Jan. 23, 1951 H. D. FORSE 2,539,013

SELECTOR CONVEYER APPARATUS

Filed Aug. 9, 1946 5 Sheets-Sheet 1

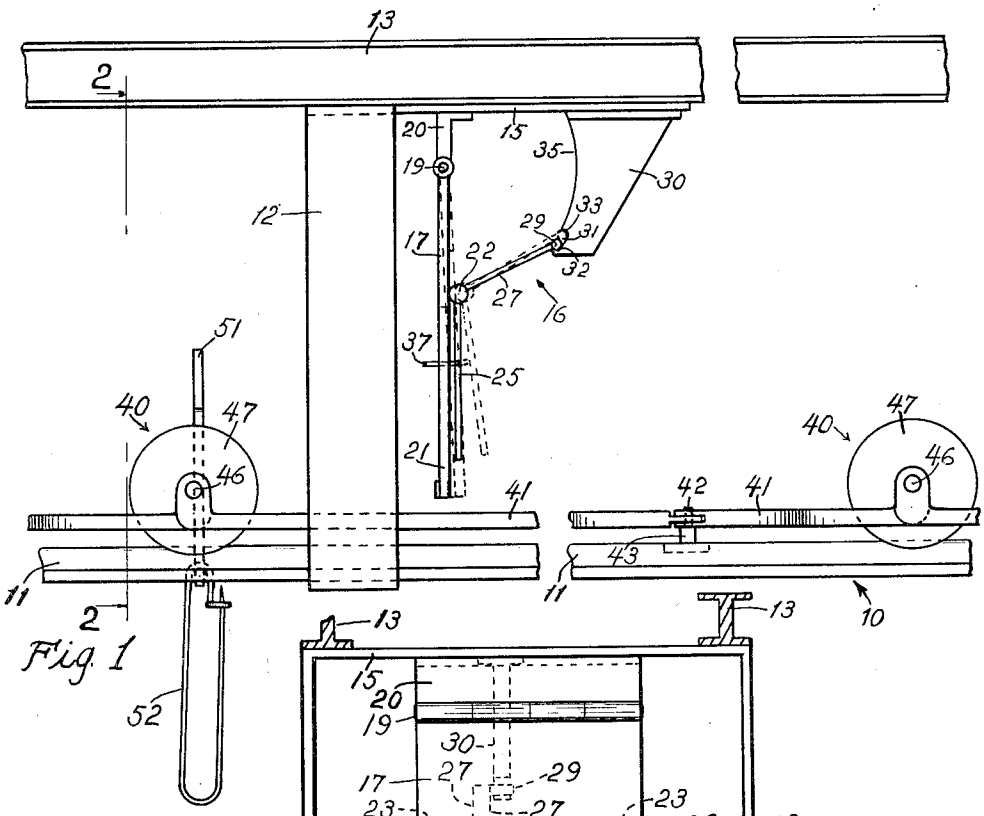


Fig. 1

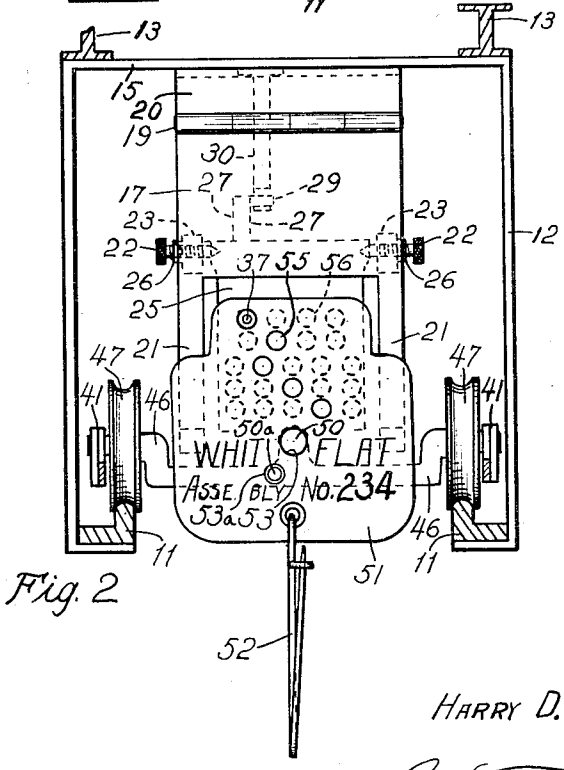


Fig. 2

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SELECTOR CONVEYER APPARATUS

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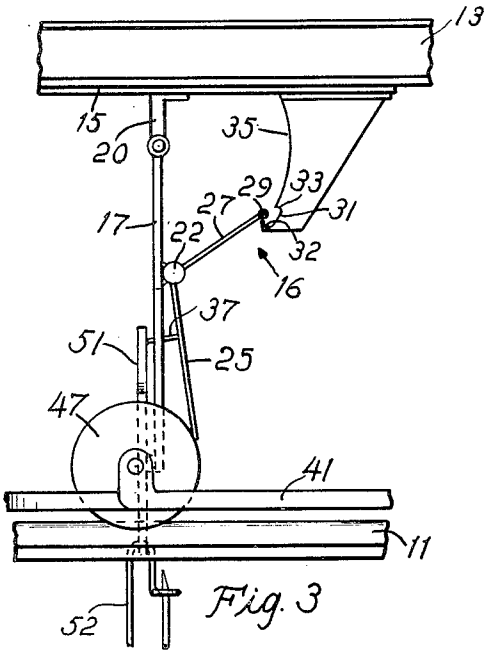


Fig. 3

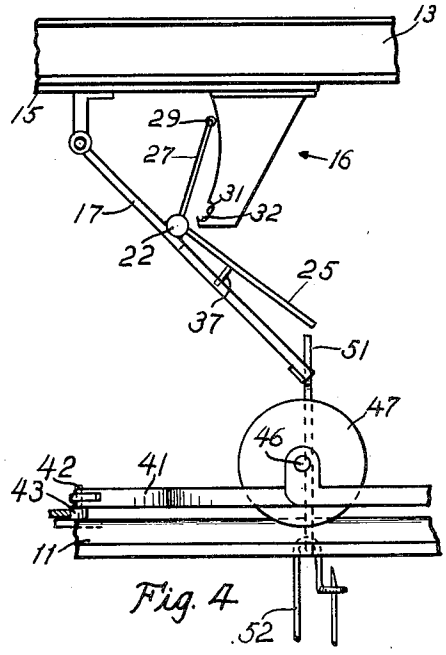


Fig. 4

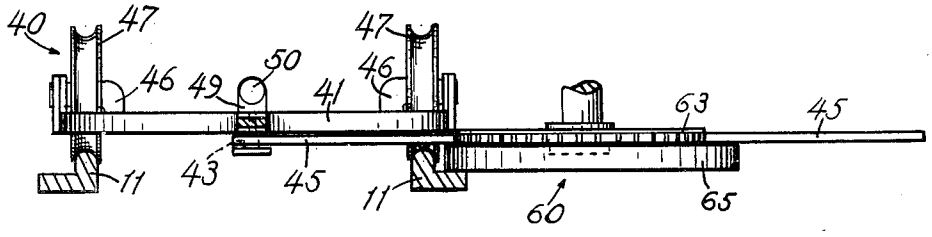


Fig. 5

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SELECTOR CONVEYER APPARATUS

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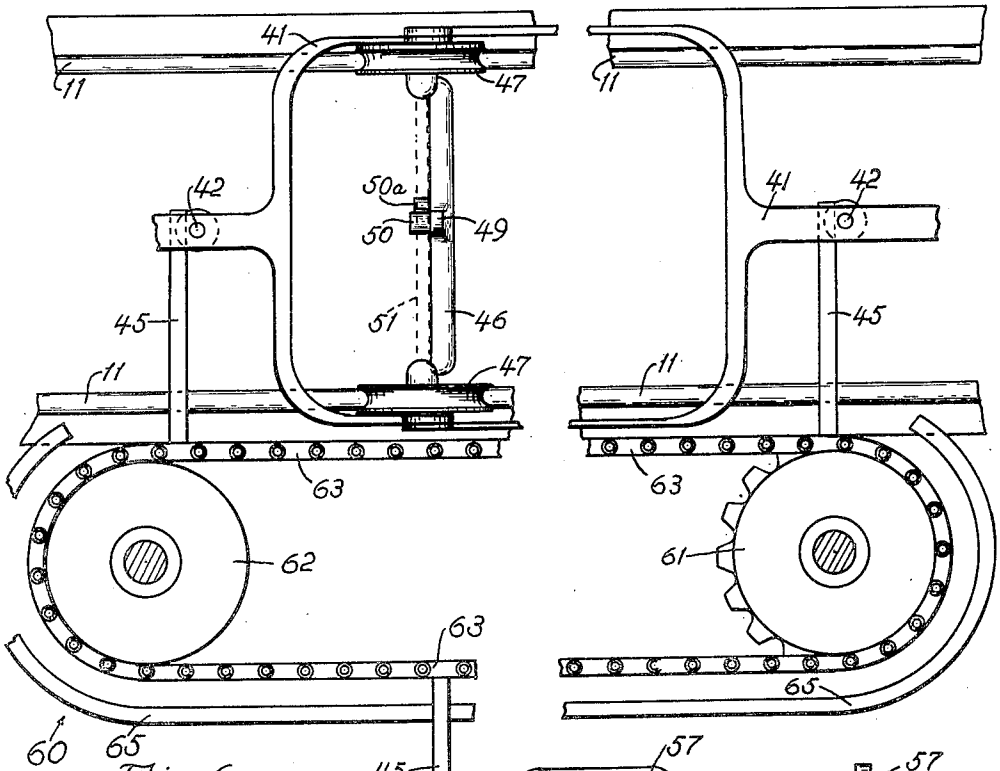


Fig. 6

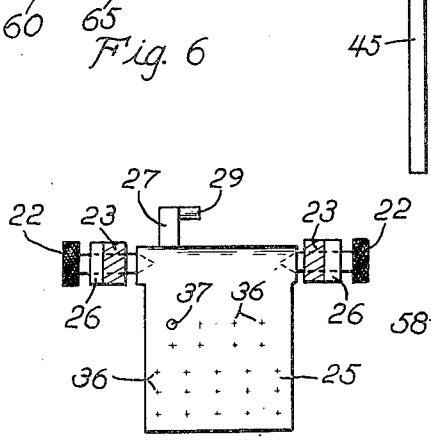


Fig. 7

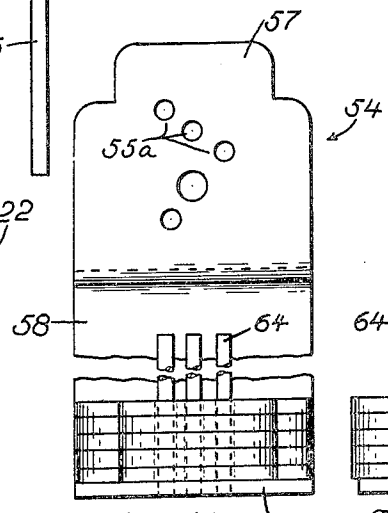


Fig. 16

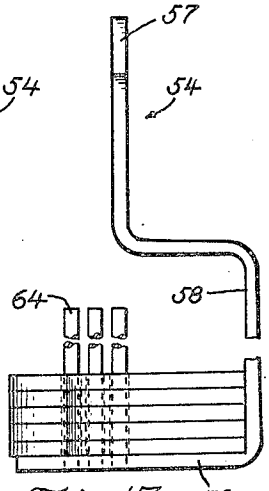


Fig. 17

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SELECTOR CONVEYER APPARATUS

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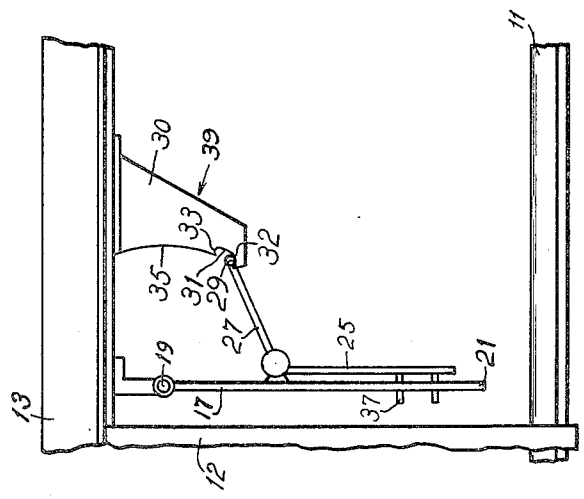



Fig. 12

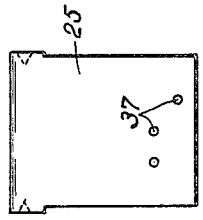



Fig. 11

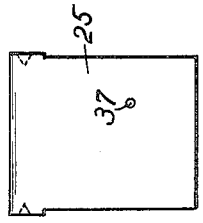



Fig. 10

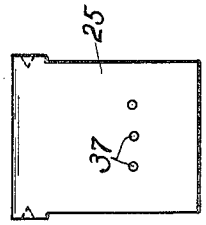



Fig. 8

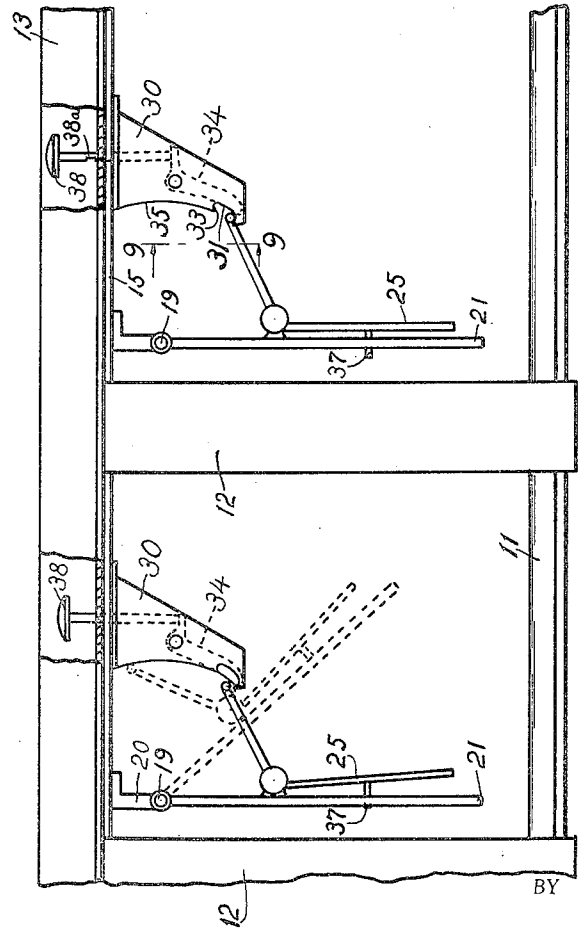
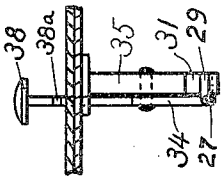



Fig. 9

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SELECTOR CONVEYER APPARATUS

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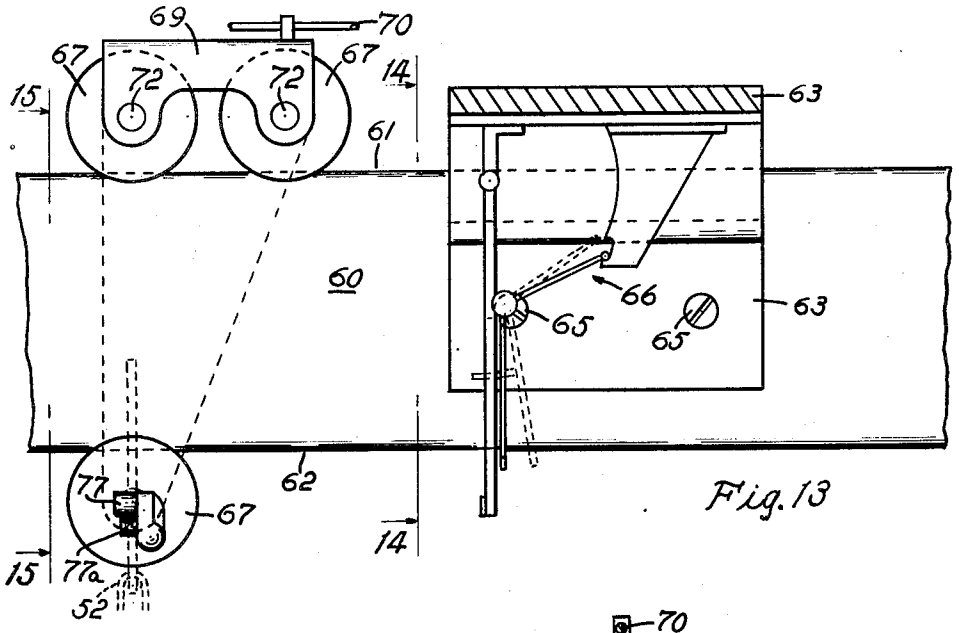


Fig. 13

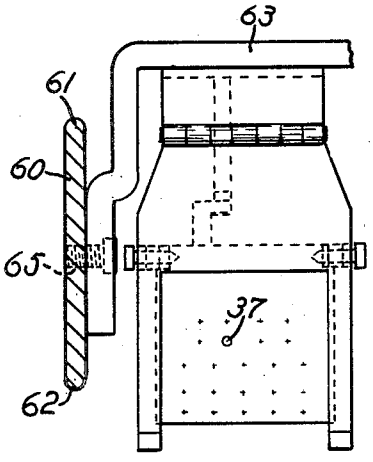


Fig. 14

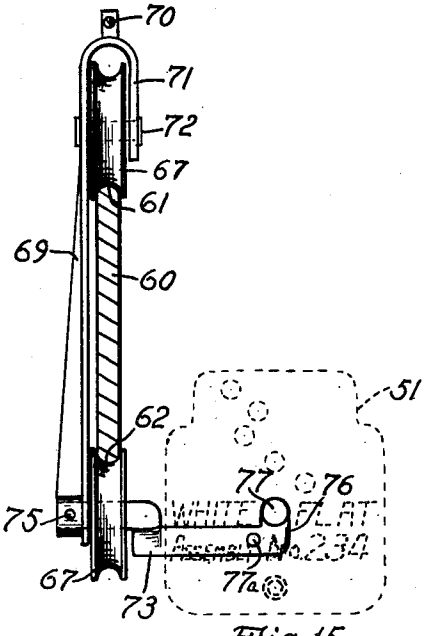


Fig. 15

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Patented Jan. 23, 1951 2,539,013

# UNITED STATES PATENT OFFICE

2,539,013

## SELECTOR CONVEYER APPARATUS

Harry D. Forse, Anderson, Ind.

Application August 9, 1946, Serial No. 689,616

1 Claim. (Cl. 198—38)

1

Various kinds of selector conveyor apparatus and marking devices for identifying the articles of different customers have from time to time appeared on the market. The apparatus and devices had for their primary object the proper reassembly of each customer's goods after washing, ironing or other processing had been completed.

In the present invention one of the primary objects of advantage and importance is the provision of means for designating an itinerary during the initial sorting and classifying of the articles of each customer's bundles and of controlling the movement of the articles through the various portions of the designated route to a final assembly station. During the progress of any article, or bundle of articles, over the designated route it may be automatically discharged from the conveyor at one or more designated processing stations.

A further object of importance and advantage is to provide a simple, efficient and foolproof method and means for classifying, identifying and routing customer's bundles in batches of a given number from a receiving zone to a final assembly zone and of permitting bundles of one batch only to be discharged at the final assembly stations during such run. For instance, if during the running of one batch, a bundle from a second batch approaches the final assembly zone it is automatically discharged from the conveyor before reaching its final assembly destination.

A further object of importance of the improved apparatus of this invention is the provision of means for designating a plurality of stations at which a bundle is to be discharged from the conveyor and of manually adjustable means for selectively discharging the bundle before it reaches its designated final station.

Still another object of advantage and importance resides in the provision of means whereby the initial classifying operator routes the bundles, to designated processing stations at which they are automatically discharged for processing, and to a final destination for inspection and packaging, at a single preliminary operation.

An additional object of importance is the provision of means for providing an automatic discharge conveyor apparatus of a relatively few and simple cooperating parts which require a minimum of attention, servicing or adjustment. Moreover, coacting parts are designed to be factory adjusted to insure proper functioning and to obviate haphazard and faulty installation.

Additional objects of advantage and importance will become apparent as the following de-

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tailed description progresses, reference being had to the accompanying drawings, wherein

Figure 1 is an elevational view of a fragmental portion of a selector conveyor apparatus which embodies the invention.

Figure 2 is a vertical section taken on line 2—2 of Figure 1 looking in the direction indicated by the arrows.

Figures 3 and 4 are elevational views of the trip mechanism showing its movement to ineffective tripping position.

Figure 5 is an end view, partly in section, of the conveyor and driving mechanism more fully illustrated in Figure 6.

Figure 6 is a top plan view of a portion of the improved conveyor and driving mechanism therefor, portions being broken away.

Figure 7 is a front elevational view of a trip plate upon which locations for the various trip pins are indicated.

Figure 8 is a side elevational view of a portion of the improved conveyor including a portion of a collective selector station and a final assembly trip station, portions being broken away.

Figure 9 is a vertical section of a selector trip actuator taken on line 9—9 of Figure 8 looking in the direction indicated by the arrows.

Figures 10 and 11 are front elevational views of selector trip plates showing trip pins in some of the various locations.

Figure 12 is a front elevational view of a final assembly trip plate.

Figure 13 shows a slightly modified form of the invention as applied to monorail conveyor.

Figure 14 is a vertical section taken on line 14—14 of Figure 13, looking in the direction indicated by the arrows.

Figure 15 is a vertical section taken on line 15—15 of Figure 13 looking in the direction indicated by the arrows.

Figure 16 is a front elevational view of an identification disk holder with a plurality of disks positioned thereon.

Figure 17 is a side elevational view thereof.

The reference numeral 10 indicates generally the improved conveyor of the present invention. In the preferred embodiment of the invention the conveyor 10 includes a pair of spaced rails 11 supported by brackets 12 which in turn are suspended from a pair of I-beams 13 or other suitable frame work. The brackets 12 which are factory formed to accurately control the lateral and vertical spacing and positioning of the rails 11, may be secured to the I-beams 13, or other framework, in any suitable manner.

Formed of the upper portion of certain brackets

12 is a plate-like portion 15 to which a selector trip mechanism 16 is fixed. The trip mechanism 16 is preferably factory fabricated to accurately position the parts and also to prevent tampering and misalignment during installation and use as will hereinafter more fully appear. The trip mechanism includes a brushoff plate 17 which is pivotally secured as at 19 to a boss 20 depending from plate 15. The lower portion of the brushoff plate 17 is bifurcated, as is best shown in Figure 2, and the forked portions 21 extend to a point slightly above the plane of the parallel rails 11. The brushoff plate 17 being pivoted at 19 may be rotated from a vertical position, as shown in Figures 1 and 3, to the angular position in which it is shown in Figure 4.

Adjustably secured to the rear surface of each brushoff plate 17 by centering screws 22 extending through bosses 23 is a trip plate 25. Suitable lock nuts 26 are provided to prevent rotation of the centering screws 22 so that once adjusted the trip plate 25 is secured against lateral displacement. The trip plate 25 may be rotated from the full line position in which it is shown in Figure 1 to the dotted line position shown in the same view or to the positions in which it is shown in Figures 3, 4 and 8, for purposes hereinafter more fully disclosed.

Projecting rearwardly from the upper portion of each trip plate 25 is an arm 27 to the outer extremity of which a roller 29 is operably attached. The arm 27 and trip plate 25 form a bell crank which functions as a trigger in controlling the rotational movement of the brushoff plate 17.

Fixed to the plate 15 and spaced from the boss 20 is a cam member 30. The cam member 30 is provided with a lower cam surface 31 which terminates in abutments 32 and 33 and an upper cam surface 35. The roller 29 functions as a cam follower and during its engagement with cam surface 31 operates, upon counterclockwise rotation of plate 17, to rotate plate 25 counterclockwise relative to plate 17 until movement of both plates is arrested by engagement of the roller 29 with the abutment 33. The engagement of the roller with cam surface 35 functions to maintain the plate 25 in its counterclockwise limit position during rotation of plate 17 for reasons hereinafter more fully explained. Certain of the cam members 30 are provided with manually actuated means for rendering the roller 29 ineffective to engage the cam surface 31 or the abutments 32 or 33. This comprises a bell crank 34 pivoted to the cam 30 and rotatable upon handle 38 being depressed, to move the roller 29 clear of the cam 30. Notches 38a in the handles 38 and engageable with the plate 15 or the member 13 provide a means for securing the bell crank 34 in one of its limit positions. These certain cam members 30 comprise a selector 39 which is positioned ahead of the final assembly zone.

Riveted or otherwise affixed to each trip plate 25, at any of the positions indicated by the cross lines 36 in Figure 7, is one or more trip pins 37. The pins 37 in each trip plate 25 are arranged in different positions or combinations to designate different stations or classifications of goods. For instance pins 37 located in the uppermost row of cross lines 36, as shown in Figure 7, indicate a primary station or classification of goods to be discharged there: Pins located in the second row of cross lines 36 as illustrated in Figure 7, indicate an intermediate processing station: Pins located in the third row, as illustrated in Figures 10 and 11 indicate the hundreds digit of the final assembly member and these plates are positioned on selector discharge units shown in Figure 8, immediately ahead of the final assembly stations: Pins located in either of the bottom two rows, as shown in Figure 12, indicate the last two digits of the final assembly number. The pins 37 are disposed to extend between the tines of the bifurcated portion 21 of the brushoff plate 17 and therebeyond as is clearly shown in the drawings. It is to be noted that movement of the pins 37 to the right, as illustrated in Figure 3, will cause rotation of the trip plate 25 and movement of the roller 29 from engagement with the cam surface 31 thereby permitting rotational movement of the brushoff plate 17 to the position in which it is shown in Figure 4.



Operably positioned on the rails 11 of the conveyor 10 is a plurality of carriages 40 which are joined one to another by suitable links 41. The links 41 are preferably joined one to another by pivot pins 42 which have portions 43 adapted to be engaged by driving members 45.

Each carriage 40 comprises a drop axle 46 upon each end of which a rail engaging wheel 47 is journalled. The ends of the axle 46 extend through the wheels 47 and provide an attaching boss to which the link members are affixed as is clearly shown in the drawings. Projecting upwardly from the control portion of each drop axle 46 is a box 49 which carries a horizontally disposed stud 50 which is adapted to receive and carry a selector identification disk 51. Fixed to the axle 46 on a plane below and to one side of the stud 50 is a pin 50a. The pin 50a extends parallel to the stud 50 and functions in a manner hereinafter more fully disclosed. It is to be noted that the axis of the stud 50 is on a plane with the axis of the bearing portions of the axle 46 and also that the ends of the bifurcated portions 21 extend below this plane, consequently the ends of the members 21 may exert a centered straight line thrust upon the selector disk 51 to force it from the supporting stud 50.

The selector disks 51 may be formed of any suitable material or shape and also may be colored or marked or both for easy identification. Each disk 51 is provided with an aperture in which securing means, such as a safety pin 52, or the like, may be removably positioned and to which articles may be detachably secured. A relatively large aperture 53 is provided whereby the disk 51 may be positioned on a stud 50, and a somewhat smaller aperture 53a is located in each disk 51 slightly below and to one side of the large aperture 53, which in addition to cooperating with pin 50a to prevent misalignment and rotation of disk 51 also prevent a reverse application of that member to the stud. Additionally, the disks are provided with other apertures 55, in any of the locations shown by dotted circles 56 in Figure 2, to indicate classification of the articles carried and the destinations therefor. The disks 51 are made up in groups of a given number wherein each disk thereof is provided with similarly located apertures designating a final destination at which the disk 51 will be discharged from the carriage 40. This similar arrangement of apertures 55 corresponds to the last two digits of the final assembly number marked on the disk and is confined to the two lowermost lines of circles 56. The circles in the third line from the bottom are preferably employed to indicate the hundreds digit of the marked assembly number. However it is to be noted that the assignment of the particular assembly numbers to the vari-

ous combinations or subcombinations of apertures employed is arbitrary. The fourth row of circles from the bottom of the disk is preferably employed to indicate an intermediate processing station as for example flat work ironer, press or the like. This destination or an abbreviation therefor may be marked on the disk as shown in the drawing. The topmost row of circles 56 is preferably used to classify the articles and to indicate the first processing station therefor, as for instance "white," "colored," "silk," "wool," or the like, with the suffix "wash" understood, which classification may be marked on the disk as shown in Figure 2. The lowermost aperture 53*a* is positioned to register with the pin 50*a* only when the disk 51 is presented with the proper face opposing the axle 46. If the disk 51 is reversed the engagement of the end of the pin 50*a* with the surface of the disk prevents that member from being affixed to stud 50.

The diameter of the apertures 53 in the disks 51 is substantially greater than the diameter of the pins 37 in order that even considerable misalignment of the parts will not impair their operating efficiency. Additionally it is to be noted that aperture 53 alone is of sufficient size to receive stud 50; consequently the disk 51 may be attached to the carriage 40 only in the single manner provided.

As previously stated, the identification disks 51 are made up in groups of a given number. There are approximately twenty disks in each group and each has the same arrangement of apertures representing a single final assembly number. A holder 54 is provided for each group of disks and each holder has a vertical upper portion 57, similar in formation to the disks 51, and a lower offset portion 58 terminating in a horizontal shelf 59, as is best shown in Figure 17. The upper vertical portion of each holder is apertured, as at 55*a*, to indicate a final assembly number which may be inscribed thereon. The vertical portion of each holder 54 is also apertured to receive a stud 50 and a pin 50*a* previously described to insure its proper attachment to a carriage for transportation from the receiving station to a final assembly station.

The horizontal shelf 59, which is approximately the same size as the disks 51, is provided with a plurality of upwardly projecting pins arranged in plan to correspond with the arrangement of the apertures 55*a* in the upper portion of the holder 54. It will therefore be apparent that only disks having the same arrangement of final assembly apertures may be threaded upon the pins 64 and be carried by the holder.

Positioned closely adjacent the conveyor 10 and paralleling a portion thereof is a drive mechanism 60. In the preferred embodiment of the invention the drive mechanism comprises a driven sprocket 61 and a sheave 62 with which a drive chain 63 is operably associated, as is best shown in Figure 6. The chain 63 is provided with a plurality of driving members 45 which upon operation of the drive mechanism 60 are adapted to engage portions 43 of pivot pins 42 and thereby impart operable movement to the link joined carriages 40. Where it is so desired a supporting and guide rail 65 may be provided to prevent sagging of the chain 63 and driving elements 45 attached thereto.

*Operation*

In the operation of the improved apparatus above described, it is to be assumed that the conveyor extends from a receiving zone through various processing zones to a final assembly zone and return. Bundles delivered to the receiving zone comprise various articles which require different processing treatment. Accordingly the articles in each bundle are divided and classified as to material and processing and are also given a final assembly number. Now the operator selects a holder 54 having a complete group of identification disks 51 thereon. From this holder the proper disks are removed to properly classify and route the various articles. The remaining disks are positioned upon the holder 54 and that member with its load is dispatched to its final assembly station, while the classified and tagged articles are started on their various routes.

Assume now that the batch of articles being run are all given final assembly numbers between one hundred and one hundred ninety-nine. In this event the operator depresses the handle 38 of a cam member of the selector 36 having trip pins 37 adjusted to discharge disks in the one hundred group. As a result the bell crank 34 is rotated to move the roller 29 from the cam surface 31 which now permit the brushoff plate to rotate freely upon being engaged by an identification disk 51 regardless of the registering positions of the trip pins 37 in plate 25 and the apertures 55 in disk 51.

As the classified and tagged articles arrive at their designated processing stations the pin or pins 37 of the trip plate 25 enter a correspondingly located aperture in the disk 51, and the disk continuing its movement engages the brushoff plate 17 which rotates slightly, thereby causing the roller 29 to follow cam surface 31 to abutment 33 which movement rotates the plate 25 and arm 27 and causes the pin to be withdrawn from its registering aperture. As the roller 29 engages the abutment 33 rotational movement of the plate 17 is arrested and the continued movement of the carriage forces the disk 51 from the stud 50 to discharge the load for processing. Upon the processing at any of the stations being completed the article is again attached to a carriage by the same disk to resume its journey.

When a carriage carrying a disk approaches a station not designated on the disk, the leading surface of the disk 51 engages the pin 37 and thereby rotates the trip mechanism lifting the roller 29 from engagement with cam 30 and thereby permits the rotation of the plate 17 as the carriage passes therebeneath as shown in Figures 3 and 4. The exception to this is that when a carriage carrying a disk having apertures positioned to register with pins of a trip plate approaches a station wherein the handle 38 of the cam 30 has been depressed, in this event the brushoff plate is rotated and the carriage and disk pass therebeneath as would be the case if the aperture and pin did not align. When the carriage approaches the final assembly station indicated by its disk, the pins of the trip plates enter the apertures of the disk and the load is discharged as above explained.

As each article or load is delivered to the final assembly station, an operator removes the disk therefrom and positions it upon the previously delivered holder 54. When the stacked disks 54 reach a given point on the pins or offset portion, the operator is aware that all of the articles of the customer's bundle have been delivered to the final assembly station. Consequently, the articles are wrapped for delivery and the holder 54 is positioned on the conveyor for re-

turn to the initial station. A brushoff plate 17 or other suitable device may be employed at this station to discharge the return disk holders.

Following the dispatching of the last of one batch from the receiving station a time interval is allowed for the clearing of the processing stations before a second batch is started. The same steps are now followed as previously except that final assembly numbers now range through the two hundred group and the handle of the one hundred group selector is elevated while the handle of the two hundred group selector is depressed. Succeeding batches may be dispatched as above described.

*Modification*

The improved method and means for controlling the flow of articles to designated processing and final assembly stations is not necessarily confined to the above described type of conveyor but may be used in conjunction with other conveyors as for instance a monorail conveyor. By way of illustration such an arrangement is shown in Figures 13, 14 and 15.

In the modified arrangement the reference numeral 60 indicates a monorail track having upper and lower wheel engaging surfaces 61 and 62 respectively. The track 60 may be supported by any suitable means as for instance bracket 63 which is attached to the central portion of the rail 60 by screws 65 or the like.

Secured to the bracket 63 by any suitable means is a tripping mechanism indicated generally by the reference numeral 66. Inasmuch as the tripping mechanism is precisely the same as the ones previously described, the description need not be repeated.

Operably positioned on the track 60 and having two wheels 67 engaging the upper wheel engaging surface 61 and one wheel 67 the lower surface 62 is shown one of a plurality of carriages 69. The carriages are spaced one from another and are joined by a cable 70. The carriages 69 are the same throughout so a description of one will suffice for all.

The upper portion of the frame of the carriage is turned upon itself and spaced therefrom as at 71 to provide supporting means for the axles 72 of the upper wheels 67. The lower portion of the frame 69 is apertured to receive the end portion of a stub shaft 73 which is secured therein by a pin 75. The shaft 73 also provides an axle upon which the lower wheel 67 rotates.

The stub shaft 73 is offset, as is best shown in Figures 13 and 15, and the free end thereof is provided with an upstanding boss 76. Fixed to the boss 76 and extending horizontally therefrom is a stud 77 upon which an identification disk 51, shown in dotted lines, may be detachably positioned. Secured in the stub shaft 73 below and to one side of stud 77 is a pin 77*a*, which is substantially identical to pin 53*a* in the preferred embodiment.

In the modified embodiment here disclosed the disks 51 and trip mechanism 66 are substantially identical in both construction and use with their counterparts shown in the preferred embodiment, accordingly their manner of operation and construction should be understood by reference to the previous description.

It will be apparent from the foregoing that herein is provided a highly efficient, simple and flexible selector conveyor apparatus which is especially adapted to control the dissemination of articles to various predetermined processing stations and then to control the reassembly of the articles at a single predetermined final assembly station. Moreover, the improved apparatus is capable of so disseminating and reassembling innumerable groups of articles accurately and dependably without any change, alteration, or adjustment in the apparatus.

As it will be apparent to those skilled in the art to which the improved apparatus appertains that numerous changes and widely different embodiments of the invention may be made without departing from the spirit and scope thereof, it is intended that the embodiments disclosed shall be interpreted as illustrative only and not in a limiting sense. Reference is, therefore, to be had to the appended claims for definition of the limits of the invention.

I claim:

In a conveyor having a plurality of discharge stations, means for controlling the discharge of goods carried by said conveyor at certain of said discharge stations, said means comprising a plurality of load carrying perforated disks removably attached to and movable with said conveyor, a plurality of pins positioned at said stations in the path of travel of said disks, certain of said pins and certain of the perforations in said disks being arranged to register to thereby cause the discharge of said load carrying perforated disks at prearranged stations.

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