Dec. 30, 1958 W. H. RIVES 2,866,640

DOCUMENT FEEDING MACHINE

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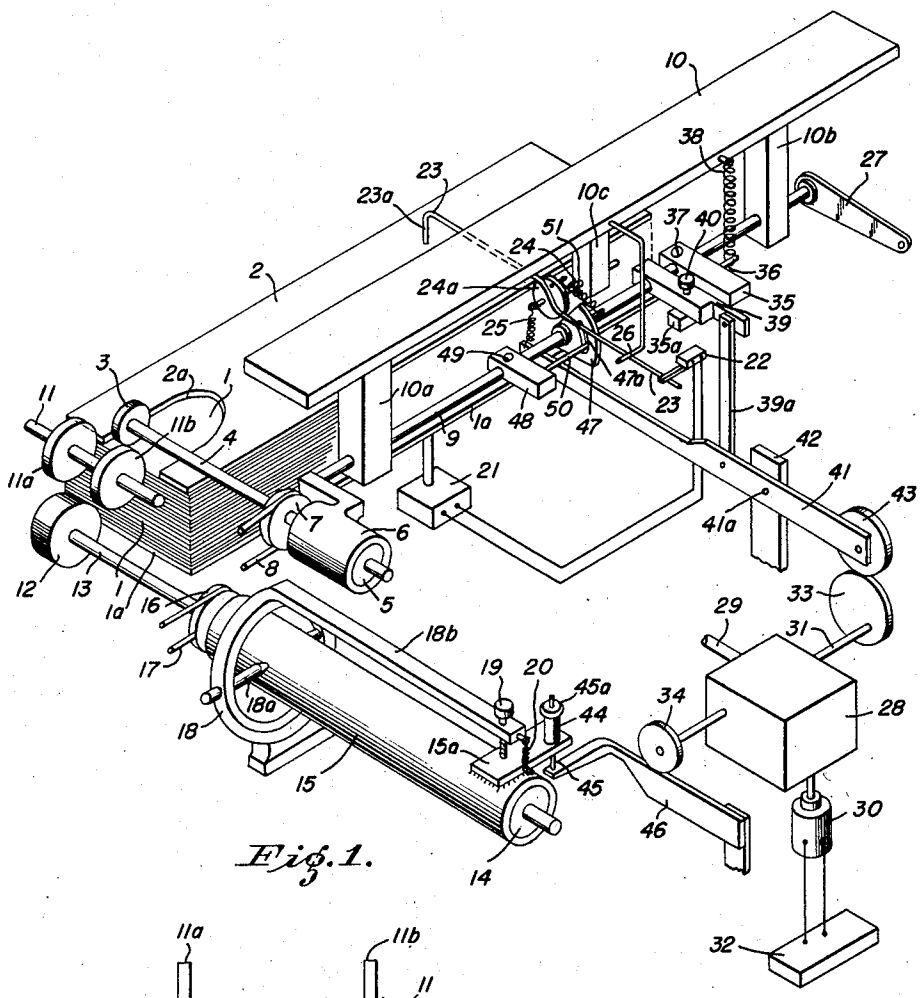


Fig. 1.

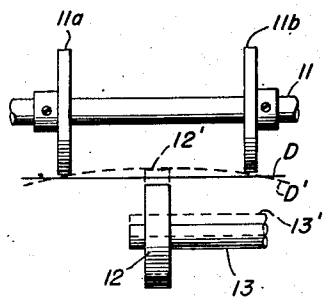


Fig. 2.

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DOCUMENT FEEDING MACHINE

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This invention relates to a sorting machine of the type disclosed in U. S. Letters Patents Nos. 2,668,706 and 2,707,569 issued to Le Roy J. Benson. Machines of this type include a bin for receiving a stack of documents to be sorted, the stack being supported upon a vertically movable bottom or platform in the bin, a feeding device for removing the top document from the stack and feeding the document to a conveying guideway adjacent the stack, a keyboard arranged adjacent the stack and having a number of key-controlled devices for selecting and operating any one of a number of tiltable gates arranged at spaced stations along the length of the guideway and for simultaneously operating the feed device to move the uppermost document into the conveying guideway. As the document is conveyed along the guideway and reaches the selected station, the tilted gate at the selected station will deflect the document downward into a suitable storage bin.

The present invention is concerned with the arrangement for feeding the documents from the top of the stack into the guideway, an arrangement for preventing more than one document from being fed to the guideway at a time, and also the arrangement for automatically elevating the stack.

The term "documents" as used herein refers to sheet-like articles generally, such as checks, vouchers, receipts, paper money, and the like.

A primary object of my invention is to devise a document feeding mechanism utilizing a continuously rotating feed roller which is brought into contact with the document to be fed for a predetermined period of time to start the document toward the conveying rollers and is removed before the trailing edge of the document has passed beneath the feed roller.

Another object of my invention is to devise a set of separating rollers which will prevent more than one document from being fed at a time and which may be readily adjusted for different weights or thicknesses of documents being sorted.

Another object is to provide a feed mechanism embodying a document feeder and a document separator which act on the documents being sorted in timed relation to achieve maximum effectiveness in each operation without interference between the two operations.

A further object of my invention is to devise a stack-elevating mechanism controlled by a feeler arm or finger engaging the top of the stack and including means for substantially relieving the pressure of the finger on the top of the stack at the moment of engagement of the top-most document by the feed roller.

Still another object is to devise means for rotating both the feed roll and the feeler finger into a raised position to permit the loading or unloading of the stack bin, and without disconnecting any of the driving or controlling connections.

One form of the invention is illustrated in the accompanying drawing in which Figure 1 shows the essential elements in perspective view, the drawing being in diagrammatic form for clearness of showing. Figure 2 is an enlarged side view of the separating rolls of Figure 1.

Referring to the drawing, a stack of documents to be sorted, shown at 1, is contained within a box or bin (not shown) and is supported upon a vertically movable platform 1*a*, as in the Benson Patent No. 2,707,569. A transparent hold-down plate 2 formed of rigid or stiff material forms the top layer of the stack to accurately position the upper end of the stack and to hold the uppermost document flat. The plate has a cut-out 2*a* formed therein to allow a feed roller 3 to contact the uppermost document. In some cases it may be desirable to form additional cut-outs in the plate 2 to decrease the weight of the plate as much as possible.

The feed roller 3 is formed of good friction material, such as rubber and mounted on shaft 4 which normally extends horizontally across the top of the stack a short distance above the hold-down plate 2. Shaft 4 is journalled in bearings 5 mounted in tubular housing 6 and is rotated continuously by means of pulley 7 which is driven by belt 8. The tubular housing 6 is supported on the end of rock-shaft 9 which is journalled in two vertical posts 10*a* and 10*b* extending downwardly from a horizontal frame member 10. The axis of shaft 9 is perpendicular to the axis of shaft 4 and intersects the axis of shaft 4 in the vicinity of pulley 7 so that rotation of the housing 6 about the axis of rock-shaft 9 does not displace belt 8 to any substantial degree. In the normal position of the shaft 4 roller 3 is held out of engagement with the stack. By rotating rock-shaft 9 through a small angle anti-clockwise, shaft 4 is lowered and feed roller 3 is brought into engagement with the uppermost document of the stack 1, or, by rotating shaft 9 clockwise through an angle of about 90°, shaft 4 with roller 3 may be raised to a near vertical position to allow documents to be easily added to or removed from the stack 1.

A set of separating rollers is provided adjacent the end of stack 1 in a position to receive the document fed forward by roll 3. A transversely-mounted upper shaft 11 has a pair of steel discs or rollers 11*a* and 11*b* adjustably mounted thereon so that the spacing of the discs from each other may be varied for documents of different weights of paper. Shaft 11 is journalled in suitable fixed bearings (not shown) and is driven in the same direction as feed roll 3 by means of a pulley and belt (not shown). A roller 12 having a periphery formed of good friction material, such as rubber, is mounted on a shaft 13 arranged immediately below and substantially parallel with shaft 11, roller 12 being positioned below and substantially mid-way between the two discs 11*a* and 11*b*. Lower shaft 13 is journalled in bearings 14 mounted in tubular housing 15 and is driven by means of pulley 16 and belt 17. The upper shaft 11 and the lower shaft 13 turn in the same direction so that discs 11*a* and 11*b* tend to draw from the stack 1 any document that is fed to the separating rollers by feed roller 3, and roller 12 tends to return the document to the stack.

To allow adjustment of the position of roller 12 with respect to discs 11*a* and 11*b*, housing 15 is pivotally mounted in a fixed bracket 18 by a pair of pivot pins 18*a* arranged transversely of the bearing housing, and an adjustable stop is formed by screw 19 which is threaded through the end portion of a rigid arm 18*b* extending from the bracket 18 parallel with and above the housing 15, the end of screw 19 engaging a horizontal plate 15*a* secured to bearing housing 15 near its free end. A tension spring 20 connects the arm 18*b* with the plate 15*a* and holds the plate against the end of screw 19. Adjustment of screw 19 turns housing 15 about the axis of pivot pins 18*a* and thereby raises or lowers roller 12 to provide more or less overlap between the periphery of the roller and the peripheries of discs 11*a* and 11*b*. This over-lap

causes transverse buckling of the documents passing through the separating rolls and aids in separating the documents when more than one is fed at a time.

Normally, the lower roller **12** is in its lowermost position, as shown in solid lines in Figure 2. In this lower position, there may be a slight overlap between the upper periphery of roller **12** and the lower peripheries of rollers **11***a* and **11***b*, or there may be a gap between the roller **12** and the rollers **11***a* and **11***b*, as explained hereinafter. Figure 2 shows the roller **12** in a normal position to provide a small gap into which a document D is fed without being buckled by the separating rolls. When the roller **12** is moved into its upper position by operation of cam **34**, the roller **12** moves into overlapping relation with the peripheral edges of rollers **11***a* and **11***b* as shown in dotted lines **12'** and **13'**. This movement causes transverse buckling of the document D to the dotted line position shown at D'. The roller **12** is moved upwardly just after feed roller **3** has fed the uppermost document into the separating rolls, and the roller **12** is returned to its normal position after the roller **3** has been lifted from the top of the stack.

It is clear from Figure 2 that by moving rollers **11***a* and **11***b* closer together, the amount of buckling produced in the document D will be increased where the roller **12** moves to the same position indicated in dotted lines at **12'**.

A stack elevating mechanism represented at **21** is provided for raising the stack platform **1***a*, and this mechanism is controlled automatically to maintain the uppermost document of the stack **1** at the proper level to be fed to the separating rollers by feed roller **3**. The details of the elevating mechanism form no part of this invention and will not be described. Suitable stack elevating arrangements are shown in the patents to Benson Nos. 2,668,706 and 2,707,569. The operation of stack elevating mechanism **21** is controlled by switch **22** which is actuated by pivoted lever **23** mounted to pivot about the axis of shaft **24** journalled in post **10***c* carried by bar **10**. Lever **23** is carried by a disc **24***a* mounted on the end of shaft **24**. The front end portion of lever **23** extending over the stack **1** is bent at a right angle and forms a feeler finger **23***a* engaging the upper surface of hold-down plate **2**. A tension spring **25** acting on disc **24***a* tends to urge the feeler finger **23***a* into contact with plate **2** and a limit stop **26** rigidly supported from bar **10** engages the tail portion of feeler lever **23** to prevent the tension of spring **25** from damaging switch **22** in the event the stack **1** is not in the right position to relieve the switch from the pressure of the spring. When the stack has been raised to the proper position, feeler lever **23** releases switch **22** and further operation of the stack elevating mechanism **21** is prevented until enough documents have been fed from the top of the stack to necessitate raising the stack again.

The elements described so far constitute the basic elements of the feed mechanism consisting of the feed roll unit, the separating roll unit and the stack elevating control unit. The action of these three units must be accurately timed, coordinated and modified to some extent. This is accomplished by the remaining parts of the illustrated mechanism and is controlled by a conventional single-revolution clutch mechanism represented at **28**. Power is fed to the clutch through a constantly rotating input shaft **29** and the clutch is actuated or tripped by solenoid **30** to rotate output shaft **31** through one complete revolution for each operation of solenoid **30**. This solenoid is controlled by a keyboard control represented at **32** to energize the solenoid upon pressing any of the gate-controlling keys in the keyboard, see the Benson patents referred to above. The output shaft **31** of the single revolution clutch has two cams **33** and **34** mounted thereon for purposes presently to be described.

Mounted on rock-shaft **9** is an arm **35** which has a lateral projection **35***a* formed on one side thereof and a pin **36** projecting from the other side, the arm **35** being adjustably locked to shaft **9** by setscrew **37**. A tension spring **38** is connected between pin **36** and the frame bar **10** of the feed mechanism and tends to rotate rock-shaft **9** in a direction (anti-clockwise) to move roller **3** into contact with the uppermost document of stack **1**. A second arm **39** is mounted on shaft **9** adjacent arm **35** and is free to rotate about the shaft. Arm **39** overlies the lateral projection **35***a* formed on arm **35**, and a screw **40** threaded through arm **39** and engaging projection **35***a* forms an adjustable stop by which the relative position of arm **35** and arm **39** may be varied. The free end of arm **39** is connected to rocker-arm **41** by means of link **39***a*.

Rocker-arm **41** is provided at one end thereof with a cam follower **43** which rides on cam **33**, the rocker arm being mounted upon a fixed support **42** to pivot about a point **41***a* located between the cam follower and link **39***a*. Spring **38**, acting through arms **35** and **39** and link **39***a*, tends to turn lever **41** clockwise about axis **41***a* and holds follower **43** in contact with cam **33** which limits the anti-clockwise turning of rock-shaft **9**. In the normal or off position of the clutch **28**, cam **33** holds rock-shaft **9** in a position with feed roll **3** elevated above the stack **1**, as shown in the drawing. As cam **33** turns from its normal position, rocker-arm **41**, acting under the force of spring **38**, turns clockwise and causes a corresponding turning of arm **39** and rock-shaft **9** in an anti-clockwise direction, until shaft **9** has rotated to the point where roller **3** engages the uppermost document in stack **1**. At this point, if further turning of shaft **9** is stopped by roll **3** engaging the stack **1**, arm **39** separates from arm **35** until cam **33** reverses the motion of rocker-arm **41** and arm **39**, whereupon arm **39** again picks up arm **35** and rotates it against the tension of spring **38**, causing roller **3** to be lifted from stack **1**. Adjustment of screw **40** varies the relative position of arm **39** and arm **35** and therefore varies the amount of time roller **3** is in contact with the stack **1** during each revolution of cam **33**.

During the feeding operation it is desirable to reduce the pressure exerted by hold-down plate **2** on stack **1** as much as possible. Since the feeler finger **23***a* increases the pressure exerted on the stack **1** by plate **2**, spring **25** is attached to the end of rocker-arm **41** so that the tension in spring **25** is relieved as roller **3** is lowered on top of stack **1**. As roller **3** is raised from stack **1**, the tension in spring **25** is again increased.

The effectiveness of the separating rolls is increased during the feeding of a document by means of a linkage controlled by cam **34**. The horizontal plate **15***a* carried by tubular housing **15** has a laterally extending portion which carries a hollow post **44** through which a rod **45** extends and connects with a cam follower arm **46** which rides on cam **34**. The upper end of rod **45** extending out of post **44** is threaded and carries a nut **45***a* by which the effective length of the connecting link formed of rod **45** may be varied. Rotation of cam **34** causes arm **46** and link **45** to rock housing **15** about pivot pins **18***a* in a clockwise direction, thereby raising roller **12** and increasing the overlap between roller **12** and discs **11***a* and **11***b*. The profile of cam **34** is such that this increase in overlap is timed to start just after feed roller **3** has fed the uppermost document in stack **1** into the separating rolls.

After the roller **3** has been lifted from the top of stack **1**, roller **12** is returned to its normal position until the next cycle of operation. In the normal position of roller **12** and at the time the document is being fed into the separating rolls, the overlap is at a minimum, or there may be a gap between the separating rolls, in order to reduce the possibility of damaging the leading edge of the document, as it enters the separating rolls.

The roller **3** may be lifted clear of the area above stack **1** by rotation of lever **27** through an angle of about 90° in a clockwise direction. However, some additional provisions are necessary to raise feeler lever **23**. A sector plate **47** having an arcuate slot **47***a* formed therein

is mounted on shaft 9 near lever 23 and is free to turn on shaft 9. An arm 48 is fixed to shaft 9 adjacent plate 47 by setscrew 49 and a pin 50 is mounted on the arm and extends through slot 47*a*. A tension spring 51 connects plate 47 and mounting disc 24*a* of feeler lever 23 so that rotation of plate 47 clockwise will raise feeler finger 23*a*. During the cyclical oscillation of shaft 9 which is effected by cam 33, pin 50 moves back and forth in slot 47*a* and plate 47 is unaffected by the limited oscillation of shaft 9. Rotation of shaft 9 by lever 27 through a greater angle, however, causes the pin 50 to come up against the lower end of slot 47*a* and plate 47 is caused to rotate, thus increasing the tension in spring 51 to overcome the tension of spring 25 and raises feeler finger 23*a* to a position to permit loading or unloading of the stack bin.

The operation of the feed mechanism is as follows: After roller 3 and feeler lever 23 have been moved to the raised position by means of lever 27, the documents are placed in the stack bin and the transparent hold-down plate 2 is placed on top of the stack. The feeler lever 23 and roller 3 are then lowered to their normal position and the feed roller 3 and separating rollers 11, 12 are placed in motion, as well as the input shaft 29 to the single-revolution clutch 28. Upon actuation of a key in the keyboard mechanism 32, the single-revolution clutch 28 is tripped, and output shaft 31 makes one revolution. Rotation of shaft 31, with cams 33 and 34 mounted thereon, causes the following sequence of operations to occur in timed relation.

First, feed roller 3 is lowered to contact the uppermost document in stack 1 and feed the document from the top of the stack. In order that not more than one document will be fed for each depression of roll 3, the time that roller 3 is in contact with the stack is adjusted by means of screw 40 so that the roller will not make a sufficient number of revolutions during the time it is in contact with the document to feed the full length of the document from under the roller.

Second, simultaneously with the lowering of roller 3, the pressure exerted by feeler finger 23*a* on the stack is relieved so that the drag on the uppermost document is reduced to the minimum amount possible.

Third, after the document has been fed forward sufficiently to enter between the separating rollers 11*a* and 11*b*, and 12, the separating action of the rollers is increased by rocking housing 15 and thereby increasing the overlap between roller 12 and discs 11*a* and 11*b*, and this overlap is further increased while the document is in the separating rolls and is returned to its normal value before the next feeding operation occurs.

I claim:

1. A device for feeding documents from a stack comprising a feed roller, means mounting said feed roller for movement between an upper position above said stack and a lower position in contact with the top of the stack, means for rotating said feed roller about its own axis in a direction to effect feeding of a document from the stack when the roller is in its lower position, operating means operable through a fixed cycle for moving said feed roller from its upper position to its lower position and back to its upper position, and means for adjusting said operating means to vary the length of the interval in said cycle during which said roller is in contact with the top of the stack.

2. A device for feeding documents from a stack comprising a feed roller, supporting means mounting said feed roller for movement between an upper position above said stack and a lower position in contact with the top of the stack, means for rotating said feed roller about its own axis in a direction to effect feeding of a document from the stack when the roller is in its lower position, an operating member movable in cycles through a fixed range of movement, coupling means connecting said supporting means with said operating member for moving said feed roll from its upper position into its lower position and back to its upper position during each cycle of said member, said coupling means including means for adjusting the interval in said cycle during which said roller is in contact with the top of the stack.

3. A device for feeding documents from a stack comprising a feed roller, means mounting said feed roller for movement between an upper position above said stack and a lower position in contact with the top of the stack, means for rotating said feed roller about its own axis in a direction to effect feeding of a document from the stack when the roller is in its lower position, spring means normally urging said roller into its lower position, a movable stop for limiting the movement of said roller under the action of said spring, and operating means for moving said stop through a fixed cycle to effect movement of said feed roller from its upper position to its lower position and back to its upper position.

4. A device according to claim 3 and including means for adjusting said operating means to vary the interval in the cycle of movement of said stop during which said roller is in contact with the top of the stack.

5. In a document sorting machine, the combination of a vertically movable platform for supporting a stack of documents, motive means for elevating said platform, means including a feeler finger yieldably engaging the top of the stack for interrupting the operation of said motive means when the top of the stack reaches a predetermined level, a feeding element mounted above said stack and being movable into feeding position in contact with the topmost document in the stack, operating means operating in cycles to move said feeding member from its upper position to its feeding position and back to its upper position, and means controlled by said operating means for reducing the pressure of said feeler finger on the top of said stack fhen said feeding member is in its feeding position.

6. A combination according to claim 5 wherein said stack includes a plate of transparent material forming the top layer of said stack and providing a contact surface for said feeler finger.

7. A combination according to claim 5 and including a common operating member for moving said feeler finger and said feeding member clear of the top of said stack.

8. In a document sorting machine, the combination of a vertically movable platform for supporting a stack of documents, motive means for elevating said platform, means including a feeler finger yieldably engaging the top of the stack for interrupting the operation of said motive means when the top of the stack reaches a predetermined level while maintaining such engagement, feeding means operating in cycles to remove the topmost document from said stack, and means controlled in timed relation with said feeding means for reducing the pressure of said feeler finger on the top of said stack without breaking contact between the finger and the stack during the feeding operation of said feeding means.

9. A combination according to claim 8 wherein said stack includes a plate of transparent material forming the top layer of said stack and providing a contact surface for said feeler finger.

10. In a document-sorting machine, the combination of a vertically movable platform for supporting a stack of documents, motive means for elevating said platform, means including a pivotally mounted feeler finger yieldably engaging the top of the stack for interrupting the operation of said motive means when the top of the stack reaches a predetermined level, a rock-shaft mounted parallel with one side of said stack adjacent the top thereof, a rotary shaft carried by said rock-shaft and extending at right angles thereto and substantially horizontally over the top of said stack, operating means operating in cycles to rock said rock-shaft through a limited angular movement in each cycle thereof, a feed roller carried by said rotary shaft in a position to engage the topmost

document in said stack when said rock-shaft moves said rotary shaft to its lower angular position, means controlled by said operating means for reducing the pressure of said feeler finger on the top of said stack when said feed roller is in its feeding position, manual means for rotating said rock-shaft to raise said rotary shaft to a substantially vertical position, and means controlled by the rotation of said rock-shaft to raise said feeler finger to a position clear of said stack.

11. In a document-sorting machine, the combination of a vertically movable platform for supporting a stack of documents, motive means for elevating said platform, means including a feeler finger yieldably engaging the top of the stack for interrupting the operation of said motive means when the top of the stack reaches a predetermined level while maintaining such engagement, feeding means mounted to remove the topmost document from said stack, operating means operating in cycles and controlling said feeding means to effect feeding operation thereof during a portion of each cycle, means controlled by said operating means for reducing the pressure of said feeler finger on the top of said stack without breaking contact between the finger and the stack during said feeding operation, document-separating means positioned to receive documents from said feeding means and normally being ineffective, and means controlled by said operating means to render said document-separating means effective in each cycle thereof following initiation of said feeding operation.

12. In a document sorting machine, the combination of a vertically movable platform for supporting a stack of documents, motive means for elevating said platform, means including a feeler finger yieldably engaging the top of the stack for interrupting the operation of said motive means when the top of the stack reaches a predetermined level, feeding means mounted to remove the topmost document from said stack, operating means operating in cycles and controlling said feeding means to effect feeding operation thereof during a portion of each cycle, means controlled by said operating means for reducing the pressure of said feeler finger on the top of said stack during said feeding operation, a set of overlapping rolls positioned to receive documents from said feeding means and operating to buckle said documents transversely, means controlled by said operating means for increasing the over-lap in said set of rolls in each cycle thereof following initiation of said feeding operation.

13. In a document-sorting machine, the combination of a vertically movable platform for supporting a stack of documents, motive means for elevating said platform, means including a pivotally mounted feeler finger yieldably engaging the top of the stack for interrupting the operation of said motive means when the top of the stack reaches a predetermined level, a rock-shaft mounted parallel with one side of said stack adjacent the top thereof, a rotary shaft carried by said rock-shaft and extending at right angles thereto and substantially horizontally over the top of said stack, operating means operating in cycles to rock said rock-shaft through a limited angular movement in each cycle thereof, a feed roller carried by said rotary shaft in a position to engage the topmost document in said stack when said rock-shaft moves said rotary shaft to its lower angular position, means for adjusting the interval in said cycle during which said feed roller is in feeding position, means controlled by said operating means for reducing the pressure of said feeler finger on the top of said stack when said feed roller is in its feeding position, a set of overlapping rolls positioned to receive documents from said feed roller and operating to buckle said documents transversely, means controlled by said operating means for increasing the over-lap in said set of rolls in each cycle thereof following movement of said feed roller into feeding position, manual means for rotating said rock-shaft to raise said rotary shaft to a substantially vertical position, and means controlled by the rotation of said rock-shaft to raise said feeler finger to a position clear of said stack.

14. In a document-sorting machine, the combination of feed means operating in cycles to feed documents, document-separating means positioned to receive documents from said feed means, said separating means being normally inoperative and being movable into operative position, and means to periodically actuate said separating means from its inoperative position to its operative position in timed relation to the operation of said feed means.

15. In a document-sorting machine, the combination of feed means operating in cycles to feed documents, document-separating means positioned to receive documents from said feed means, said separating means being movable from a position of relatively low effectiveness to a position of relatively high effectiveness, and means to periodically move said separating means in timed relation to the operation of said feed means from the position of low effectiveness to the position of high effectiveness.

16. In a document-sorting machine, the combination of feed means operating in cycles to feed documents, a set of over-lapping rolls positioned to receive documents from said feed means and operating to buckle said documents transversely, and means controlled in timed operation with said feed means for increasing the over-lap in said set of rolls in each cycle of operation of said feed means.

17. In a document-sorting machine, the combination of a feed means operating in cycles to feed documents, document-separating means positioned to receive documents from said feed means, said separating means comprising a first rotating shaft, a pair of discs mounted in spaced relation on said shaft, a second rotating shaft mounted in substantially parallel relation with said first shaft, a friction roller mounted on said second shaft in a plane which passes between said pair of discs and operating in a direction tending to return documents to said feed means, and means controlled in timed operation with said feeding means for changing the relative position of said first and second shafts to effect periodic changes in over-lapping of the circumference of said roller with the circumference of said discs.

18. In a sorting machine, a document-separating mechanism comprising a first rotating shaft arranged on one side of a plane in which documents are presented, a pair of discs mounted in spaced relation on said shaft and being adjustable along the length of said shaft, a second rotating shaft mounted on the opposite side of said plane and in substantially parallel relation with said first shaft, a friction roller mounted on said second shaft substantially mid-way between said pair of discs, and an adjustable mounting for one of said shafts to vary the over-lap between said friction roller and said discs and thereby buckle said documents transversely, and the spacing between said discs being adjustable whereby the curvature imparted to documents passing between said discs and said roller may be varied.

19. In a document sorting machine, the combination of a vertically movable platform for supporting a stack of documents, electrically operated motive means for elevating said platform, a circuit for energizing said motive means including a normally closed switch, means for maintaining the top of the stack at a predetermined level comprising a feeler finger extending over said stack in a position to engage the uppermost document on the stack and being operable by the upward movement of the stack to open said switch when the top of the stack reaches a predetermined level, and means for mounting said feeler finger on a pivotal axis located to one side of said stack and for the upward tilting of said finger through

substantially 90 degrees into a position clear of the top of the stack.

20. In a document sorting machine, the combination of a vertically movable platform for supporting a stack of documents, electrically operated motive means for elevating said platform, a circuit for energizing said motive means including a control switch, an operator for said switch mounted to turn about a pivotal axis located to one side of said stack, a feeler finger supported by said switch operator and extending over the top of said stack in a position to engage the uppermost document on the stack, spring means acting on said switch operator tending to move said feeler finger downwardly and to hold said switch in closed position, said feeler finger being operable by the upward movement of the stack to open said switch when the top of the stack reaches a predetermined level,

the pivotal mounting for said switch operator and feeler finger being constructed to permit upward tilting of said finger through substantially 90 degrees into a position clear of the top of the stack, and releasable means for retaining said finger in its tilted position.

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