Feb. 13, 1968 G. P. COPPING ETAL 3,368,701

SERIATIM PRESENTATION OF ARTICLES FOR VIEWING

Filed Oct. 12, 1965 4 Sheets-Sheet 1

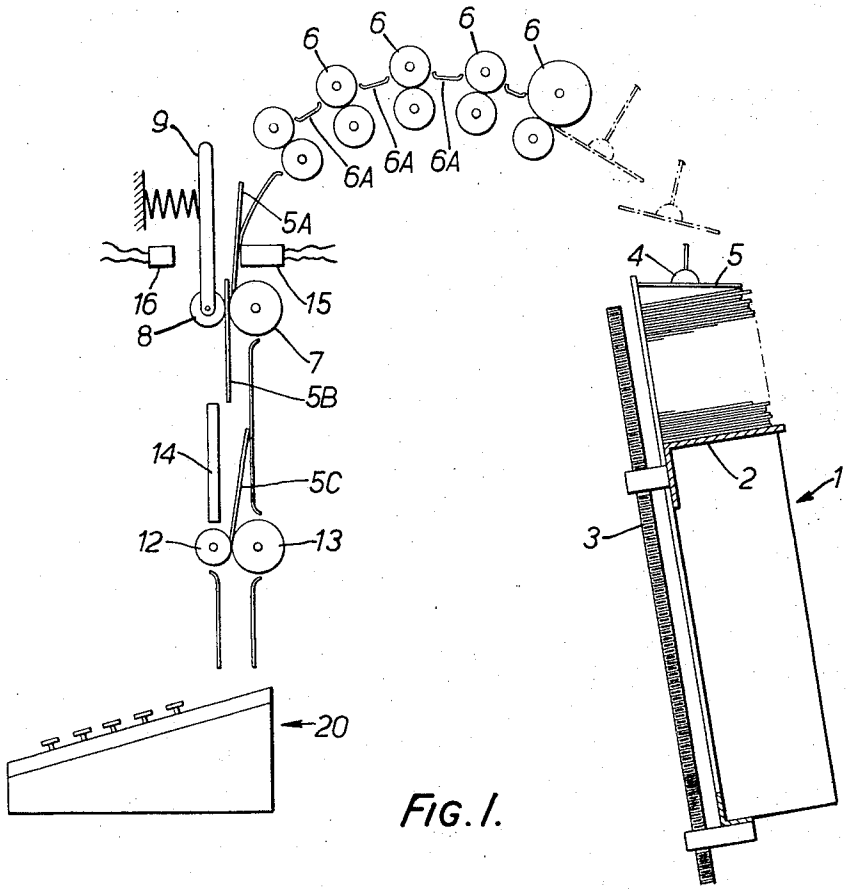

FIG. 1.

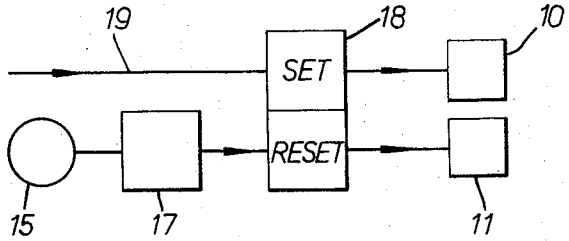

FIG. 3.

Geoffrey P. Copping.
Kenneth W.H. Whittington,
INVENTORS

BY Hull & Houghton

ATTORNEY

SERIATIM PRESENTATION OF ARTICLES FOR VIEWING

Filed Oct. 12, 1965 4 Sheets-Sheet 2

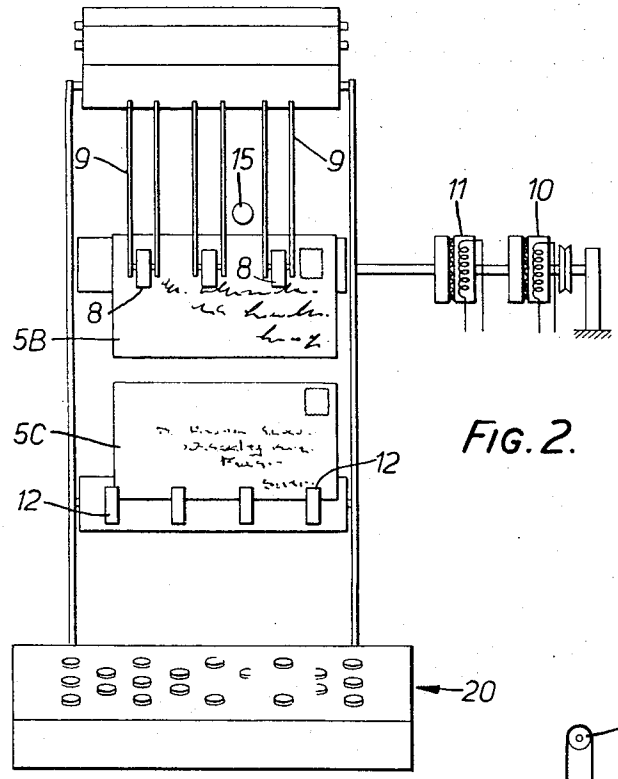

FIG. 2.

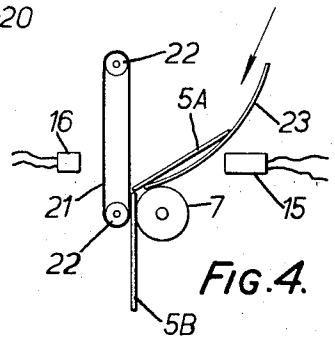

FIG. 4.

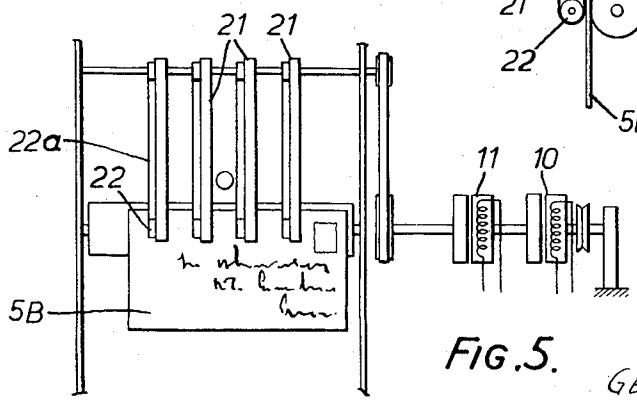

FIG. 5.

GEOFFREY P. COPPING,
KENNETH W.H. WHITTINGTON
INVENTORS

BY Hall & Houghton

ATTORNEY

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SERIATIM PRESENTATION OF ARTICLES FOR VIEWING

Filed Oct. 12, 1965 4 Sheets-Sheet 3

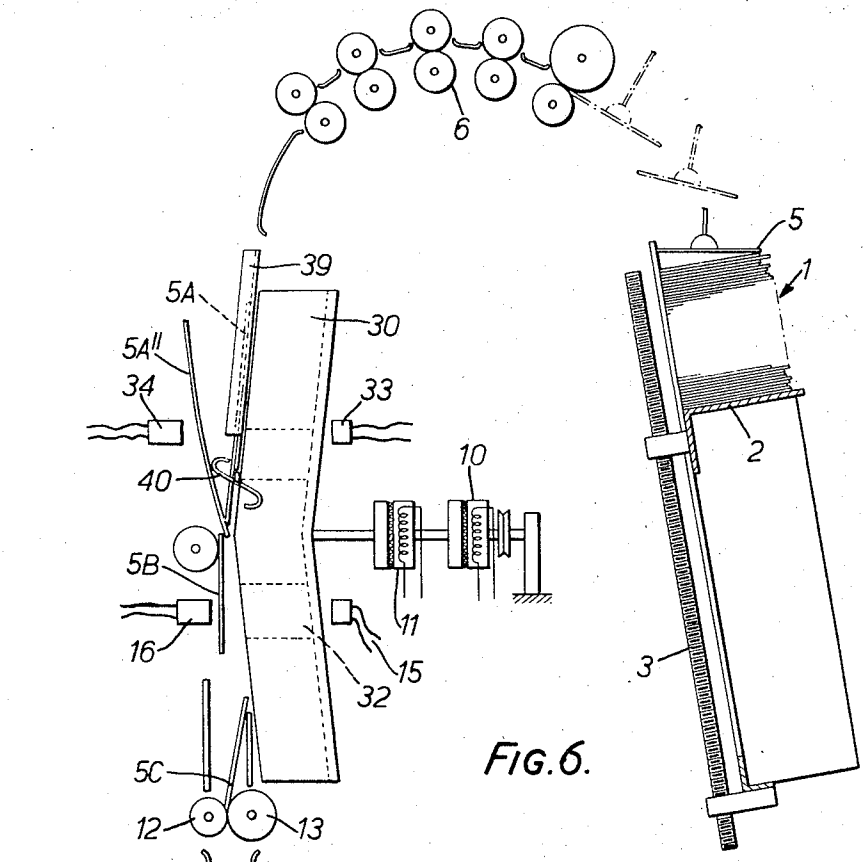

FIG. 6.

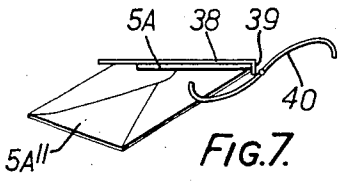

FIG. 7.

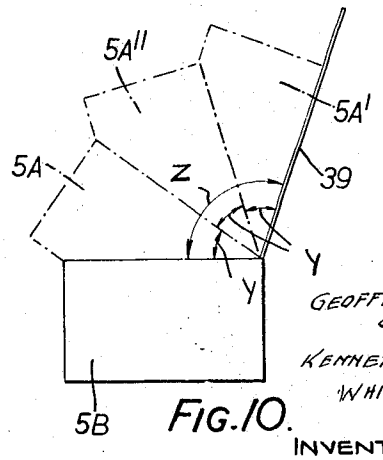

FIG. 10.

GEOFFREY P. COPPING, KENNETH W. H. WHITTINGTON, INVENTORS

BY Hall & Houghton

ATTORNEY

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SERIATIM PRESENTATION OF ARTICLES FOR VIEWING

Filed Oct. 12, 1965 4 Sheets-Sheet 4

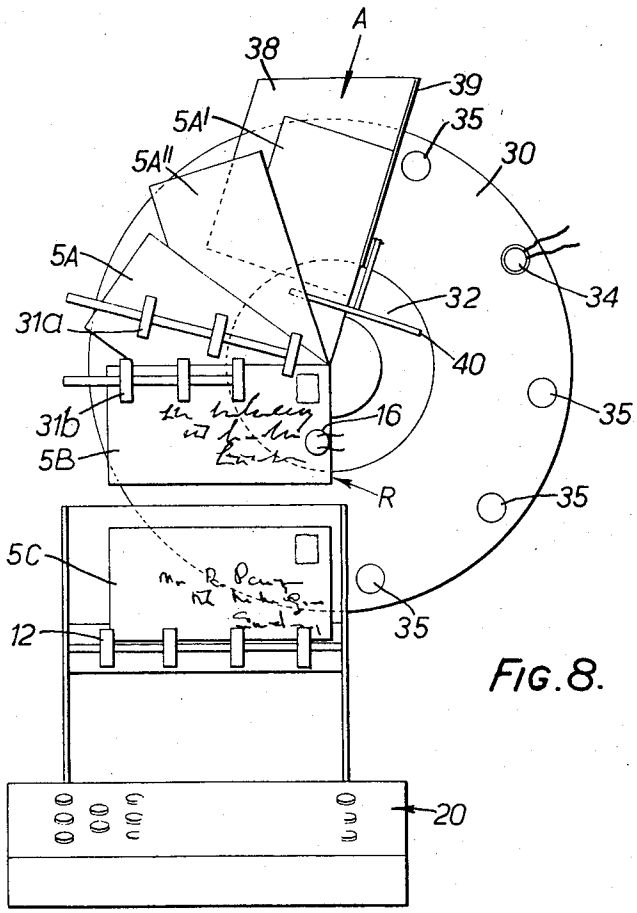

FIG. 8.

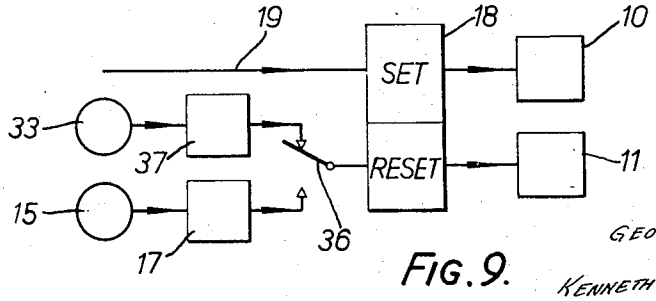

FIG. 9.

GEOFFREY P. COPPING.
KENNETH W.H. WHITTINGTON,
INVENTORS
BY Hall & Houghton
ATTORNEY

United States Patent Office 3,368,701
Patented Feb. 13, 1968

3,368,701

SERIATIM PRESENTATION OF ARTICLES FOR VIEWING

Geoffrey Percy Copping, Chesham, and Kenneth William Herbert Whittington, Barking, England, assignors to Her Majesty's Postmaster General, London, England

Filed Oct. 12, 1965, Ser. No. 495,224
Claims priority, application Great Britain, Oct. 15, 1964, 42,139/64
20 Claims. (Cl. 214—11)

This invention relates to apparatus for presenting each of a series of articles in turn at a viewing position.

In certain machines handling documents and especiallly machines handling letters end similar flat items, the items are presented singly and in turn at a window or opening in the machine for examination. In the case of a letter coding or sorting machine, the presented letter is viewed by an operator who reads the address on the letter and depresses keys appropriate to that address on a keyboard fitted to the machine. Depression of the keys applies code marks to the letter or controls the subsequent path of the letter through the machine. Rapidity of presentation ensures maximum operator output and minimum eye fatigue but in certain machines there has been an unavoidable delay between the removal from the viewing position of one item and the presentation of a succeeding item and this has limited the rate of presentation of items.

It is an object of the present invention to provide presentation apparatus in which the delay referred to above is virtually eliminated.

According to the present invention apparatus for presenting each of a series of flat items in turn at a viewing position comprises conveying means for bringing each item to the viewing position in a substantially vertical orientation, releasable gripping means for holding the item whilst in the viewing position along its upper edge, and a control arrangement for the releasable gripping means to bring said means into operation when required.

When the gripping means are released the item held thereby falls free of the means into a holding position as is described later or may drop into a receptacle, for example a mail bag, or the item may drop on to a conveyor which transports it from the presentation apparatus.

The gripping means may feed the item into the viewing position and may comprise a single pair of co-operating rollers at least one of which is driven and between which the item is passed to be gripped along its upper edge only between the nip of the rollers whilst the item is in the viewing position. In such case, the grip is released by driving the rollers to feed the item from the nip. The length of the roller of the single pair must be sufficient to enable the item to be gripped satisfactorily. Alternatively, a plurality of pairs of co-operating rollers may be used.

The gripping means may be a movable surface, for example, a short conveyor belt and a co-operating roller or rollers. Again, the item is gripped in the nip between the roller or rollers and the surface. The use of a conveyor belt encourages a more positive entry of the items into the nip.

In a further form of the invention, the movable surface of the gripping means is that of a wide-angle cone mounted for rotation about its axis and having the co-operating roller or rollers mounted radially with respect to that axis and in contact with the cone surface.

Preferably, the rollers and conveyor belt are resiliently mounted in such manner that they can accommodate items of different thickness. Alternatively, the rollers themselves are formed of a resilient material.

The control arrangement includes a device responsive to passage of the item to the viewing position and which causes the gripping means to grip an item when the latter reaches that position. Release of the gripping means is normally effected on completion of viewing and may be under the control of an operator who views the item in the viewing position. When the gripping means also feeds the item into and from the viewing position, the control arrangement determines the instant at which the feed ceases, the item then being held stationary in the viewing position. Feed of the item from the viewing position may be under the control of the operator as before.

By way of example only, embodiments of the invention will now be described in greater detail with reference to the accompanying drawings, wherein:

FIG. 1 is a diagrammatic side elevation of part of a first embodiment,

FIG. 2 is a front elevation of the apparatus shown in FIG. 1,

FIG. 3 is a block schematic diagram of part of a control circuit for the embodiment of FIG. 1,

FIGS. 4 and 5 are diagrammatic side and front elevations respectively of part of a second embodiment,

FIG. 6 is a diagrammatic side elevation of part of a third embodiment,

FIG. 7 is a scrap view of a detail of the embodiment of FIG. 6, seen in the direction of arrow A in FIG. 8,

FIG. 8 is a front elevation of the apparatus shown in FIG. 6,

FIG. 9 is a block schematic diagram of part of a control circuit for the embodiment of FIGS. 6, 7 and 8, and,

FIG. 10 shows schematically a detail of the embodiment of FIG. 6.

The embodiments illustrated each form part of letter coding and/or sorting apparatus having a keyboard controlled by an operator in accordance with information read-off from the letters.

Referring to FIGS. 1 and 2, the apparatus has a de-stacking device generally indicated at **1** and including a platform **2** which is movable by a feed screw **3**. The device also includes a transfer arm (not shown) having a suction head **4** operable to lift letters **5** individually from platform **2**. An array of driven rollers **6** is mounted adjacent the de-stacking device **1** to feed letters to sets of co-operating rollers **7** and **8** which suspend the letters in a viewing position. Guide plates **6A** are disposed between the rollers **6** and between the rollers **6** and the rollers **7** and **8**. The rollers **7** are mounted on a common shaft which is connected with driving means (not shown) while the rollers **8** are mounted on axles carried at the lower end of spring-loaded arms **9**. The drive to the rollers **7** is transmitted through an electromagnetic clutch **10** (FIG. 2), and an electromagnetic brake **11** is incorporated between the clutch **10** and the rollers **7**. Further sets of co-operating rollers **12** and **13** are mounted beneath the rollers **7** and **8** and a window **14** is disposed above the rollers **12**. A photo-electric cell **15** and an associated source of light **16** are positioned above the rollers **7** and **8**, the light beam from source **16** being at right angles to the axes of the rollers.

Referring now to FIG. 3, the photo-electric cell **15** is connected with a circuit **17** arranged to emit a pulse when the cell **15** is exposed to light from the source **16**. The circuit **17** is connected to the brake **11** via a bistable trigger **18**. The clutch **10** is also connected to the bistable trigger **18**, a lead **19** connecting the latter to the operator's keyboard **20**.

The general operation of the apparatus is that letters **5** are transferred individually from the de-stacking device **1** by the suction head **4** of the transfer arm (not shown) to the rollers **6** which feed each letter to a stored position **5A** in which it rests freely in the nip of the rollers **7** and **8**. From the stored position **5A**, the letter is moved to the viewing position **5B** by the rollers **7** and **8** in which posi-

tion it is suspended by the rollers at a point adjacent its upper edge. When the operator has read the address on the letter in the viewing position 5B he operates the keyboard 20 and the letter is fed through the rollers 7 and 8 and falls to a holding position 5C in which it rests in the nip of the rollers 12 and 13.

The detailed operation of the apparatus is as follows. Assuming the apparatus to be empty, the operator places a stack of letters 5 on the platform 2 of the de-stacking device 1 having first "knocked down" the stack to align the right-hand edges of the letters as viewed from the front. He then switches on the apparatus whereupon drive is transmitted to the rollers 6 and the light source 16 is energised. Light shines on the photo-electric cell 15 and an electric pulse is transmitted to the bistable trigger 18 (FIG. 3) to reset it and energise the brake 11 to hold the rollers 7 stationary. The apparatus is then primed by first depressing a "transport" key on the keyboard 20 which causes a letter 5 to be transferred by the suction head 4 from the stack to the rollers 6 and causes an electric pulse to be transmitted to the bistable trigger 18 via the lead 19 whereupon the trigger is set and the clutch 10 is energised and the brake 11 de-energised. Energisation of the clutch 10 causes drive to be transmitted to the rollers 7. The rollers 6 carry the letter 5 to the rollers 7 and 8 and the letter interrupts the beam of light passing from the source 16 to the photo-electric cell 15 but this has no effect on trigger 18. The letter is fed into the rollers 7 and 8 until its trailing (upper) edge moves clear of the light source 16 whereupon light falls on the cell 15 and the bistable trigger 18 is reset again and the brake 11 energised to bring the rollers 7 to rest. The operation of the brake 11 is rapid and the rollers 7 are brought to rest in a matter of milliseconds. The arrangement is such that when the rollers 7 are braked, the letter 5 is still in the grip of the rollers 7 and 8 and is in fact suspended near its upper edge in the viewing position 5B.

Next, a special priming key is depressed which results in a second letter 5 being fed to the rollers 6 but does not transmit a pulse along lead 19 to set the trigger 18 and energise the clutch 10. Therefore, the first letter remains in the viewing position 5B. The second letter is fed through the rollers 6 and falls into the stored position 5A in which it rests freely and interrupts the beam of light from the source 16. Again, this interruption has no effect. The leading edge of the second letter lies behind the trailing edge of the first letter. The apparatus is now primed. However, to load the apparatus fully, the "transport" key is depressed again whereupon the first letter in the viewing position 5B is released by the rollers 7 and 8 and falls to the holding position 5C; the second letter (in the stored position 5A) is fed through the rollers 7 and 8 immediately following the first letter allowing the photo-electric cell 15 to reset the trigger 18 and brake the rollers 7 when the trailing edge of the letter moves clear of the light beam from source 16; a third letter which has, in the meanwhile, been transferred from the stack to the rollers 6, then comes to rest in the stored position 5A.

When the apparatus has been fully loaded, the operator keys each letter to its eventual destination while it is in the holding position 5C. Throughout the operation of the apparatus, each letter is read in the viewing position 5B and keyed when in the holding position 5C. This enables the operator to increase his rate of working and to check a letter when it has passed from the viewing position 5B but before it is dispatched to its destination. The window 14 retains the letters in the holding position 5C should they fall forward. The rollers 13 have drive transmitted to them when an address is keyed and the letter is fed through the rollers 12 and 13. Also, a keying operation has the same effect as the depression of the "transport" key in the priming operation which is to transfer a further letter from the stack to the stored position 5A and to move letters in the stored, viewing and holding positions to the respective succeeding positions. As letters are taken from the stack, the platform 2 of the de-stacking device 1 is moved upwardly by the feed screw 3 to maintain the top of the stack at a constant height. Because the letters are "knocked down" prior to being placed on the platform 2, substantially correct alignment of the letters as they pass through the apparatus is ensured.

Any variation in the thickness of the letters is accommodated by movement of the spring-loaded arms 9 on which the rollers 8 are mounted.

A principal advantage of the apparatus described is that as soon as a latter starts to move from the viewing position 5B to the holding position 5C, a letter in the stored position 5A starts to enter the viewing position immediately, whereas in prior apparatus the letter has, for example, been supported on a trap door which had to be kept open long enough to allow a letter having the maximum permissible dimension (in the direction of travel) to drop clear. Also, with the use of a quick-operating electromagnetic clutch 10 and brake 11, the operating speed of the apparatus is further increased. A secondary advantage is that as the letters are suspended in the viewing position 5B, there is no need for a viewing window and this gives the operator an uninterrupted view of each letter. Also, there is easy access to a letter in the viewing position should it be necessary to withdraw the letter by hand. Yet a third advantage is secured because letters have to pass between rollers or belts and rollers only, there being no hazards such as flaps. Elimination of such flaps also removes the need of associated operating mechanisms.

The rollers 8, as well as the rollers 7, may be positively driven to obtain a more positive feed of the letters through the rollers and a more positive stopping and starting action. If both the rollers 7 and 8 are driven a difficulty does arise in independently suspending each roller 8 on its arm 9.

FIGS. 4 and 5 show an alternative mechanism for suspending a letter in the viewing position 5B. The rollers 8 are replaced by belts 21 and upper and lower pulleys 22 as used in timing gear, the lower pulleys each being carried on a separate spring-loaded arm 22*a* pivoted on the axis of the upper pulley, and each belt 21 being positively driven, the rollers 7 also being positively driven as before. A letter is fed to a chute 23 and the leading edge of the letter settles against the belts 21. The shape of the chute is such that part of the underside of the letter rests on the rollers 7 and such that the inclination of the letter to the vertical does not exceed about 60°. When the letter is to be moved to the viewing position 5B, it is found that there is little tendency for the letter to hesitate before passing between the rollers 7 and the belt 21 and that when in the viewing position, its leading edge is substantially horizontal since the arrangement just described permits any misorientation of a letter reaching the stored position 5A to be corrected. This arrangement is also particularly useful when comparatively thick letters are to be handled.

The apparatus shown in FIGS. 1 and 2 may be modified so that the letter in the holding position 5C is also suspended, instead of resting on rollers 12 and 13. Sets of rollers similar to 7 and 8 would be mounted approximately midway between rollers 7, 8 and rollers 12, 13, to grip the upper edge of the letter in the holding position 5C, but in this position the rollers carried on spring-loaded arms would have to be at the rear, to avoid obstructing the operator's view of the letter in the viewing position 5B. Instead of rollers similar to 7, 8, belts and rollers as in FIGS. 4 and 5 could be used to suspend the letter in the holding position 5C, with the belts at the rear to avoid obstructing the operator's view. In either case the rollers 12, 13 would become continuously-rotating transport rollers.

Referring now to FIGS. 6 to 9, a third embodiment is shown which has a de-stacking unit 1, rollers 6 and a

keyboard **20** as in the first embodiment but has different means for presenting the letters to the viewing position.

A shallow cone **30** having a surface of resilient material is mounted for rotation about a horizontal axis, drive being transmitted via a clutch **10** and a brake **11** similar to those parts in the first embodiment. Two sets **31***a*, **31***b* of free-running rollers are arranged to contact the surface of the cone **30** along generators of the cone, set **31***a* lying along the generator perpendicular to the line of entry of the letters while the other set **31***b* lies along the horizontal generator.

An annular window **32** is formed in the cone **30** behind which window is mounted the photo-electric cell **15** and in front of which is mounted the light source **16**. A series of equi-spaced holes **35** is formed in the cone **30** adjacent the periphery thereof, and a further photo-electric cell **33** and associated light source **34** are mounted behind and in front of the cone **30** respectively, at the same radius from the cone axis as the holes.

The control circuit shown in FIG. 9 is similar to that shown in FIG. 3 except that a changeover switch **36** is incorporated to connect either the photo-electric cell **15** and the pulse circuit **17** or the photo-electric cell **33** and pulse circuit **37** to the bistable trigger **18**.

Referring again to FIGS. 6 to 8, a guide plate **38** having an upturned edge **39** is positioned to feed letters on to the surface of the cone **30** and a rotatably-mounted, S-shaped arm **40** is mounted adjacent the lower end of guide plate **38**. The edge **39** is aligned with the apex of the cone.

Assuming the apparatus is empty, the operation is as follows. A stack of letters is "knocked down" so that the upper and right-hand edges, as viewed from the front, are aligned and the stack is placed on the platform **2** of the de-stacking device **1** so that the right-hand edges of the letters constitute the leading edges when the letters are fed to the rollers **6**. The changeover switch **36** is set to the position shown in FIG. 9 to render the photo-electric cell **33** operative and the photo-electric cell **15** inoperative. The operator depresses the "transport" key on the keyboard **20** resulting in a letter **5** being transferred from the stack to the rollers **6**. Simultaneously, the clutch **10** is energised and the brake **11** de-energised so that the cone **30** is rotated until a hole **35** in the cone is aligned with the source of light **34** and photo-electric cell **33** whereupon a pulse is transmitted from the circuit **37** to reset the bistable trigger **18** which energises the brake **11**, de-energises the clutch **10** and the cone **30** is brought to rest. The letter **5** then reaches the cone via guide plate **38** and comes to rest in a first stored position **5A'**.

The "transport" key is depressed again and, as the rotation of the cone starts, the first letter is carried round towards a second stored position **5A''** and is inclined forwardly as shown in FIG. 7 by the action of the arm **40**, which is rotated through half of one revolution upon depression of the "transport" key or upon completion of any other key sequence, the rotation beginning simultaneously with the rotation of the cone **30** and ending before the leading edge of the next letter reaches the arm. The cone comes to rest with the first letter in position **5A''**, the angular movement of the cone being governed by the spacing of the holes **35**, and the next letter. In the second stored position **5A''**, the first letter is gripped beween the cone and the free-running set **31***a* of rollers. Depression of the "transport" key is repeated until the first letter reaches the viewing position **5B** in which it is suspended adjacent its upper edge between the surface of the cone **30** and the lower set **31***b* of the rollers with its leading edge (not the lower edge of the letter) substantially horizontal. To ensure that this leading edge of the letter is substantially horizontal when in the viewing position **5B**, the angle Z (as seen in FIG. 10) between the line of entry of a letter (i.e. the edge **39** of the guide plate) and the horizontal must be an integral multiple of the angle Y through which the cone turns at each movement. The angle Y is, of course, an integral sub-multiple of 360°, the value depending upon the angular spacing of the holes **35**. It is advisable for angle Z to be greater than 90° to ensure that the edge of a letter in the first stored position **5A'** stays in contact with the edge **39** of the guide plate. A suitable value for Z lies between 95° and 120°. A fan of 3, 4 or 5 letters on the cone at once has been found to be most suitable and, if $Z=nY$ where

$n=2$ for 3 letters in fan
$n=3$ for 4 letters in fan
$n=4$ for 5 letters in fan

then, using the limits of Z mentioned above, Y lies between the values 95°/4 and 120°/4—i.e. between 24° and 60°. A convenient value for Y is 36°, giving a value of 108° for Z and an arrangement of four letters in a fan (as illustrated in FIGS. 8 and 10).

In the substantially horizontal viewing position, as seen in FIGS. 6 and 8, the right-hand edge of the first letter interrupts the light beam from the source **16** to the photo-electric cell **15**. The interruption occurs as the letter attains this horizontal viewing position because it, and each subsequent letter, is fed on to the cone in a position such that the letter rotates about its top right-hand corner, as viewed from the front, when carried by the cone. This is achieved by aligning the upturned edge **39** of the guide plate with the apex of the cone, and by the positioning of the upper set **31***a* of rollers as described above. The apparatus is fully loaded by depressing the "transport" key yet again so that the first letter is moved clear of the lower set **31***b* of rollers and falls to the holding position **5C**; the second letter is moved immediately into the viewing position **5B**, each of the letters in the other stored positions progresses to the next stored position and a further letter is fed to the cone from the stack.

As before, each letter is actually keyed to its appropriate destination when in the holding position. Before the first letter is so keyed, the changeover switch **36** is operated to make the photo-electric cell **15** operative and the photo-electric cell **33** inoperative. The circuitry **17** is arranged to emit an electric pulse when light to the cell **15** from the source **16** is interrupted (instead of vice versa as in the first embodiment), restoration of the light having no effect. When the first letter is keyed, the clutch **10** is energised and the brake **11** de-energised so that the cone **30** rotates and drive is transmitted to rollers **13**. The first letter is thus fed through the rollers **12** and **13** from the holding position **5C**, the second letter drops from the viewing position **5B** to the holding position **5C** and the third letter enters the viewing position. As the third letter enters the viewing position, its right-hand edge approaches the path between the photo-electric cell **15** and the light source **16** and interrupts the light when it reaches the set viewing position. Interruption of the light results in the circuitry **17** emitting an electric pulse which resets the bistable trigger **18** to energise the brake **11** and de-energise the clutch **10**. Thus, the cone **30** is brought to rest only when the third letter is in the correct viewing position **5B** whilst the other letters on the cone **30** progress as already mentioned and a further letter is fed on to the cone from the stack. The procedure is repeated as often as necessary, the feed screw **3** of the de-stacking device **1** maintaining the top of the stack of letters at a predetermined height as before.

There is a minimum period during which a letter presented for reading must be stationary but apart from this, the maximum number of letters which the apparatus can handle in a given time is determined by the speeds of operation of the clutch **10** and the brake **11**. As in the first described embodiment, the clutch **10** and the brake **11** are electromagnetic and comparatively fast operating (a matter of milliseconds) and, as each angular movement of the cone **30** is small, angular acceleration and therefore clutch and brake torque requirements are mini-

mised, resulting in an increased operational speed of the apparatus.

The apparatus illustrated in FIGS. 6 to 8 may be modified for example, by accommodating the photo-electric cell **15** in an annular groove in the surface of the cone **30**. Alternatively, the photo-electric cell **15** and associated light source **16** can be omitted and the photo-electric cell **33** permanently connected to the bistable trigger **18**. In such an arrangement, the cone **30** is rotated through a fixed angle each time, the angle being governed by the spacing of the holes **35**. A disadvantage of this arrangement is that the cone **30** is brought to rest irrespective of whether the letter entering the viewing position **5A** is exactly horizontal. A further modification is that the sets **31***a*, **31***b* of rollers may be replaced by narrow angle cones which contact the cone **30** along respective generators positioned as before. Also, the rotatable arm **40** may be dispensed with if the articles being handled are stiff so that they automatically fall forward when fed on to the surface of the cone **30**. However, if any of the articles are flimsy or bowed, it is almost essential to have the arm **40** or a similar device to clear the way for the entry of succeeding articles.

In any of the arrangements described, the de-stacking device may be of a type other than that referred to and any of the various rollers employed may be of the resilient type. Also, means other than photo-electric cells can be used in the control of the apparatus and the rollers **12** and **13** may be replaced by a controllable flap for example.

Further, apparatus constructed in accordance with the invention is not restricted to the handling of letters but is applicable to any substantially flat articles.

What is claimed is:

1. Apparatus for presenting each of a series of individual flat items which are not connected to one another in turn at a viewing position comprising in combination:

(a) conveying means for bringing each item in turn to the viewing position in a substantially vertical orientation,

(b) gripping means located at the viewing position for holding the item whilst in the viewing position along its upper edge only, and

(c) releasable control means for controlling the operation of said gripping means and conveying means.

2. Apparatus as claimed in claim **1** in which the gripping means comprises means for feeding the item from the conveying means into the viewing position and for thereafter holding the item, in that viewing position, along its upper edge only.

3. Apparatus as claimed in claim **2** in which the gripping means comprises as its feeding and holding means a single pair of cooperating rollers at the viewing position, at least one of which is driven, the item being passed between said rollers and being held thereby, whilst in the viewing position, along its upper edge only.

4. Apparatus as claimed in claim **2** in which the gripping means comprises as its feeding and holding means a plurality of pairs of cooperating rollers at the viewing position at least one of each pair being driven, the item simultaneously passing between the rollers of each pair and being held thereby, whilst in the viewing position, along its upper edge only.

5. Apparatus as claimed in claim **2** in which the gripping means comprises as its feeding and holding means a movable surface cooperating with at least one roller at the viewing position, the item passing between the movable surface and the roller and being held thereby, whilst in the viewing position, along its upper edge only.

6. Apparatus as claimed in claim **5** in which the movable surface is that of a drivable conveyor belt, the item passing between the conveyor belt and the at least one roller and being held thereby along its upper edge only whilst in the viewing position.

7. Apparatus as claimed in claim **5** in which the movable surface is that of a wide-angle cone mounted for rotation about its axis, the at least one roller being located at the viewing position and mounted in contact with the cone surface along a generator of the surface, the rotating surface of the cone conveying an item between the at least one roller and the surface of the cone into the viewing position where it is held along its upper edge only.

8. Apparatus as claimed in claim **7** in which the control means comprises means for determining the instant at which the feed ceases for causing the item to then be held stationary by the gripping means.

9. Apparatus as claimed in claim **8** in which the means responsive to the passage of the item comprises in combination a photo-electric cell and an associated radiation beam, said beam positioned to be normally incident on the cell, and to be interrupted by the passing of an item to the viewing position, operation of the gripping means being controlled by the excitation or non-excitation of the photo-electric cell by said associated radiation beam.

10. Apparatus as claimed in claim **8** in which the control means further comprises means responsive to the angular position of the rotating cone for controlling the conveyance of an item to the viewing position.

11. Apparatus as claimed in claim **10** in which the cone contains a series of equi-spaced holes disposed in a circle, the centre of said circle lying on the axis of rotation of the cone, and in which the means responsive to the angular position of the rotating cone comprises a photo-electric cell and associated radiation beam mounted on opposite sides of the cone and each at the same radius from the axis of the cone as said holes, the rotating cone being brought to rest each time a hole in the cone is in alignment with the radiation beam and photo-electric cell.

12. Apparatus as claimed in claim **8** and further comprising, in combination with said control means, keyboard operated means controlling both said control means to govern the passage of an item through the apparatus and the eventual destination of said item.

13. Apparatus as claimed in claim **7** and further comprising, in combination with said cone, guide plate and cooperating rotatable arm means for ensuring that the items are fed in turn on to the surface of the cone in overlapping relationship.

14. Apparatus as claimed in claim **2** in which the control means comprises means for determining the instant at which the feed ceases for causing the item to then be held stationary by the gripping means.

15. Apparatus as claimed in claim **14** and further comprising, in combination with said control means, keyboard operated means for controlling both said control means to govern the passage of an item through the apparatus and the eventual destination of said item.

16. Apparatus as claimed in claim **14** in which the means responsive to the passage of the item comprises in combination a photo-electric cell and an associated radiation beam, said beam positioned to be normally incident on the cell, and to be interrupted by the passing of an item to the viewing position, operation of the gripping means being controlled by the excitation or non-excitation of the photo-electric cell by said associated radiation beam.

17. Apparatus as claimed in claim **1** in which the control means comprises means responsive to the passage of the item to the viewing position for causing the gripping means to grip the item when said item reaches that position.

18. Apparatus as claimed in claim **17** in which the means responsive to the passage of the item comprises in combination a photo-electric cell and an associated radiation beam, said beam positioned to be normally incident on the cell, and to be interrupted by the passing of an item to the viewing position, operation of the gripping means being controlled by the excitation or non-excitation

of the photo-electric cell by said associated radiation beam.

19. Apparatus as claimed in claim **1** in which the components of the gripping means are of a resilient material.

20. Apparatus as claimed in claim **1** in which the components of the gripping means are resiliently mounted.

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RICHARD E. AEGERTER, *Primary Examiner.*

EVON C. BLUNK, *Examiner.*

M. L. AJEMAN, *Assistant Examiner.*