

Feb. 7, 1961

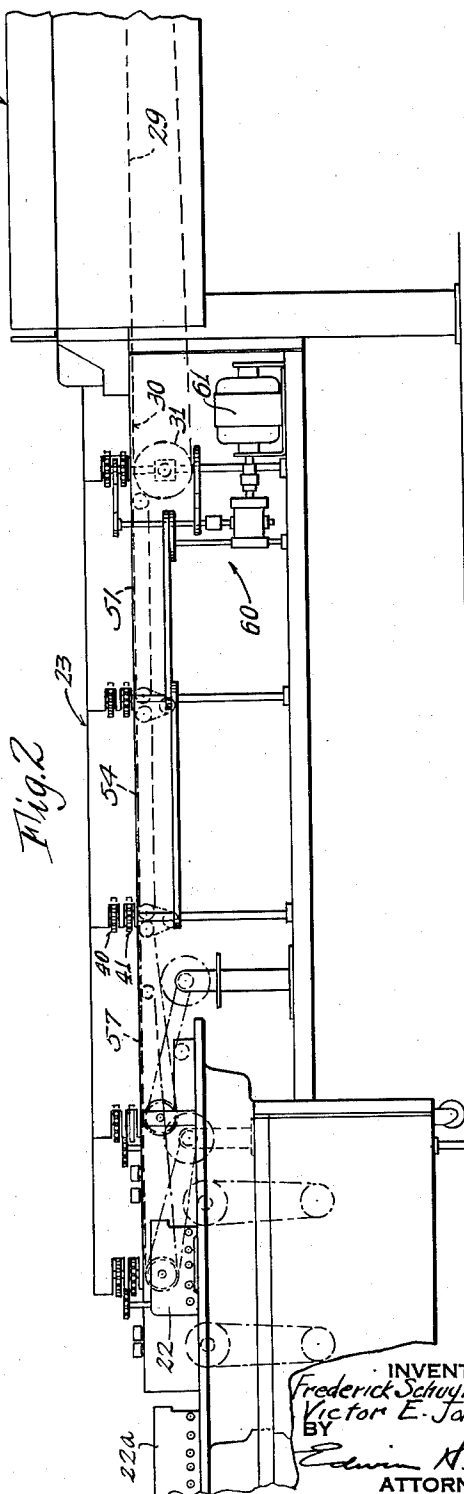
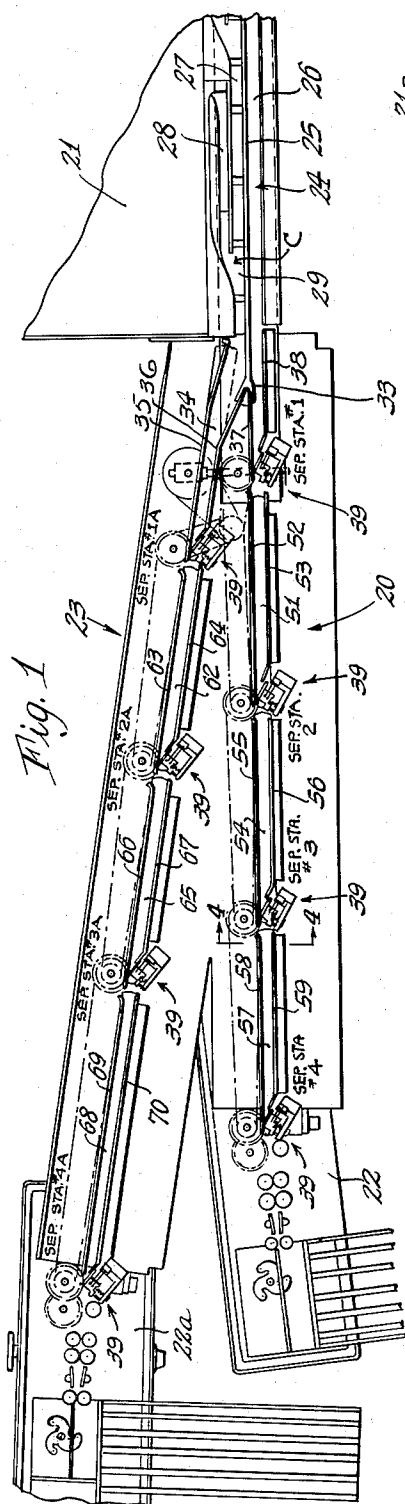
F. S. WARDWELL ET AL

2,970,537

MAIL HANDLING MECHANISM

Filed June 12, 1957

3 Sheets-Sheet 1



INVENTORS
Frederick Schuyler Wardwell
Victor E. Johnson
BY
Edwin H. Owen
ATTORNEY

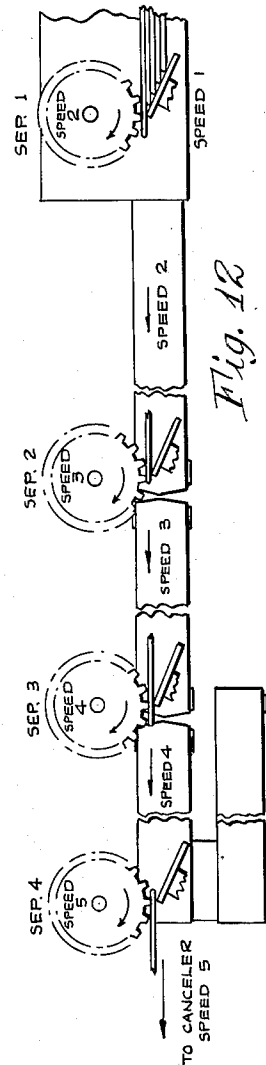
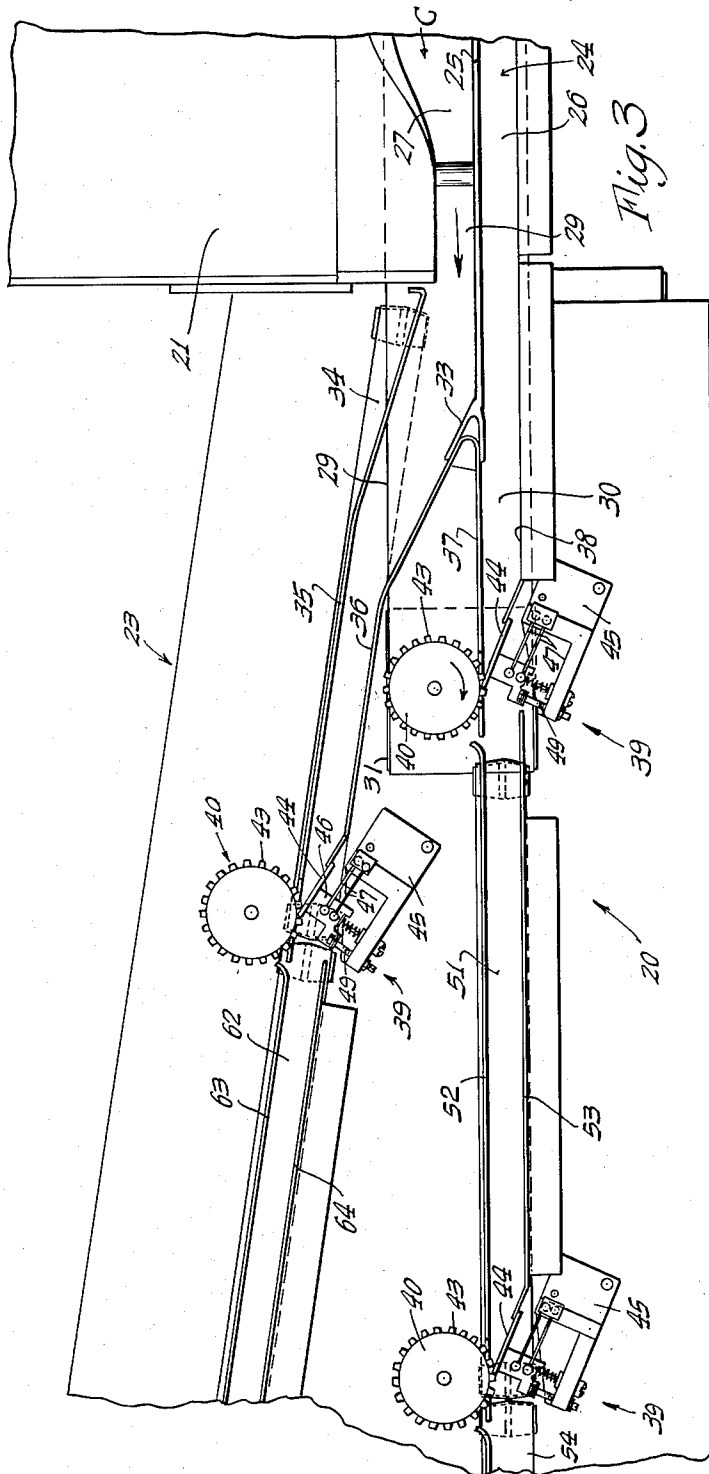
Feb. 7, 1961

F. S. WARDWELL ET AL
MAIL HANDLING MECHANISM

2,970,537

Filed June 12, 1957

3 Sheets-Sheet 2



INVENTORS
Frederick Schuyler Wardwell
Victor E. Johnson
BY
Edwin H. Owen
ATTORNEY

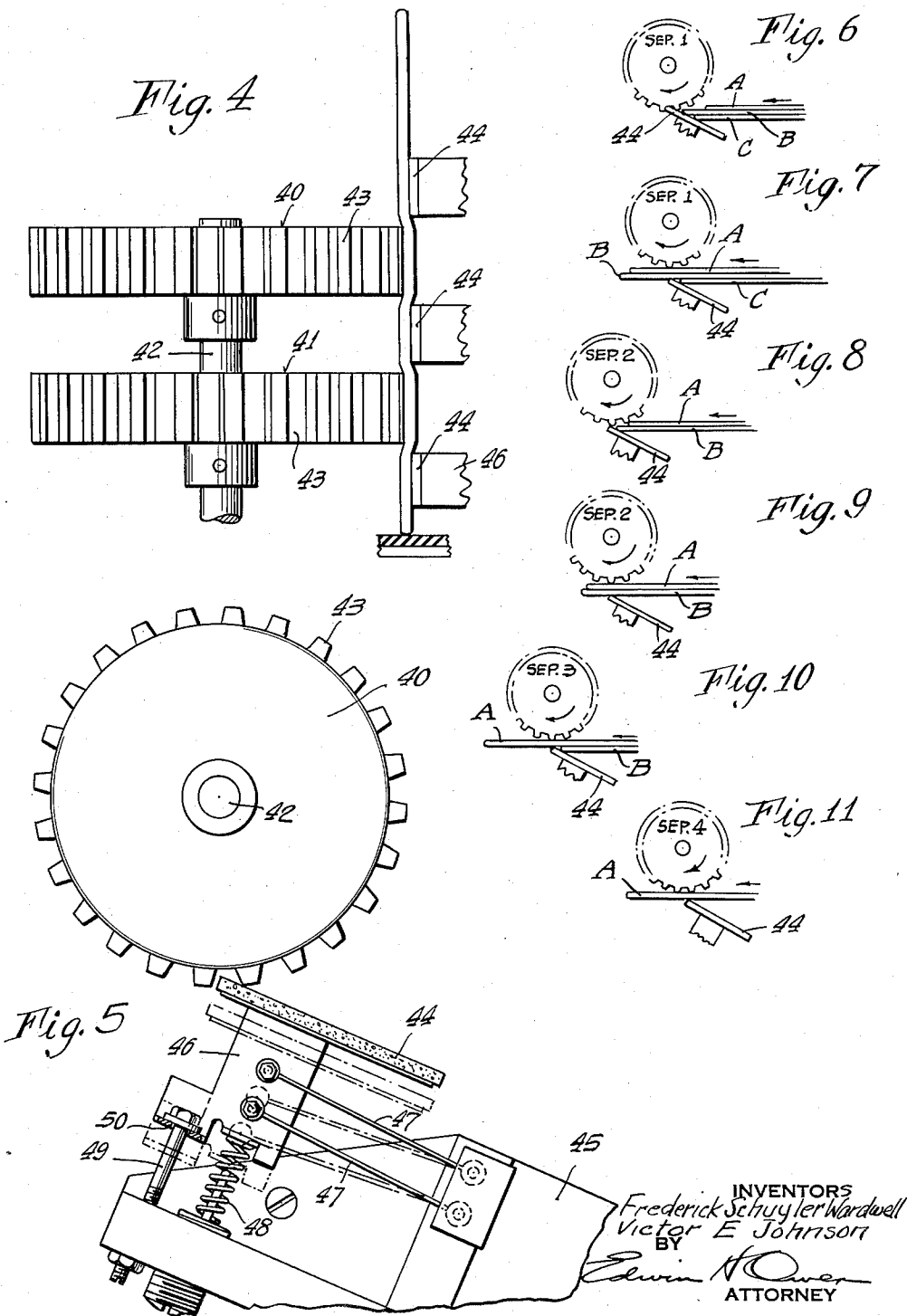
Feb. 7, 1961

F. S. WARDWELL ET AL
MAIL HANDLING MECHANISM

2,970,537

Filed June 12, 1957

3 Sheets-Sheet 3



INVENTORS
Frederick Schuyler Wardwell
Victor E Johnson
BY
Edwin H. Over
ATTORNEY

1

2,970,537

MAIL HANDLING MECHANISM

Frederick Schuyler Wardwell, Darien, and Victor E. Johnson, Norwalk, Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn., a corporation of Delaware

Filed June 12, 1957, Ser. No. 665,336

1 Claim. (Cl. 101—232)

This invention relates to an improved method of handling mail and to a new type of conveying machine for effecting such a mail handling process. More particularly, it embodies a conveyor system which is adapted to receive oriented letters in variously bunched relation from a conventional post office mail sorting table and automatically conditions these letters, previously separated into long letters and short sized letters, for subsequent feeding into, and further processing by, cancelling and stacking machines.

Numerous attempts have been made to mechanize mail handling operations in large post offices. Usually, sacks of mail are dumped on sorting tables along which sorting clerks are stationed to manually separate the letters from the packages and to face the letters for subsequent operation in a stamp cancelling machine.

One or more of the edges of such mail sorting tables are frequently provided with a pair of channels having a conveying belt running thereunder for carrying letters placed thereon to the cancelling machine. The sorting clerks place the long letters in one channel and the short letters in the other of the pair of channels, the respective letters being properly oriented then deposited either singly or in multiple numbers to fall onto the conveying belt. With the edge of each letter adjacent the stamp forming the leading edge and the stamp facing the clerk the letter is in a properly oriented position for processing in the cancelling machine.

It frequently happens, particularly when a number of sorting clerks are working side-by-side, that letters become arranged in a bunched or overlying position, both with respect to letters inserted by one sorting clerk and to letters already placed in the appropriate channels by previous sorting clerks. When these bunched or overlying letters advance to a cancelling machine there is a tendency for two letters to occasionally pass through the cancelling machine as a unit, thereby cancelling only one letter and skipping the other.

These cancelling skips, common to prior methods of mail handling, necessitated individual checking of the processed mail in order to remove uncanceled letters and for subsequent rerunning and/or hand cancelling. Such expensive and inefficient additional processing is completely eliminated by the present invention.

Accordingly, it is an object of the present invention to so process and automatically condition such bunched letters that each letter is individually presented to the cancelling machine in order to avoid the passage of uncanceled letters therethrough.

Additional objects, features and advantages will appear hereinafter as the description proceeds.

In its broadest aspects this invention provides a conveyor system including a plurality of sequentially arranged separating stations, each subsequent station running at a progressively higher speed than its immediately preceding station. This conveyor system is adapted to receive bunched letters from a sorting table and reduce the number of letters in each bunch, with the result that

2

after passing through a predetermined number of separating stations the letters emerge from the conveying device one-by-one and are fed individually to the cancelling machine.

5 The conveyor of the present invention is illustrated herein as used with a mail sorting table merely as exemplary of one of its many applications. It has utility for various other sorting, paper separating or work-performing functions.

10 For purposes of illustration and explanation, the invention is shown in detail in its preferred form in the accompanying drawings, wherein:

Fig. 1 is a plan view of the mechanism of the invention;

15 Fig. 2 is a fragmentary front elevation of Fig. 1;

Fig. 3 is an enlarged fragmentary plan view of a portion of Fig. 1;

Fig. 4 is an enlarged fragmentary vertical elevational view taken in the direction indicated on line 4—4 of Fig. 1;

20 Fig. 5 is a plan view of the structure shown in Fig. 4;

Fig. 6 is a semi-diagrammatic plan view similar to Fig. 5 illustrating bunched letters arriving at the first separator station;

25 Fig. 7 is a view similar to Fig. 6 illustrating bunched letters passing through the first separator station;

Fig. 8 is a view similar to Fig. 6 illustrating bunched letters arriving at the second separator station;

Fig. 9 is a view similar to Fig. 6 illustrating bunched letters passing through the second separator station;

30 Fig. 10 is a view similar to Fig. 6 illustrating how the bunched letters are now reduced to a letter passing through the third separator station;

Fig. 11 is a view similar to Fig. 6 illustrating the single letter passing through the fourth separator station; and

35 Fig. 12 is a semi-diagrammatic plan view of the four separator stations illustrating that there are different speeds from one separator to another that a letter passes through.

40 With respect to the following description, it is to be understood that the printing dies, star wheels and other elements of the cancelling machine are driven by suitable gearing, belts and the like, not shown, and that the trip mechanism for the cancelling machine, likewise, is operated by a conventional and well-known trip finger actuated device; hence it is not believed necessary to show or describe the operation of these devices in detail herein.

As further exemplary of the present invention, the arrangement shown generally at 20 and 23 illustrates an embodiment adapted to convey both long and short letters to their individually associated cancelling machines 22 and 22a, respectively, from the mail sorting table 21.

55 The mail sorting table 21 shown is a conventional type whereon letters are manually sorted from mixed pieces of mail. Adjacent one edge of the sorting table 21, Figs. 1 and 2, is a channelway generally indicated at 24 provided with a partition 25 to form two narrower letter-receiving channels 26, 27. The sorting clerks, standing in front of the channelway 24, drop the long letters into channel 26 and the short letters into channel 27. The short letters are preferably dropped on a downwardly inclined surface 28 which directs them downwardly to a conveyor member generally shown at C. All letters are oriented with the stamped corner at the leading edge and at the bottom.

65 The conveyor member C comprises a single flat belt 29 which extends across both slots 26, 27 engaging the lower edges of the letters and carries them to their respective long and short letter conveying sections 20, 23 for subsequent insertion into their individual cancelling ma-

3

chines 22, 22a. The terminal or end portion 30 of belt 29 extends beyond the discharge end of table 21 and is supported on drive pulley 31. The partition 25 terminates in a forked letter deflector plate 33 overlying end portion 30 of belt 29 for directing the short letters from channel 27 via a divergent path into conveyor section 23 for debunching purposes and ultimately to cancelling machine 22a. The long letters in channel 26 are carried directly into conveyor section 20 for debunching purposes and ultimately to cancelling machine 22.

A relatively narrow belt 34 extends at an angle to belt 29 and has one end thereof substantially coplanar with and underlying the upper flight of the end portion 30 of belt 29. The conveyor section 23 is provided with channel-forming walls 35 and 36, which overlie the opposite edges of belt 34 and form a continuation of the slot 27 as can best be seen in Fig. 3. A second pair of channel-forming walls 37 and 38 overlie the terminal end portion 30 of belt 29 and form a continuation of the sorting table slot 26. These walls 35, 36 and 37, 38 are wide enough to hold the letters upright so that the lower edges of the letters are engaged by the immediately associated belts.

Letter separator stations, indicated generally at 39, are mounted at the exit ends of each belt. The letter separator stations 39 are identical in structure and each includes a pair of letter feed wheels 40, 41, Figs. 4 and 5, carried in vertically spaced relation on a vertical driven shaft 42. The feed wheels 40, 41 are preferably provided with a corrugated peripheral surface 43 for engagement with the surface of an adjacent letter to be moved thereby. The surfaces 43 of the wheels 40, 41 extend slightly into the line of travel of the approaching letters. To retard the travel of a portion of a group of bunched letters moving in the conveyor section 23, a plurality of ceramic or abrasively faced pads 44 are vertically spaced and spring biased to press one edge against wheels 40, 41 while being set at an angle across the path of travel of the approaching letters. A base block 45, detachably secured to the conveying mechanism 23, provides a mounting for the pads 44, each of which pads is carried on a bracket 46 connected to the base block 45 by parallel linkage 47. Spring 48 normally biases bracket 46 and the associated pad 44 against the wheels 40, 41. A limit bolt 49 arrests the spring biased movement of each of the pads 44 toward the wheels 40, 41 and is adjustably mounted in base block 45 at one end and engages aperture 50 in bracket 46 at the other end. Letters coming into contact with the separator pads 44 are directed into engagement with the corrugated surfaces 43 of the wheels 40, 41 so that the letter engaged thereby can be advanced. In one exemplification the pads 44 are arranged to dovetail between the wheels 40, 41, Fig. 4, to increase the pressure and the effective letter separating action on bunched letters passing therebetween.

The separator station 39 positioned adjacent the end of the channel-forming walls, 37, 38 is designated as separator station #1 and the separator 39 positioned at the end of the channel-forming walls 35, 36 is designated as letter separator station #1A.

A flat belt 51 extends outwardly from separator station #1 to a second separator station designated #2 in general alignment with the belt 29. A pair of spaced parallel channel-forming walls 52, 53 are arranged in overlying relation to the belt 51. A belt 54 and an associated pair of channel-forming walls 55, 56 extend between separator station #2 and a third separator station designated #3. A flat belt 57 and spaced parallel channel-forming walls 58, 59 associated therewith extend between separator station #3 and a fourth separator station designated #4. Drive means, generally indicated at 60, including a drive motor 61, is provided for moving the belts 29, 51, 54 and 57.

A flat belt 62 along with associated spaced parallel

4

channel-forming walls 63, 64 extend between separator station #1A and a second separator station designated #2A. A flat belt 65 and its associated spaced parallel channel-forming walls 66, 67 extend between separator station #2A and a third separator station designated #3A. A flat belt 68 and its associated spaced parallel channel-forming walls 69, 70 extend between separator station #3A and a fourth separator station designated #4A. The separator wheels 40, 41 of separator units 39 at the separator stations #1, 2, 3, 4, 1A, 2A, 3A and 4A, as well as the belts 34, 62, 65 and 68 are all driven by appropriate means from the motor 61. The drive means 60 is arranged to drive the belts 29 and 34 at one linear speed. The letter feeding wheels 40 and 41 in the separator stations #1 and #1A, and the belts 51 and 62 are driven at a uniform speed somewhat greater than the speed of belts 29 and 34. The letter feeding wheels 40 and 41 of separator stations #2 and #2A, along with the belts 54 and 65 are driven at a somewhat greater speed than the belts 51 and 62. The letter feeding wheels 40 and 41 in the separator stations #3 and #3A, along with the belts 57 and 68 are driven at a somewhat greater speed than the belts 54 and 65, and finally the letter feeding wheels 40 and 41 in the separator stations #4 and #4A are driven at a somewhat greater speed than the belts 57, 58. The speed of rotation of the last named feeding wheels 40 and 41 is preferably equal to the speed of rotation of the cancelling machine feed rollers.

The operation of the separator stations together with the detailed steps of letter feeding and separating are readily understood by referring to the semi-diagrammatic step-by-step views shown in Figs. 6-11. A completely sequential series of steps illustrating the travel of a bunched group of letters from the letter sorting table 21 through channel 20 and culminating in the letters being individually fed to the cancelling machine are shown semi-diagrammatically in Fig. 12.

The bunched group of letters A, B and C, Fig. 6, arriving at the #1 separator station and striking the abrasively faced pads 44 may pass more than one letter (i.e. two, in this instance) to the next or #2 station, as shown in Fig. 7. This may happen again at separator station #2, Figs. 8 and 9, where two letters are again passed therethrough. However, at each station, the letter A immediately adjacent the feed wheels 40 and 41 will be advanced a little over the letter B, immediately adjacent the abrasively faced pads 44. At separator station #3 the separation of letters A and B is positively effected and a single letter, A, is fed through station #3, Fig. 10, and passed on to the next or #4 station. Finally, the separation is shown as restricted to a single letter A at the fourth or last point of separation in Fig. 11.

The association of varying drive or feeding wheel speeds and belt speeds is shown in Fig. 12, where greater speeds are indicated by numerals 1 through 5 in increasing order, and in that progressive sequence, to clearly demonstrate the letter acceleration feature and accompanying separation steps of this invention, whereby a processed letter or a bunched group of letters is enabled gradually to reach its top speed, that is the speed of the cancelling machine, and the passage of letters is restricted at the last separation station to a single letter, which is individually fed to the cancelling machine. This enables the cancelling machine to operate at its highest efficiency, at full speed capacity and without allowing more than one letter at a time to pass the cancelling die. The accelerated speed differential also effects an increased separation as the outermost letter advances from one separator station to the next thus assuring that upon reaching the cancelling machine the letter will be well in advance of the one following.

While in order to comply with the statute the invention is described in language which is rather specific as to structural features and arrangements, it is to be un-

5

derstood that the invention is not limited to the specific details shown, but that the means and method herein disclosed comprises the preferred of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the scope of the language employed in the appended claim.

What is claimed is:

In a device for cancelling mail, the combination with a mail supply table having a conveyor adapted to receive letters on edge and including a channel to guide said letters, of a cancelling machine in the path of said channel for cancelling stamps on said letters as delivered thereto, a plurality of separator stations along said channel, each separator station including a letter feed roller and a separator element cooperating therewith, each separator station also being spaced a sufficient distance apart to allow the trailing end of one letter to move beyond the feed roller of one station before the leading end

6

reaches the feed roller of the succeeding separator station, a driven conveyor between each separator station, and means to move each successive conveyor at an increased speed starting with the first conveyor to receive letters, whereby letters may advance to the first station in the channel in a bunched or overlying order and become debunched as the letters pass from one separator station to another so as to be finally restricted to a single letter before reaching the cancelling machine.

References Cited in the file of this patent

UNITED STATES PATENTS

650,410	Morin	May 29, 1900
1,482,752	Bombard et al.	Feb. 5, 1924
2,113,078	Campbell	Apr. 5, 1938
2,737,885	Persson et al.	Mar. 13, 1956