26. The method of separating an assembly of alternating record and transfer material strips, including collectively advancing the record and transfer strips in unison, directing the record and transfer strips in separate paths of travel, winding the transfer material into roll formation and forming the record strips into separate zigzag formations.

27. A strip separating apparatus, a guide table over which a plurality of superposed alternating record and transfer material strips are advanced in unison, guide slots in the table through which the strips are separately directed, relatively spaced receivers into which the record material is folded into zigzag formation, and winding means upon which the transfer material is wound into roll formation.

28. A strip separating apparatus by which an assembly of continuous superposed alternating record and transfer strips are separated one from another, means for collectively advancing the assembly of strips and a series of at least two receiving compartments and an intermediate collecting reel to which the record and transfer material strips are simultaneously advanced, into which receiving compartments the record strips are folded in zigzag formation and upon which

reel the transfer strip is wound into roll formation.

29. A strip separating apparatus for an assembly of continuous superposed alternating record and transfer material strips, including guide means relative to which the strips are advanced in unison, a plurality of substantially aligned receivers, one for each record strip, into which the record strips are directed into zigzag formation, a winding reel between succeeding record strip receivers on which a corresponding transfer material strip is retrieved, and driving means effective to simultaneously advance the strips to the corresponding receivers and wind the interleaved transfer material upon the corresponding reel.

30. A strip separating apparatus for an assembly of continuous superposed alternating record and transfer material strips, including a series of alternating receivers and reels into which the record strips are received in zigzag folded formation and upon which the transfer material strips are wound respectively, guide means for directing each of the record and transfer material strips to a corresponding receiver and reel respectively, and drive means for simultaneously advancing the strips and rotating the winding reels.

31. An apparatus for progressively separating an assembly of continuous alternating superposed record and transfer material strips, including motion transmitting means for collectively advancing the assembly of strips from a source of supply, a plurality of receivers for the record strips and winding reels for the transfer material strips arranged in alternating sequence, guide means directing individual strips through separate paths to the respective receivers and winding reels and driving means for actuating the winding rolls in synchronism with the advancement of the strips.

32. A strip separating apparatus for an assembly of superposed alternating record and transfer strips, including a table over which the strips of the assembly are collectively advanced, guide means directing different strips of the assembly into separate paths of travel, receiving means for the record strips in which the strips are zigzag folded, and a winding reel for transfer material disposed in relatively spaced relation with the record strip receiving means.

33. A strip separating apparatus for an assembly of superposed alternating record and

transfer strips, including a table over which the strips are advanced, having guide slots therein through which individual strips of the assembly are directed, a plurality of relatively spaced receptacles for the record material and winding means for the transfer material disposed intermediate succeeding record material receptacles, and driving means for the transfer material winding means.

34. The herein described method of separating superposed alternating strips of record and transfer material, including collectively advancing the assembly of strips, directing different strips of the assembly into separate paths of travel, zigzag folding the record material and winding the transfer material into roll formation.

35. The herein described method of separating superposed strips of record and transfer material, including collectively advancing the assembly of strips from a source of supply, directing different strips of the assembly through separate radiating paths of travel collecting the record strips into zigzag formation and winding the transfer material into roll formation.

36. The herein described method of separating superposed strips of record and transfer material, including collectively advancing the assembly of strips from a source of supply, directing different strips of the assembly through separate radiating paths of travel, collecting the separated record and transfer material strips into alternate zigzag and roll formations.

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