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[54] **COPY SHEET FEED TRAY RAISING AND LOWERING DEVICE FOR DUPLICATOR OR THE LIKE**

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[52] **U.S. Cl.** **271/39**, 271/62

[51] **Int. Cl.** **B65h 1/14**

[58] **Field of Search** ..... 271/39, 62 R, 36

[56] **References Cited**

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Assistant Examiner—James W. Miller
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[57] **ABSTRACT**

A copy sheet feed tray operating device comprising an operation lever, pivotally supported by a side plate of the duplicating machine in which it is incorporated and movable from a first position to second and third positions, and suitable operating mechanisms whereby pivoting of the operation lever from the first position to the second position moves the copy sheet feed tray downwardly and the copy sheet feed roller upwardly, thereby permitting the placing of a predetermined number of copy sheets on the tray. Shifting of the operation lever from the second position to the third position moves the copy sheet feed tray upwardly so as to bring the top of a new stack of copy sheets on the tray into pressing engagement with the copy sheet feed roller. The force with which the copy sheet feed roller presses against the stack of copy sheets on the tray is automatically adjusted to an optimum level so that it is possible to feed each copy sheet under optimum conditions without requiring further adjustments. When the operation lever is released, it automatically returns to the first position.

10 Claims, 9 Drawing Figures

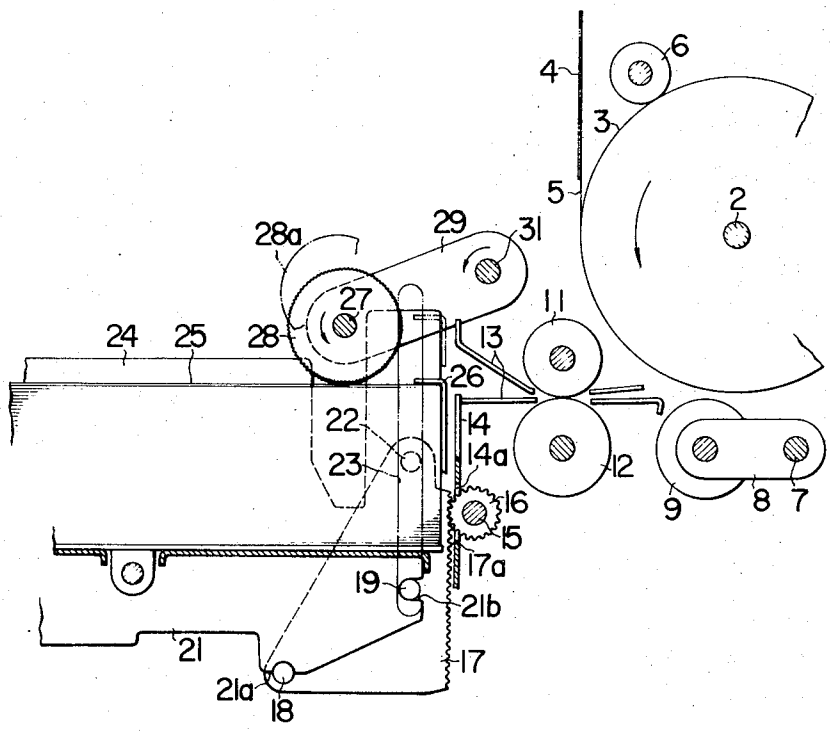

FIG. 1

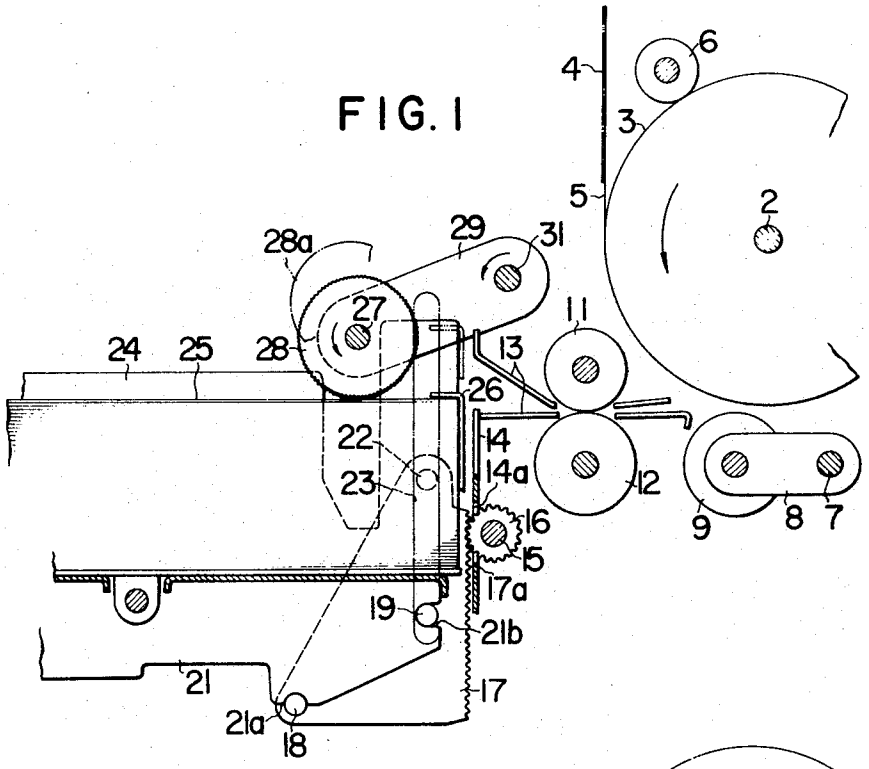

FIG. 2

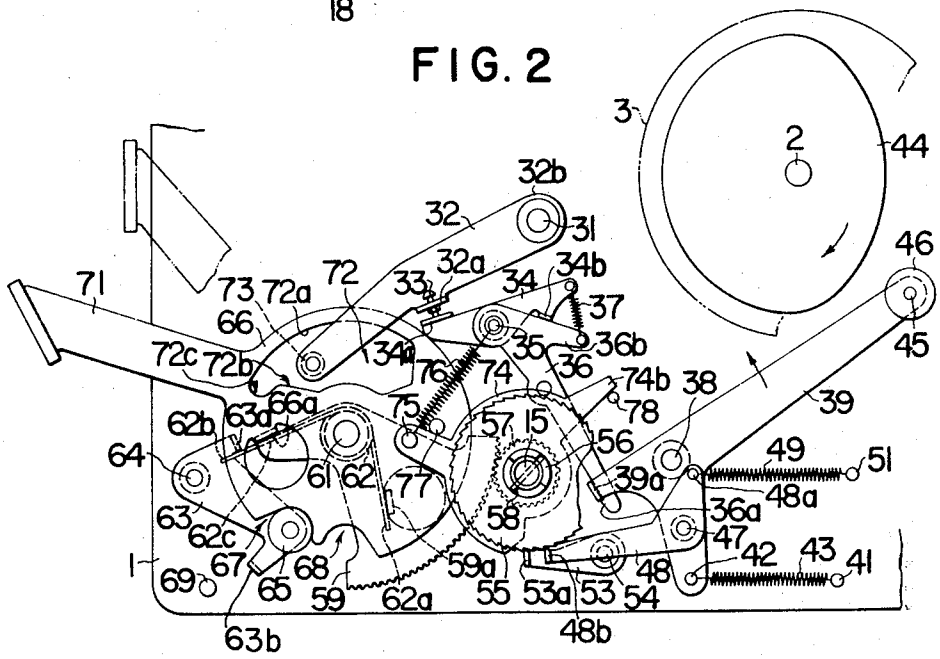

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FIG. 3

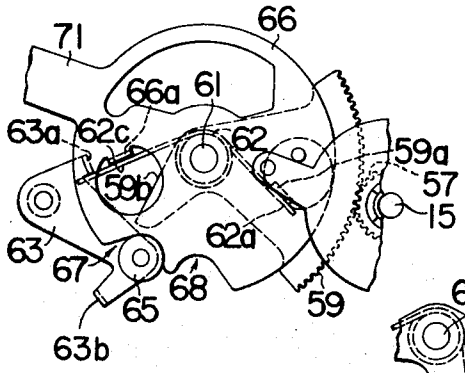

FIG. 6

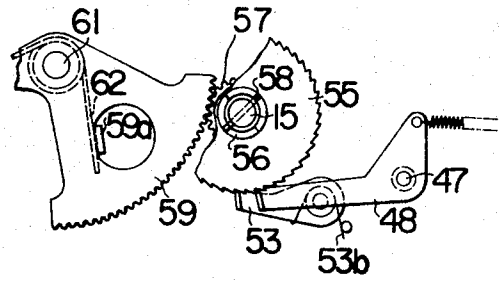

FIG. 7

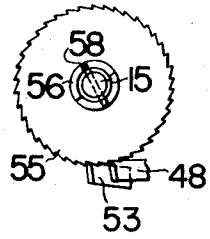

FIG. 8

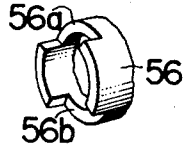

FIG. 9

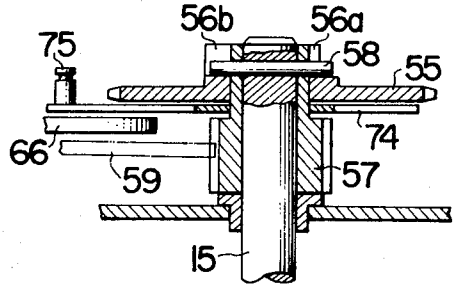

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FIG. 4

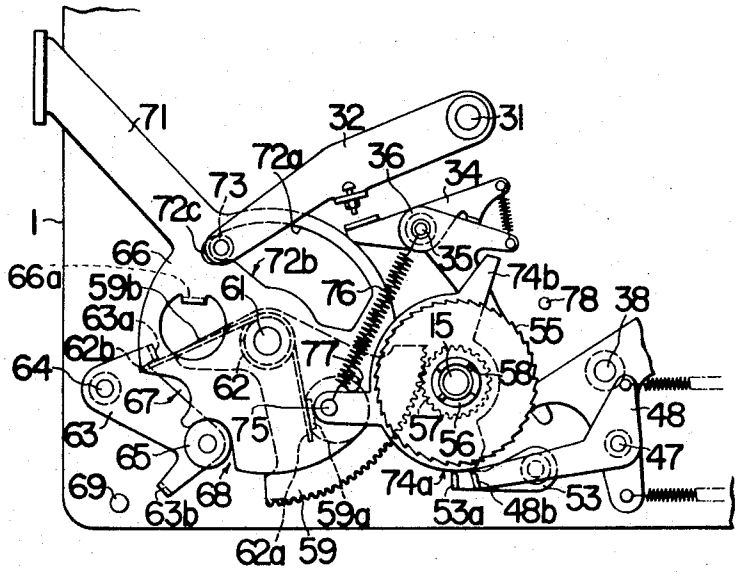
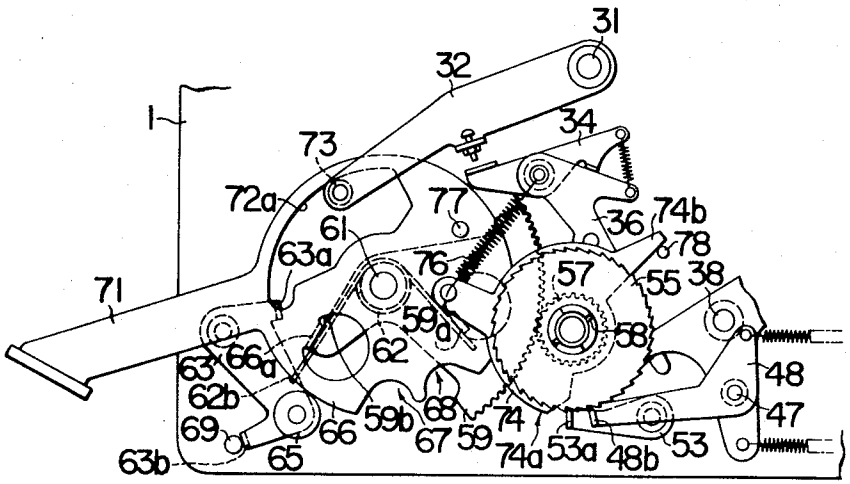


FIG. 5



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COPY SHEET FEED TRAY RAISING AND LOWERING DEVICE FOR DUPLICATOR OR THE LIKE

BACKGROUND OF THE INVENTION

This invention relates to a copy sheet feed tray raising and lowering device for duplicating machines or the like.

In mimeograph printing machines, offset printing machines and the like, the copy sheet feed tray is gradually moved upwardly by a known copy sheet feed tray elevating device coupled to the printing machine as the number of copy sheets on the tray gradually decreases with the progress of printing operation. In such devices, the command to move upwardly is generally given when a detection lever operatively associated with the copy sheet feed roller moves downwardly.

When a new stack of copy sheets is placed on the copy sheet feed tray after all the copy sheets of the prior stack have been fed or only a small number of them remain, it has hitherto been customary in the known device to manually and separately perform in different steps the operations of lowering the copy sheet feed tray, raising the copy sheet feed roller, raising the copy sheet feed tray to a predetermined level after a new stack of copy sheets has been placed thereon, lowering the copy sheet feed roller into pressing engagement with the top of the stack of copy sheets, and adjusting the force with which the copy sheet feed roller presses against the top of the stack of copy sheets. This has caused inconvenience to the operator because it is troublesome and time-consuming to perform such operations separately, and this greatly reduces printing efficiency.

SUMMARY OF THE INVENTION

This invention embodies a copy sheet feed tray raising and lowering device for duplicating machines or the like comprising suitable mechanism actuated by an operation lever which is movable from a first position to second and third positions. When the operation lever is shifted from the first position to the second position, the mechanism causes a detection lever to be moved in pivotal motion, a copy sheet feed roller to move upwardly, and a ratchet wheel for moving the copy sheet feed tray upwardly to be released, thereby permitting the copy sheet feed tray to move downwardly by its own weight to its lower position for the placing of a new stack of copy sheets thereon. When the operation lever is moved from the second position to the third position, the ratched wheel is rotated so as to move the copy sheet feed tray upwardly into pressing engagement with the copy sheet feed roller. When the operation lever is released, it automatically returns to the first position and the force with which the copy sheet feed roller presses against the top of the new stack of copy sheets is automatically adjusted to an optimum level so that it is possible to feed each copy sheet under optimum conditions without requiring further adjustments. This invention thus permits the copy sheet feed tray to be moved upwardly and downwardly by merely shifting the operation lever from the first position to the second and third positions, and the additional operation of adjusting the force with which the copy sheet feed roller presses against the top of the new stack of copy sheets on the copy sheet feed tray can be eliminated.

According to this invention, the need to manually perform the operations of raising the copy sheet feed roller, raising the copy sheet feed tray and lowering the copy sheet feed tray separately as is done in conventional devices of this type is eliminated. These operations can be performed by merely shifting the operation lever from the first position to the second and third positions. Furthermore, the operation of adjusting the force with which the copy sheet feed roller presses against the top of the new stack of copy sheets on the copy sheet feed tray can be eliminated, thereby simplifying the operation of placing a new stack of copy sheets on the copy sheet feed tray and greatly increasing printing efficiency.

BRIEF EXPLANATION OF THE DRAWINGS

FIG. **1** is a side view of a conventional copy sheet feed tray for rotary mimeograph printing machines in which the present invention can be incorporated.

FIG. **2** is a side view of the copy sheet feed tray raising and lowering device embodying the present invention.

FIGS. **3** to **5** are views illustrating the operation of the device shown in FIG. **2**.

FIG. **6** is a side view of the segmental gear and the ratchet wheel portion of the device shown in FIG. **2**.

FIG. **7** is a view illustrating the operation of the ratchet wheel and the feed roller force adjusting means.

FIG. **8** is a perspective view of the boss of the ratchet wheel shown in FIG. **7**; and

FIG. **9** is a fragmentary sectional view in plan of the ratchet wheel portion shown in FIG. **6**.

DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

While this invention can have application in the copy sheet feed tray means of offset printing machines or rotary mimeograph printing machines, or the like, the invention will be described with reference to an embodiment incorporated in a rotary mimeograph printing machine.

A rotary mimeograph printing machine generally comprises a pair of (upper and lower) master cylinders having a screen entrained thereover, a pair of ink form rollers each maintained in pressing engagement with one of the two master cylinders, and a pressure roller maintained in pressing engagement with the lower master cylinder through the screen. Printing is carried out as a copy sheet fed by the copy sheet feed device is pressed by the pressure roller against the original to be duplicated which is mounted on the screen beforehand.

In FIG. **1**, such a screen **5** having an original **4** to be duplicated mounted thereon is shown entrained about a master cylinder **3** supported by a shaft **2** connected to a machine side plate **1** (shown in FIG. **2**). An ink form roller **6** is maintained in pressing engagement with the peripheral surface of master cylinder **3**.

A pressure roller **9** mounted by a shaft at a free end of an arm **8** which is supported by a shaft **7** connected to the machine side wall, is adapted to come into pressing engagement with master cylinder **3** only when a copy sheet is fed into engagement with the master cylinder **3** by a pair of delivery rollers **11** and **12** which are supported by shafts connected to the machine side plate.

A copy sheet guide plate **13**, and a wall **14** are also secured to the side plate **1**. Wall **14** is formed therein with an opening **14***a* through which projects leftwardly in the figure a portion of a drive pinion **16** mounted on the side plate **1** by a shaft **15**. A rack **17***a* of a rack plate **17** is maintained in meshing engagement with the projecting portion of pinion **16**.

Cutouts **21***a* and **21***b* formed in copy sheet feed tray **21** engage pins **18** and **19**, respectively, which are attached to rack plate **17**. The pin **19** projecting inwardly of rack plate **17** and with a pin **22**, attached to an upper portion of rack plate **17**, is loosely received in a vertical slot **23** formed in the side plate **1**. Copy sheet feed tray **21** is provided with a guide side wall **24** which brings side edges of copy sheets **25** piled in a stack on copy feed tray **21** into alignment with one another. Front edges of the copy sheets **25** facing rightwardly in the figure are lightly held in place by a corner separator **26**.

A copy sheet feed roller **28** supported by a shaft **27** is maintained in engagement with the top of the stack of copy sheets **25**. Shaft **27** is mounted at a free end of a supporter **29** which is secured at its base to a shaft **31** rotatably connected to the side plate **1**. The shaft **31** extends outwardly through the side plate **1** and has secured to the projecting end portion thereof a base **32***b* of a detection lever **32** as shown in FIG. **2**. Supporter **29** and detection lever **32** operate in a substantially integral manner with each other.

On the other side of the side plate, as shown in FIG. **2**, detection lever **32** is formed with a tab portion **32***a* having an opening for threadably receiving therein an adjusting screw **33**. Adjusting screw **33** is maintained in engagement with a tab portion **34***a* formed on a charge member **34** which is supported by a shaft **35** connected to the side wall **1**. A spring **37** is mounted between a first lock member **36**, also supported by shaft **35**, and charge member **34** so that another tab portion **34***b* of charge member **34** is maintained in pressing engagement with side edge **36***b* of first lock member **36** by the biasing force of spring **37**.

Adjacent lock member **36** is a follower **39** which is supported by a shaft **38** connected to the side wall **1** and urged to pivot counter-clockwise by the biasing force of a spring **43** which is mounted at one end on a pin **41** attached to the side plate **1** and at the other end on a pin **42** attached to follower **39**. Counterclockwise pivotal movement of follower **39** is normally precluded by the pressing engagement of an extended portion **39***a* formed on follower **39** with an offset portion **36***a* formed on the end of first lock member **36**.

Above follower **39** is a drive cam **44** mounted on shaft **2** supporting master cylinder **3** and adapted to be rotated clockwise, that is, in a direction opposite to the direction of rotation of master cylinder **3** by suitable reverse rotation means. A roller **46** mounted at a free end of follower **39** by a shaft **45** is engaged by cam **44**, moving follower **39** slightly against the action of spring **43** each time cam **44** makes one complete revolution, so as to reduce the force with which extended portion **39***a* is maintained in pressing engagement with offset portion **36***a*.

A feed pawl **48** pivotally connected to follower **39** by a shaft **47** is urged to pivot clockwise about shaft **47** by the biasing force of a spring **49** which is mounted at one end on a pin **51** attached to the side plate **1** and at the other end on a pin **48***a* attached to the pawl **48**. Feed pawl **48** is formed at its front end with a pawl member **48***b* which is maintained in pressing engagement with the peripheral edge of a ratchet wheel **55** by the biasing force of spring **49**. A reverse rotation check pawl **53** is pivotally supported by a shaft **54** connected to the side plate **1** and has a pawl member **53***a* at its front end which is maintained in pressing engagement with the peripheral edge of ratchet wheel **55** by the biasing force of a spring **53***b* shown in FIG. **6**.

Cutouts **56***a* and **56***b*, shown more clearly in FIG. **8**, are formed in a boss **56** of ratched wheel **55**. Received in the two cutouts are opposite ends of a cotter pin **58** which secures a pinion **57** to shaft **15** (see FIG. **9**). With this arrangement, ratchet wheel **55** is mounted on shaft **15** such that it can rotate freely relative to shaft **15** within limits defined by the side surfaces of the two cutouts **56***a* and **56***b* in boss **56** which abut against cotter pin **58** after permitting a degree of play as shown in FIG. **7**.

Returning to FIG. **2**, a segmental gear **59** is maintained in meshing engagement with pinion **57** which segmental gear is pivotally supported at its base by a shaft **61** connected to the side plate **1**. A biasing spring **62** mounted on shaft **61** is maintained by a free end **62***a* thereof in pressing engagement with a tab portion **59***a* formed on segmental gear **59**. Spring **62** is maintained by the other end **62***b* thereof in engagement with a tab portion **63***a* formed in a click stopper **63** pivotally supported by a shaft **64** connected to the side wall **1**. A roller **65** mounted by a shaft at a free end of click stopper **63** is maintained in pressing engagement in a recess **67** formed in an actuation cam **66**, mounted on shaft **61**, by the biasing force of spring **62**.

An operation lever **71** in accordance with the present invention extends from an actuation cam **66** which has a tab portion **66***a* that is brought, by the weight of lever **71**, into engagement with a straight arm portion **62***c* of spring **62**.

Actuation cam **66** is formed with an opening **72** into which extends a roller **73** mounted on a shaft at a free end of detection lever **32**. As subsequently to be described, roller **73** may be brought into engagement with a downwardly facing arcuate inner edge portion **72***a* an upwardly facing straight edge portion **72***b* and a valley **72***c* contiguous with edge portions **72***a* and **72***b*, as operation lever **71** is operated.

A release cam **74** for releasing pawl members **53***a* and **48***b* from engagement with ratchet wheel **55** is mounted on the shaft **15** which ratchet wheel **55** is mounted. Release cam **74** is urged to rotate clockwise by the biasing force of a spring **76**, whose opposite ends are mounted on a pin **75** attached to a short arm of cam **74** and shaft **35** respectively. The short arm is maintained by one side edge in pressing engagement with a pin **77**, attached to actuation cam **66**, by the biasing force of spring **76**.

Referring to FIG. **1** again, in operation, copy sheet feed roller **28** intermittently rotates in the direction of the arrow as the copy sheet feed mechanism (not shown) is actuated to feed one copy sheet **25** after another to the pair of delivery rollers **11** and **12** which deliver each copy sheet between master cylinder **3** and pressure roller **9**, so that printing is carried out.

Copy sheet feed roller **28** gradually moves downwardly as the copy sheets **25** on copy sheet feed tray **21** are reduced in number, with supporter **29** pivoting counter-clockwise as shaft **31** angularly rotates in the same direction. During the pivotal movement of supporter **29**, detection lever **32** shown in FIG. **2**, which is substantially integral in operation with supporter **29** as aforesaid, pivots in the same direction and causes charge member **34** to pivot counterclockwise, so that some energy of resilience is gradually stored in spring **37**. When the energy of resilience stored in spring **37** is low in magnitude, counter-clockwise pivotal movement of lock member **36** does not occur even if follower **39** is caused to slightly pivot clockwise by the action of cam **44** and the force with which extended portion **39***a* is maintained in pressing engagement with offset portion **36***a* is reduced. Thus, lock member **36** continues to lock follower **39**.

When the energy of resilience stored in spring **37** increases in magnitude with a reduction of the number of copy sheets **25** on copy sheet feed tray **21** by, for example, about 10 sheets, then lock member **36** is caused to pivot counter-clockwise about shaft **35** by the biasing force of spring **37** when the force with which follower **39** is maintained in engagement with lock member **36** is reduced, thereby releasing follower **39** from engagement with lock member **36**. As a result, follower **39** makes one pivotal motion about shaft **38** in slaved relation to the rotation of cam **44**. By this pivotal movement of follower **39**, feed pawl **48** angularly rotates ratchet wheel **55** clockwise a predetermined amount, and cotter pin **58** maintained in pressing engagement with the boss **56** of ratchet wheel **55** as shown in FIG. **7** pivots clockwise as shaft **15** rotates in the same direction.

As aforementioned, pinion **57** maintained in meshing engagement with segmental gear **59** and drive pinion **16** maintained in meshing engagement with rack plate **17** shown in FIG. **1** are secured to shaft **15**. Because of this arrangement, rack plate **17** and copy sheet feed tray **21** mounted thereon intermittently move upwardly as ratchet wheel **55** angularly rotates clockwise. Upward movement of copy sheet feed tray **21** is repeated each time about **10** copy sheets are removed from the stack of copy sheets on copy sheet feed tray **21**. Segmental gear **59** pivots counter-clockwise as shown in FIG. **3** each time copy sheet feed tray **21** moves upwardly.

When all the copy sheets on copy sheet feed tray **21** are fed, it is necessary to place thereon a fresh supply of copy sheets. To this end, it is required to lift copy sheet feed roller **28**, lower copy sheet feed tray **21** and raise copy sheet feed tray **21** after a new stack of copy sheets is placed thereon. As aforesaid, these operations have hitherto been performed separately by hand in devices of the prior art. According to this invention, these operations can be readily performed by shifting operation lever **71** upwardly and downwardly. Operation of the device according to this invention will now be set forth.

In FIG. **2**, operation lever **71** is shown disposed in a first position in which it is inoperative and copy sheets are fed one after another to perform a printing operation. When it is desired to place a fresh supply of copy sheets on the copy sheet feed tray, operation lever **71** is shifted clockwise to a second position shown in FIG. **4**. As operation lever **71** is moved from the first position shown in FIG. **2** to the second position shown in FIG. **4**, the roller **73** of detection lever **32** is pushed upwardly by the upwardly facing straight edge portion **72***b* of action cam **66** and into valley **72***c* as shown in FIG. **4**. Clockwise pivotal movement of detection lever **32** results in clockwise pivotal movement of copy sheet feed roller supporter **29** shown in FIG. **1** which is substantially integral in operation with detection lever **32**, so that copy sheet feed roller **28** is moved upwardly to a dash-and-dot line position **28***a* in FIG. **1**.

On the other hand, release cam **74** is caused to pivot counterclockwise by pin **77** during the clockwise pivotal movement of actuation cam **66**. This results in reverse rotation check pawl **53** and feed pawl **48** being engaged by and riding on an outer side edge **74***a* of cam **74**, so that pawl members **48***b* and **53***a* are released from engagement with ratchet wheel **55** as shown in FIG. **4**. When ratchet wheel **55** and shaft **15** are thus released, copy sheet feed tray **21** which is mounted on the rack plate **17** in meshing engagement with the pinion **16** shown in FIG. **1** is free to move downwardly by its own weight to a predetermined position. At the same time, the segmental gear **59** in meshing engagement with pinion **57** angularly rotates and returns to a position shown in FIG. **4** in conjunction with the downward movement of copy sheet feed tray **21**.

It will thus be evident that by merely shifting operation lever **71** to the second position shown in FIG. **4**, it is possible to simultaneously cause copy sheet feed roller **28** to move upwardly and copy sheet feed tray **21** to move downwardly so as to permit placing of a new stack of copy sheets on the copy sheet feed tray. When operation lever **71** is shifted to this second position, the roller **65** of click stopper **63** drops into another recess **68** formed in actuation cam **66**, thereby holding operation lever **71** in place while in the second position shown in FIG. **4**.

One has only to shift operation lever **71** from the second position shown in FIG. **4** to the third position shown in FIG. **5** to raise copy sheet feed tray **21** to a predetermined position after a new stack of copy sheets has been piled thereon. Angular rotation of actuation cam **66** from its position shown in FIG. **2** to its position shown in FIG. **5** causes tab portion **66***a* to move the straight arm portion **62***c* of spring **62** and one side edge **59***b* (shown in FIG. **3**) of segmental gear **59** counterclockwise. As a result, click stopper **63** angularly rotates till its lower end **63***b* abuts against a stopper **69** affixed to the side plate **1**, thereby releasing roller **65** from pressing engagement with actuation cam **66**.

Meanwhile, counter-clockwise angular rotation of segmental gear **59** causes the drive pinion **16**, shown in FIG. **1**, which is substantially integral in operation with pinion **57**, to angularly rotate clockwise, thereby raising rack plate **17** and copy sheet feed tray **21**.

As copy sheet feed tray **21** draws close to its upper position in its upward movement, the top of the new stack of copy sheets **25** thereon engages and upwardly moves copy sheet feed roller **28**. This causes the supporter **29** which supports copy sheet feed roller **28** and the detection lever **32** to slightly pivot clockwise to bring the roller **73** of detection lever **32** into abutting engagement with the downwardly facing arcuate inner

edge portion 72*a* of actuation cam 66 as shown in FIG. 5.

The position at which roller 73 comes into abutment with the arcuate edge portion 72*a* will vary depending on the number of copy sheets piled in a stack on copy sheet feed tray 21. The smaller number of copy sheets, the greater is the counter-clockwise pivotal movement of operation lever 71. Regardless of the extent, however, the counter-clockwise angular movement of operation lever 71 is terminated as roller 73 is forcibly brought into abutting engagement with arcuate inner edge portion 72*a*. The force with which roller 73 is brought into abutting engagement with inner edge portion 72*a* is produced by the action of the copy sheets on copy sheet feed tray 21 upwardly pushing copy sheet feed roller 28 and the manual force exerted on lever 71 in moving it from the second to the third position. Therefore, the copy sheets are brought into pressing engagement with copy sheet feed roller 28 with a significant force if operation lever 71 is pivoted till it stops. It is impossible to perform a smooth copy sheet feed operation so long as the copy sheets and copy sheet roller 28 are in this state. According to this invention, means is provided for automatically lowering copy sheet feed tray 21 to an optimum position for carrying out copy sheet feed smoothly without requiring further adjustments. This feature will now be described.

As actuation cam 66 angularly rotates from its position shown in FIG. 4 to its position shown in FIG. 5, release cam 74 angularly rotates clockwise till it stops when the arm 74*b* thereof abuts against a stopper 78 affixed to the side plate 1. This angular rotation of release cam 74 brings the pawl members 53*a* and 48*b* of check pawl 53 and feed pawl 48 respectively into engagement with ratchet 55 again as shown in FIG. 5. Meanwhile, when segmental gear 59 angularly rotates counter-clockwise, the cotter pin 58 attached to pinion 57 turns the boss 56 of ratchet wheel 55 clockwise in a manner shown in FIG. 6. Therefore, if operation lever 71 is released when it has been brought to its position shown in FIG. 5 in which the copy sheets on copy sheet feed tray 21 are brought into pressing engagement with copy sheet feed roller 28, shaft 15 and cotter pin 58 will be slightly rotated in the reverse direction or counter-clockwise by the weight of copy sheet feed tray 21. This reverse movement is stopped by cotter pin 58 abutting against the other wall surfaces of cutouts 56*a* and 56*b* as shown in FIG. 7.

The amount of reverse movement of cotter pin 58 may thus be varied by regulating the dimensions of the cutouts 56*a* and 56*b*. As cotter pin 58 moves in the reverse direction as aforesaid, the pinion 16 secured to shaft 15 as shown in FIG. 1 rotates counterclockwise, thereby causing copy sheet feed tray 21 to move slightly downwardly. The distance of this downward movement corresponds to the thickness of several number of copy sheets, so that the force with which copy sheet feed roller 28 presses against the top of the stack of copy sheets is brought to an optimum level which permits the carrying out of copy sheet feeding under satisfactory conditions.

If operation lever 71 is released when it is in the position shown in FIG. 5, actuation cam 66, which is integral with lever 71, will be caused to angularly rotate clockwise by the biasing force of spring 62 till it stops at a position shown in FIG. 2 in which one end 62*b* of the spring abuts against the tab portion 63*a* of click stopper 63. This automatically returns operation lever 71 to the first position. Click stopper 63 is caused to angularly rotate counter-clockwise by the biasing force of spring 62 to bring roller 65 into engagement in the recess 67 of actuation cam 66 again, so as to thereby hold operation lever 71 in place in the first position.

What is claimed is:

1. Apparatus for raising and lowering a copy sheet feed tray in a duplicating machine comprising:

a. means for elevationally supporting a copy sheet feed tray;

b. a copy sheet feed roller for feeding copy sheets in succession from a stack of copy sheets on said feed tray to the machine;

c. means for elevating said feed tray supporting means;

d. a rotatable shaft for operating said elevating means;

e. a ratchet wheel for rotating said shaft;

f. a feed pawl for advancing said ratchet wheel;

g. a check pawl for preventing reverse rotation of said ratchet wheel;

h. a pivoted supporter for said copy sheet feed roller;

i. a detection lever connected to and pivoted with said supporter;

j. drive means;

k. means responsive to the position of said detection lever for intermittently coupling said feed pawl to said drive means so as to intermittently advance said ratchet wheel to raise the feed tray by operating the shaft and elevating means;

l. an operation lever movable from a first position to second and third positions;

m. first cam means actuated by said operation lever for pivoting said detection lever when said operation lever is shifted to its second position so as to raise said feed roller;

n. means for releasing said feed pawl and check pawl from engagement with said ratchet wheel when said operation lever is shifted to its second position so as to permit said feed tray to descend to its lowest position;

o. means connected to said operation lever for rotating said rotatable shaft when the operation lever is shifted to its third position so as to raise said feed tray; and

p. second cam means actuated by said operation lever for preventing the pivoting of said detection lever when said operation lever is in its third position so as to maintain said feed roller in position when said feed tray is raised by the shifting of said operation lever to said third position whereupon said feed roller is urged upwardly by engagement with a stack of copy sheets on said feed tray.

2. Apparatus as in claim 1, wherein said means for intermittently coupling said feed pawl and said drive means comprises:

q. pivotable means actuated by said detection lever;

r. lever means resiliently connected to said pivotable means and pivoted when said pivotable means pivots beyond a predetermined displacement;

s. follower means having said feed pawl mounted thereon and held against pivoting by said lever means; and

t. cam means rotated by said drive means and cooperating with said follower means upon the release of said follower means by said lever means to drive said feed pawl.

3. Apparatus as in claim 1, including:

q. boss means on said ratchet wheel having opposed cut-out portions therein; and

r. pin means fixed to said rotatable shaft and received in said cut-out portions to permit a predetermined amount of play between the rotation of said shaft and said ratchet wheel.

4. Apparatus as in claim 1, wherein said feed pawl and check pawl releasing means comprises:

q. third cam means;

r. spring means for holding said third cam means in inoperative position; and

s. means on said operation lever for engaging said third cam means when said operation lever is shifted to its third position to overcome the force of said spring means and rotate said third cam means to a position to release said pawls.

5. Apparatus as in claim 1, wherein the means connected to said operation lever for rotating said rotatable shaft when the operation lever is shifted to its third position comprises:

q. a segmental gear rotated by said operation lever; and

r. pinion means on said rotatable shaft cooperating with said segmental gear.

6. Apparatus as in claim 1, wherein said elevating means comprises:

q. a rack on said supporting means; and

r. a pinion cooperating with said rack on said rotatable shaft.

7. Apparatus as in claim 1, including a member on said operation lever having an edge with adjacent recesses therein and a spring loaded roller means riding on the edge of said member and respectively seating in said recesses when said operation lever is in its first and third positions for holding said operation lever in said positions.

8. Apparatus as in claim 7, wherein said member comprises said first and second cam means.

9. Apparatus as in claim 8, wherein said member comprises third cam means for holding said detection lever in the raised position when said operation lever is in its second position.

10. Apparatus as is claim 1, wherein said drive means comprises a continuously rotating cam means operatively connected to a master print cylinder of the duplicating machine.

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