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E. SATHER ET AL

3,306,606

COMBINATION INSERTER AND COLLATOR HAVING REVERSE INSERT TRACK

Filed Aug. 28, 1963

3 Sheets-Sheet 1

Fig. 1

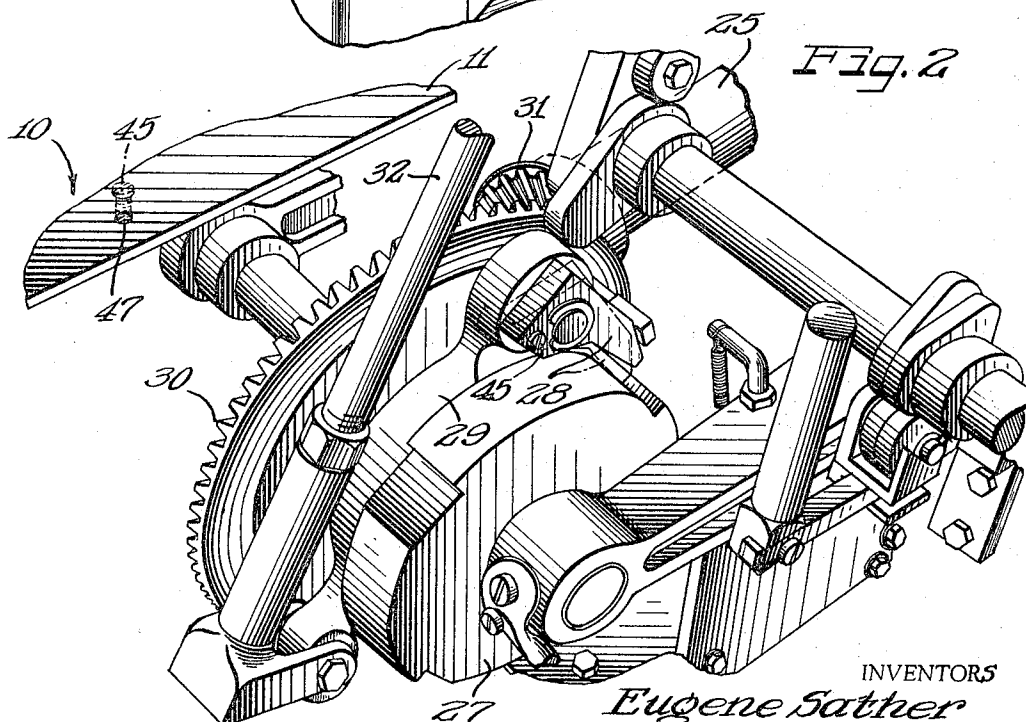
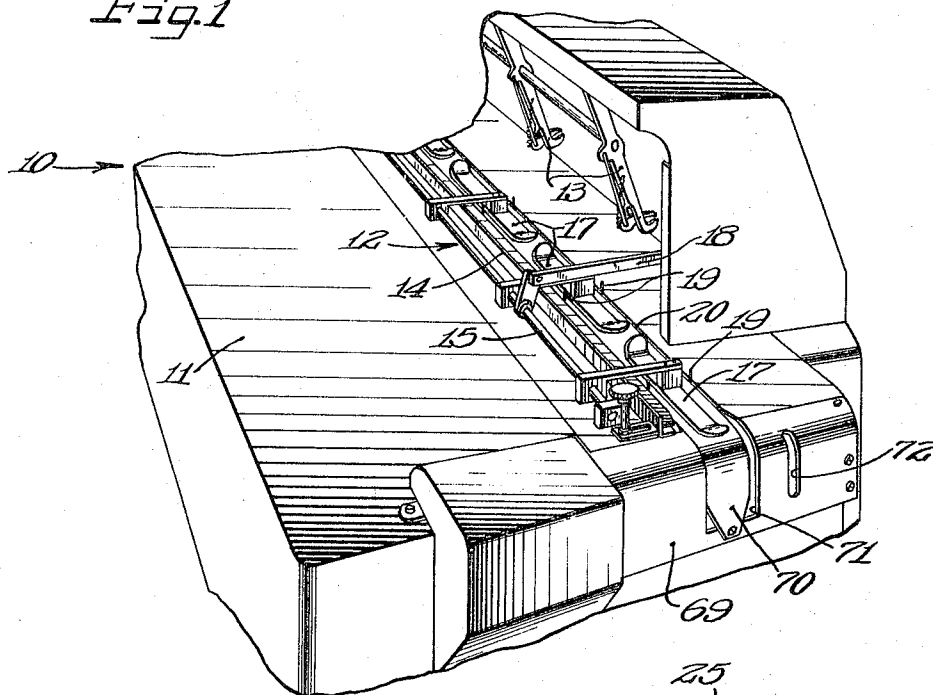


Fig. 2

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Fig. 3

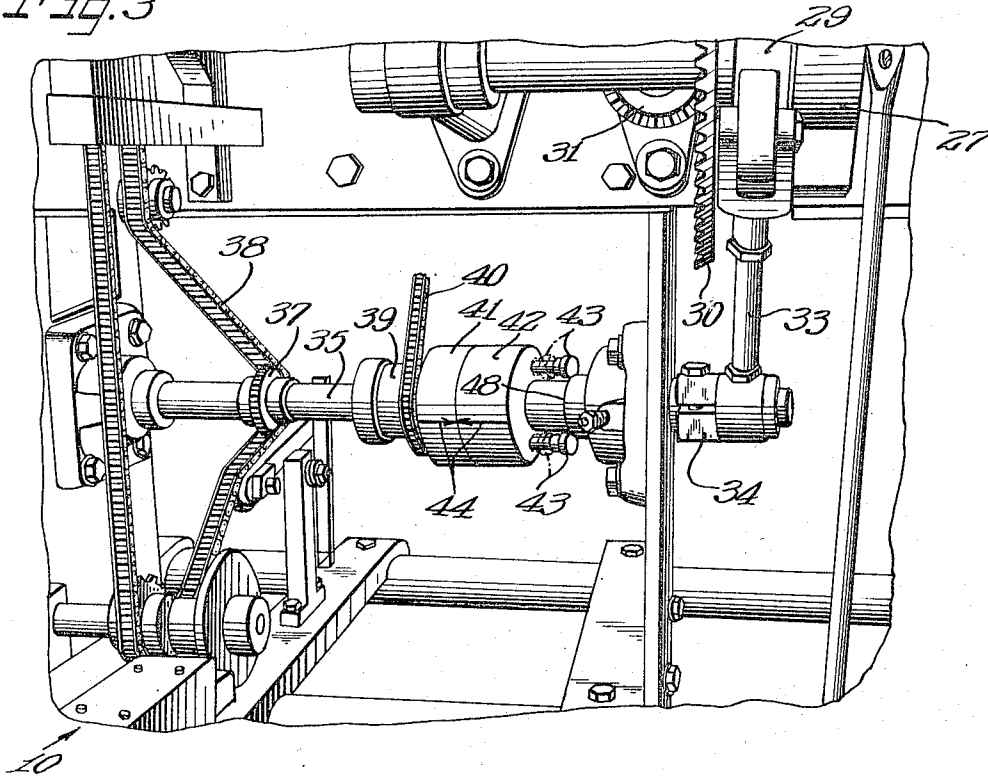
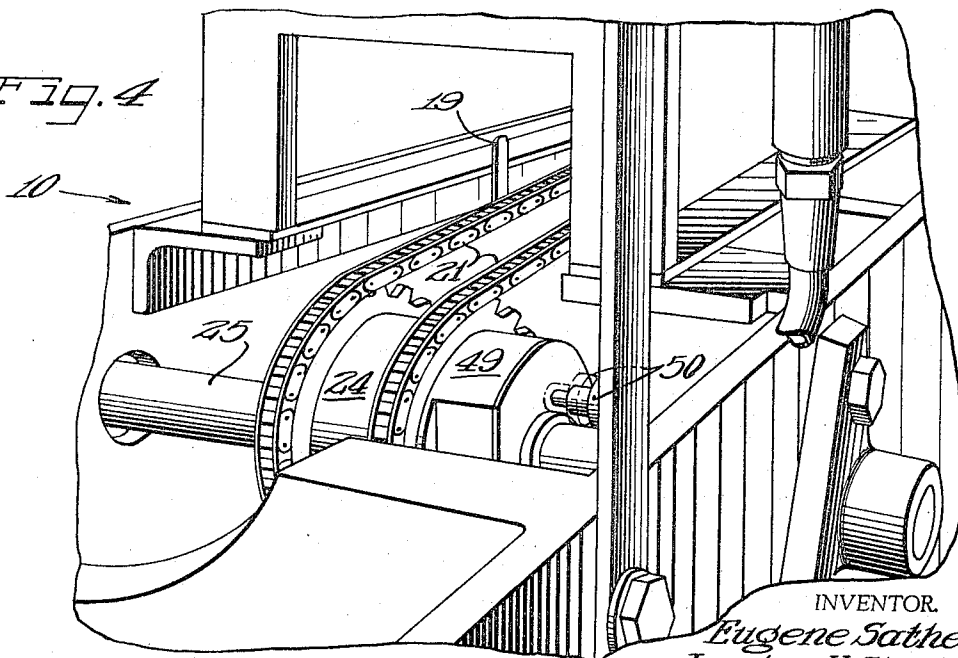


Fig. 4



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Fig. 5

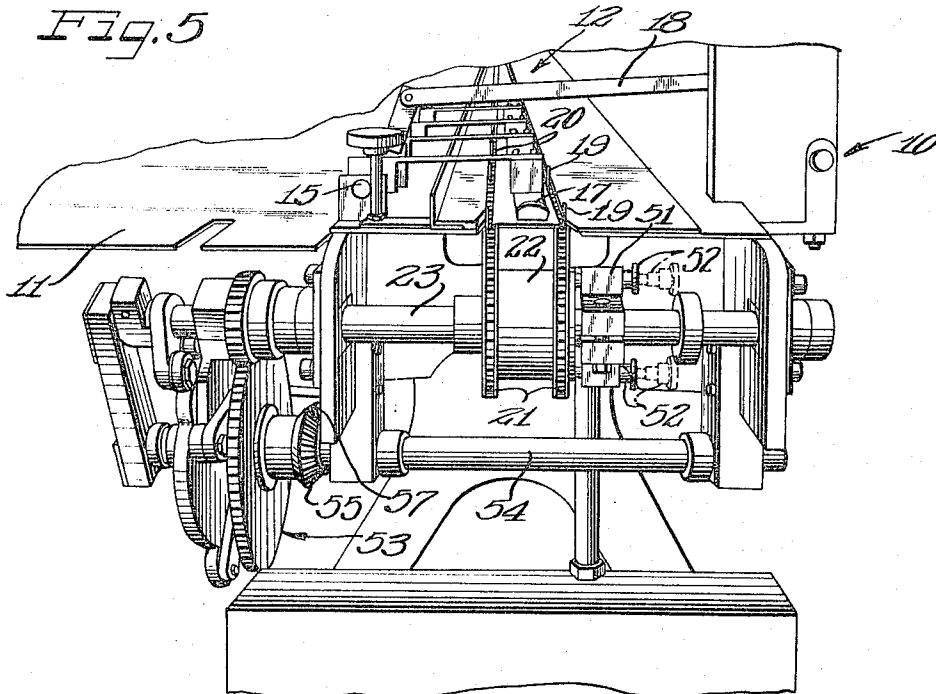
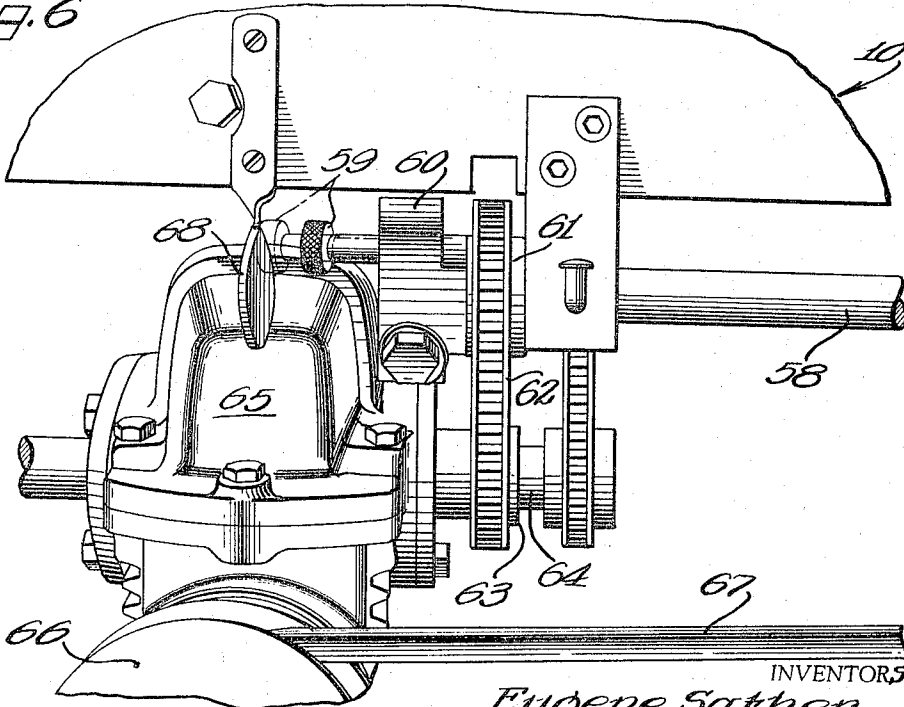


Fig. 6



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COMBINATION INSERTER AND COLLATOR HAVING REVERSE INSERT TRACK

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12 Claims. (Cl. 270—58)

This invention relates to inserters, sometimes referred to as envelope fillers or stuffers, and more particularly to improvements in inserters of the type comprehensively disclosed in A. H. Williams Patent 2,325,455, dated July 27, 1943, and marketed as the Phillipsburg inserter, enabling such a machine to serve the dual functions of inserter and collator.

In machines of this type, a plurality of insert supply magazines or stations are provided along and adjacent to an insert track having therein a conveyor into which inserts comprising any preferred mailable sheet-form material are successively deposited as withdrawn from the magazines by means comprising gripper arms. The conveyor intermittently advances the inserts to an inserting or filling station located at one end of the insert track where the inserts are inserted by collated groups into envelopes. The filled envelopes are then sealed, if desired, and stamped and stacked ready for mailing.

Occasion has arisen for desiring only collated material from the insert magazines or stations, without insertion of the material into envelopes. Instead of requiring a separate machine to effect such mere collation, we have conceived of the idea of utilizing the envelope handling and filling inserter for this purpose by reversal of the direction of movement of the insert track conveyor so that instead of inserts being conveyed to the inserting station, they are conveyed in the opposite direction in collated relationship for deposit or other handling from what comprises the free end of the machine as distinguished from the envelope filling and stacking end portion of the machine.

It is, accordingly, an important object of the present invention to provide a new and improved dual function capability for an inserter.

Another object of the invention is to provide novel means for converting an inserter into a combination inserter and collator.

A further object of the invention is to provide a combination inserter and collator which can be easily converted to function either as an inserter or as a collator by means of simple manipulative adjustments in the operating mechanisms of the machine.

Still another object of the invention is to provide an improved machine adapted to be selectively reversed for use as an inserter or as a simple collator.

Other objects, features and advantages of the present invention will be readily apparent from the following detailed description of a preferred embodiment thereof taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a fragmentary perspective view of the collated-material-delivery end of a combination inserter and collator;

FIGURE 2 is a fragmentary perspective view of the drive pawl and ratchet for intermittent advance of the conveyor, and associated mechanism of the machine;

FIGURE 3 is a fragmentary perspective view of the inserting station drive means;

FIGURE 4 is a fragmentary perspective view of the insert pusher or conveyor chain mechanism;

FIGURE 5 is a fragmentary perspective view of the collated-material-delivery end portion of the machine

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with various enclosure hoods and casing portions removed to reveal operating mechanism; and

FIGURE 6 is a fragmentary perspective view of the main drive device of the machine and showing the reverse collating drive means.

In FIGURE 1 is shown the right-hand end portion of an inserter 10 embodying the principles of the aforesaid Patent 2,325,455, and including an elongated table 11 having thereon a longitudinal insert track 12 which leads toward an inserting station (not shown) at the left-hand end of the machine. Gripper arms 13 are constructed and arranged to oscillate in unison in a front-to-rear direction over the insert track 12 for engaging successive inserts from respective insert stations (not shown) and deposit the inserts in the track.

Defining the front edge of the insert track is a guide rail bar 14, forwardly parallel to which is mounted a rock shaft 15 to which hold down members or shoes 17 are keyed to be swung up and down as the shaft is rocked by a link and crank mechanism 18 in timed relation to the gripper arms 13 for receiving inserts thereunder and holding them down in the track for advance longitudinally therealong by means of lugs or pins 19 projecting upwardly through spaced parallel longitudinal slots 20 and carried by endless conveyor chains 21 trained over respective sprockets on a drum 22 carried by shaft 23 at the right end of the machine and over a drum 24 carried by a shaft 25 (FIG. 4) at the left or inserting station end of the machine.

For inserting operation, the conveyor chains 21 are driven in unison to have the upper horizontal runs thereof travelling from the right to the left, toward the inserting station, in properly timed, intermittent or step-by-step relation correlated with the envelope handling and filling means at the inserting station and with the gripper arms 13. Such timed, intermittent advancing operation of the conveyor chains is effected through mechanism including a ratchet wheel 27 (FIG. 2) with which coacts a pawl 28 reciprocally carried by an oscillating wheel 29 and by which a bevel gear 30 is driven to drive a bevelled pinion 31 keyed to the shaft 25. Also connected to the oscillating wheel 29 for synchronized operation with the pawl 28 is a driving link 32 which is suitably connected to oscillate the rock shaft (not shown) on which the gripper arms 13 are mounted.

Oscillations of the pawl and gripper arm link driving wheel 29 are effected through a link 33 (FIG. 3) connected by a crank 34 to a main drive shaft 35. A sprocket gear 37 keyed to the shaft 35 drives a chain 38 meshing over respective sprockets on cam shafts of the machine for driving them synchronously with the gripper arms and the conveyor chains to coordinate various operations of the machine.

Also mounted on the drive shaft 35 is a normally freely rotatable sprocket gear 39 which is adapted to drive a chain 40 by which the mechanisms at the inserting station involved with inserting into envelopes the inserts accumulated on the insert track 12 and delivered by the conveyor are actuated. For coupling the sprocket gear 39 to the drive shaft 35, such sprocket has a hub 41 slidably facing a hub 42 which is fixedly keyed or otherwise fixedly secured to the shaft 35 for corotation and carries a pair of coupling pins 43. In the coupled relation, the pins 43 are in the pushed-in, dash outline position shown in FIGURE 3. For proper synchronization, the hubs 41 and 42 have respective indexing marks 44 thereon which are matched or aligned in the properly synchronized relationship of the parts.

When it is desired to convert the machine from collating and inserting to merely collating, the machine is shut down, and various adjustments effected, comprising dis-

connecting the intermittent drive of the conveyor toward the inserting station, disconnecting the inserting station from operation, and reversing the direction of the conveying or pushing run of the conveyor. In this instance, five manipulations effecting simple disconnecting or connecting relationships in the actuating mechanism of the machine result in the change-over or conversion.

One step in the conversion comprises disabling the intermittent chain drive pawl 28. This is readily accomplished by means of a screw 45 (FIG. 2) which is projected through the heel portion of the pawl and screwed into the portion of the oscillating wheel 29 on which the pawl is pivotally mounted. Thereby the pawl is held in the full line position shown, out of the actuating relation to the ratchet wheel 27 indicated in dash outline. For convenience, the screw 45 may when not in use be carried by the table 11 at a handy location near the pawl and ratchet mechanism as for example as indicated in dash outline in FIGURE 2, by partially threading it into a retaining hole or socket 47 in the table.

A second step in effecting conversion comprises disconnecting or disabling the inserting station. For easily accomplishing this, the coupling pins 43 are withdrawn into projected relation from the dash outline coupling position to the uncoupled full line position shown in FIGURE 3. To avoid complete withdrawal of the pins 43 from the shaft keyed hub 42, a stop shoulder 48 is provided against which the heads of the pins engage in their withdrawn position.

As a third step in the conversion, the conveyor chain sprocket hub 24 is uncoupled with respect to the shaft 25 on which this sprocket hub is then freely rotatable. To effectuate this, a hub 49 (FIG. 4) is fixedly keyed to the shaft 25 at one face of the sprocket hub 24 and one or more coupling pins 50, preferably two, are withdrawn from the coupling position shown in dash outline in FIGURE 4 to the uncoupled position shown in full outline. Thereupon the sprocket hub 24 rotates freely on the shaft 25.

As a fourth conversion step, the sprocket hub 22 (FIG. 5) which normally rotates freely on the shaft 23 is coupled corotatively with said shaft by means of a collar or hub 51 fixed on the shaft adjacent to one face of the hub 22 and adapted to be coupled thereto selectively by means of a pair of coupling pins 52 which for this purpose are pushed into coupling relation as shown in full outline from the uncoupled relation shown in dash outline. Through a gear train 53 the shaft 23 is coupled to a shaft 54 having keyed thereon a bevel gear 55 which meshes with a bevel gear 57 carried by one end of a selectively driven shaft 58 (FIG. 6).

During inserting operation of the machine, the shaft 58 is non-operating. When the conveyor is to be driven in reverse for collating only, and as the final step in converting the machine for this purpose, a coupling pin 59 carried by a hub 60 rigidly corotative with the shaft 58 is moved from a non-coupling or disconnect outward position as shown in dash outline into a coupling position as shown in full outline wherein it couples corotatively with the shaft 58 a sprocket 61 which is normally freely rotatable thereon. This sprocket is connected by means of a drive chain 62 with a drive pulley 63 on a driven shaft 64 extending from a reduction gear mechanism within a housing 65 connected through a pulley 66 and a drive belt 67 with a power source comprising an electrical driving motor (not shown) mounted on the framework of the machine. A stop or limit disk 68 is mounted to be engaged by the head of the coupling pin 59 when it is fully withdrawn to the disconnect position.

After the described conversion steps have been taken, powering of the machine will result in concurrent operation of the gripper arms 13, as well as the hold down shoes 17 and continuous collating and delivery drive of the conveyor chains 21, with the speed of the conveyor correlated to synchronize the movement of the pusher

lugs 19 for registration of the span or space between the lugs to receive the documents or other sheet-like articles from the successive gripper arms, to the end that at the collated material delivery end of the machine, namely the right-hand as shown in FIGURE 1, properly collated groups of the articles are delivered. To facilitate such delivery of the collated articles, the housing or casing structure of the machine includes a track extension portion 69 carrying a divider flange member 70 mounted in a recessed portion 71 of the extension 69 and providing extensions of the pusher lug clearing slots 20. An access opening 72 in the member 69 facilitates manipulation of the coupling pins 52.

When it is desired to reconvert the machine for inserting, the several described steps are reversed, namely, the coupling pin 59 (FIG. 6) is withdrawn, the coupling pins 52 (FIG. 5) are withdrawn, the coupling pins 50 (FIG. 4) are reinserted, the coupling pins 43 (FIG. 3) are reinserted, with the index marks 44 aligned, and the pawl 28 is released by removing the holding screw 45. While for convenience in description, the several manipulative steps for converting or reconverting the machine have been recited in a particular order, it will be appreciated that the precise order of effecting such steps is not essential, and neither in this description nor in the following claims is any limitation to the particular order of recitation to be inferred or implied.

Only those parts and features of the machine which are concerned with conversion of the machine and reversal of the conveyor have been shown and described in detail. For all parts and features of the machine not specifically described, as well as for a more detailed description of various of the illustrated and described parts and features of the machine, reference may be had to said Williams Patent 2,325,455 which is included herein by reference.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

We claim as our invention:

1. An inserter including an elongated table providing an insert track having a conveyor for moving articles therealong,
 - means for depositing a series of articles successively into said track to be collated in respective groups as the successive articles are moved along the track,
 - means providing an inserting station at one end of the track,
 - means for driving said conveyor and said depositing means and said inserting station in coordinated relation to one another,
 - means for coupling said conveyor to transport the groups of articles in the track to the inserting station,
 - means for disconnecting said inserting station from said driving means,
 - and means operative after the inserting station has been disconnected for reversing the direction of movement of the conveyor coordinated with the operation of said depositing means to transport the collated groups of articles to the opposite end of the track.
2. An inserter including a conveyor movable along a longitudinal path toward an inserting station,
 - means for depositing on the conveyor a series of articles removed successively from respective supplies of the articles,
 - means for intermittently advancing the conveyor toward the inserting station in coordinated relation with operation of the depositing means,
 - means for disconnecting the conveyor from said intermittent advancing means,
 - and means arranged to be selectively coupled to the conveyor after disconnection of the conveyor from the intermittent advancing means for driving the

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conveyor in coordinated relation with said depositing means to transport the articles in the opposite direction from the inserting station.

3. An inserter including a conveyor movable along a longitudinal path toward an inserting station, means for depositing on the conveyor a series of articles removed successively from respective supplies of the articles,

means for intermittently advancing the conveyor toward the inserting station in coordinated relation with operation of the depositing means,

means for disconnecting the conveyor from said intermittent advancing means,

and means adapted to be selectively coupled with the conveyor for driving the conveyor continuously in the opposite direction and away from the inserting station in coordinated relation with said depositing means after the conveyor has been disconnected from said intermittent advancing means.

4. An inserter including an insert track having a conveyor and means including a plurality of gripper arms operating in unison to deposit inserts on the conveyor,

means for driving said gripper arms and for advancing said conveyor incrementally in timed coordination with the gripper arms and including an oscillating member carrying a pawl and a ratchet wheel operatively connected with the conveyor,

and means for disabling said pawl to maintain it out of engagement with the ratchet wheel for discontinuing said intermittent advance of the conveyor.

5. An inserter including an insert track having a conveyor and means including a plurality of gripper arms operating in unison to deposit inserts on the conveyor,

means for driving said gripper arms and for advancing said conveyor incrementally in timed coordination with the gripper arms and including an oscillating member carrying a pawl and a ratchet wheel operatively connected with the conveyor,

means for disabling said pawl to maintain it out of engagement with the ratchet wheel for discontinuing said intermittent advance of the conveyor, alternate means for driving the conveyor continuously in timed coordination with the gripper arms, and means for coupling said alternate means drivingly with the conveyor when said pawl is disabled.

6. An inserter as defined in claim 5, wherein said coupling means of the means for continuously driving the conveyor comprise a driving shaft including a disconnectable coupling with the conveyor and a disconnectable coupling with powered driving means.

7. An inserter including a table providing an elongated insert track,

a longitudinal slot in said table along said track, a conveyor chain under said table having pusher lugs extending upwardly through said slot at predetermined spaced intervals,

gripper arms operable above said table at respective spaced intervals corresponding to the intervals between said lugs for depositing inserts onto the track between said lugs,

means for driving the conveyor chain intermittently in timed relation to the operation of said gripper arms,

means for driving the conveyor chain continuously but with the location of the lugs correlated with operation of the gripper arms to receive inserts between the lugs,

and means for selective driving of the conveyor chain by either of said driving means.

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8. In an inserter of the type including a table having an elongated insert track with a conveyor operative to transport articles deposited on the track toward an inserting station at one end of the track,

said track having at its opposite end a collated insert delivery extension,

a plurality of gripper arms oscillatably mounted above said track for depositing articles onto the track, insert station operating mechanism,

first means for driving said conveyor and gripper arms as well as said mechanism in coordinated relation and including a pawl and ratchet drive operating through bevel gears and a first shaft to drive the conveyor intermittently toward the inserting station,

means for disconnecting the pawl and ratchet, means for disconnecting the conveyor from said first shaft,

means for disconnecting the inserting station mechanism from said driving means,

alternative means for driving said conveyor toward said collated material delivery extension including a second shaft mounting the conveyor,

and means for selectively coupling said second shaft with the alternative driving means in coordinated relation with operation of said gripper arms by said first drive means.

9. An inserter as defined in claim 8, in which said alternative driving means include a powered shaft, and means disconnectably coupling said second shaft with said powered shaft.

10. An inserter as defined in claim 8, in which said means for disconnecting the inserting station mechanism include a driven shaft, a rotary driving member freely rotatably mounted on the shaft, a hub corotatably mounted on the shaft alongside said rotary driving member, and coupling pin means carried by the hub and selectively operable to engage and couple the hub and member or disengage and uncouple the hub and member.

11. An inserter as defined in claim 10, including indexing means on said rotary member and on said hub arranged to be matched to assure proper coupled relation of the member and hub.

12. An inserter including an elongated insert track, an inserting station at one end of the track, a collated insert delivery extension at the opposite end of the track,

means for depositing a series of articles onto the track, means for selectively transporting the articles toward either end of the track,

means for driving the transporting means toward one end of the track,

means for driving the transporting means toward the opposite end of the track,

and alternatively operable means coordinated in operation with the transporting means for selectively coupling said transporting means with either of said driving means.

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