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Ravera et al.

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[54] **COPYING MACHINE PARTICULARLY OF THE DESK-TOP ELECTROSTATIC TYPE**

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[21] Appl. No.: **251,994**

[30] **Foreign Application Priority Data**

May 5, 1971 Italy 68539/71

[52] **U.S. Cl.** **83/205,** 83/67, 83/362, 83/649, 242/68.7

[51] **Int. Cl.** **B65h 19/00**

[58] **Field of Search** 83/67, 66, 203, 205, 649, 83/650, 362; 242/68.7, 78.7

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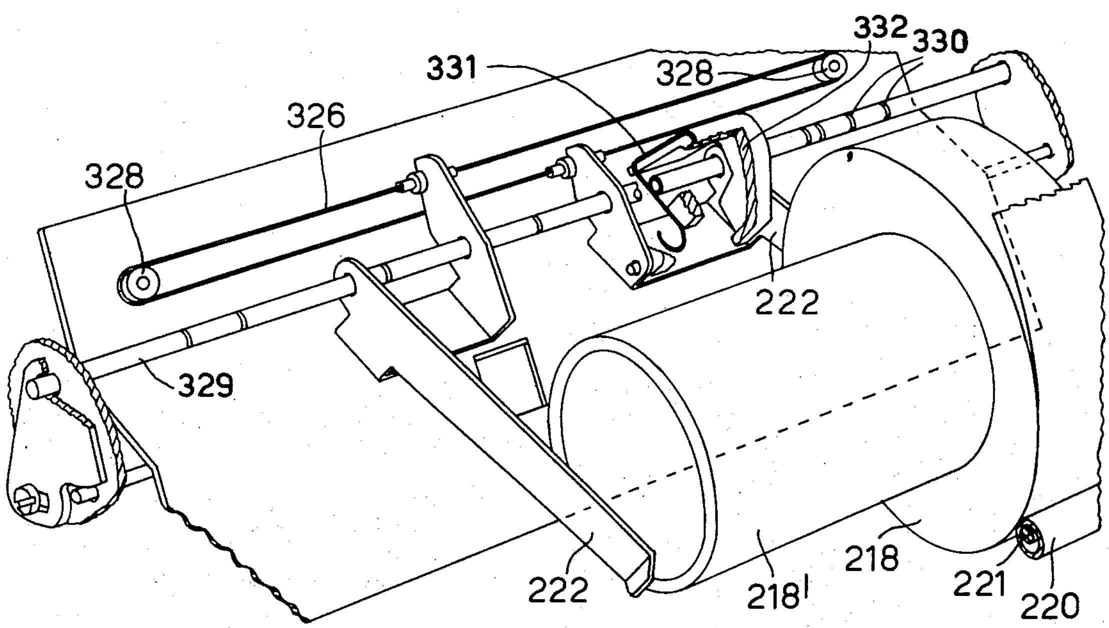
Primary Examiner—Frank T. Yost
Attorney, Agent, or Firm—I. J. Schaefer

[57] **ABSTRACT**

A roll fed electrostatic copying machine having a bed including a pair of rollers for receiving a roll of copy paper and means attached to the machine for maintaining the roll in a predetermined axial position in the bed, and including a mechanical knife mechanism for cutting sheets from the roll, and means for insuring that the length of the copy paper cut by the knife mechanism falls between predetermined minimum and maximum lengths.

2 Claims, 12 Drawing Figures



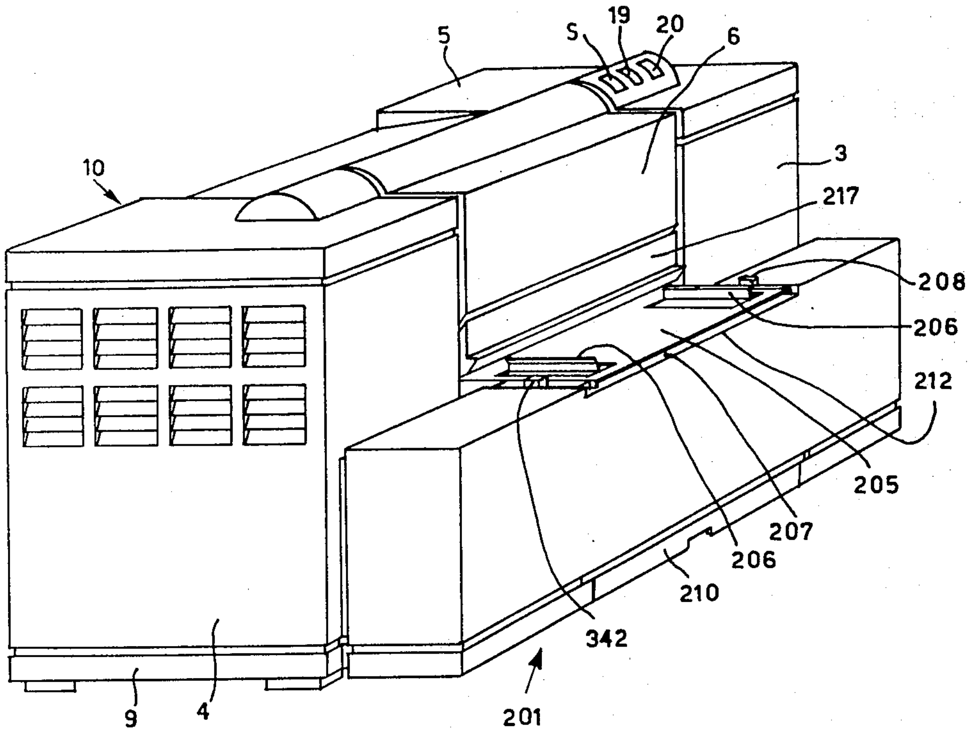


Fig. 1

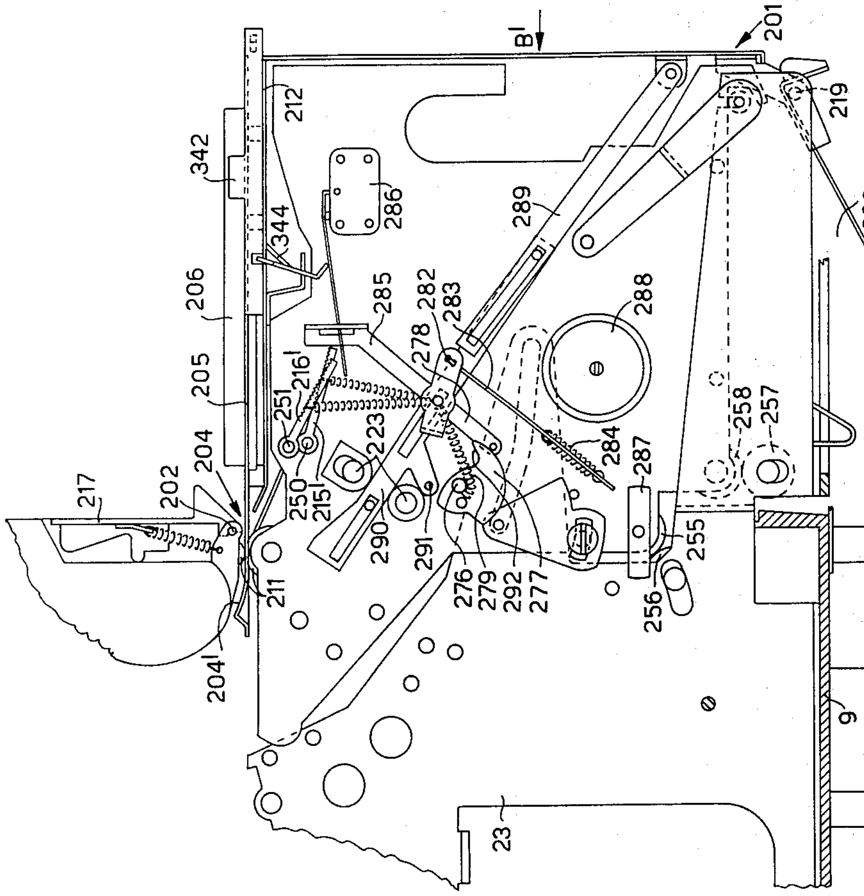


Fig. 3

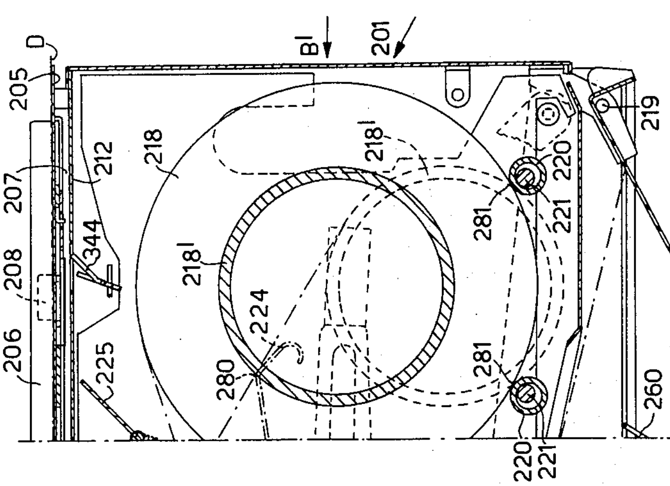


Fig. 2b

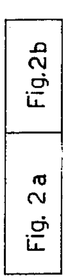


Fig. 2

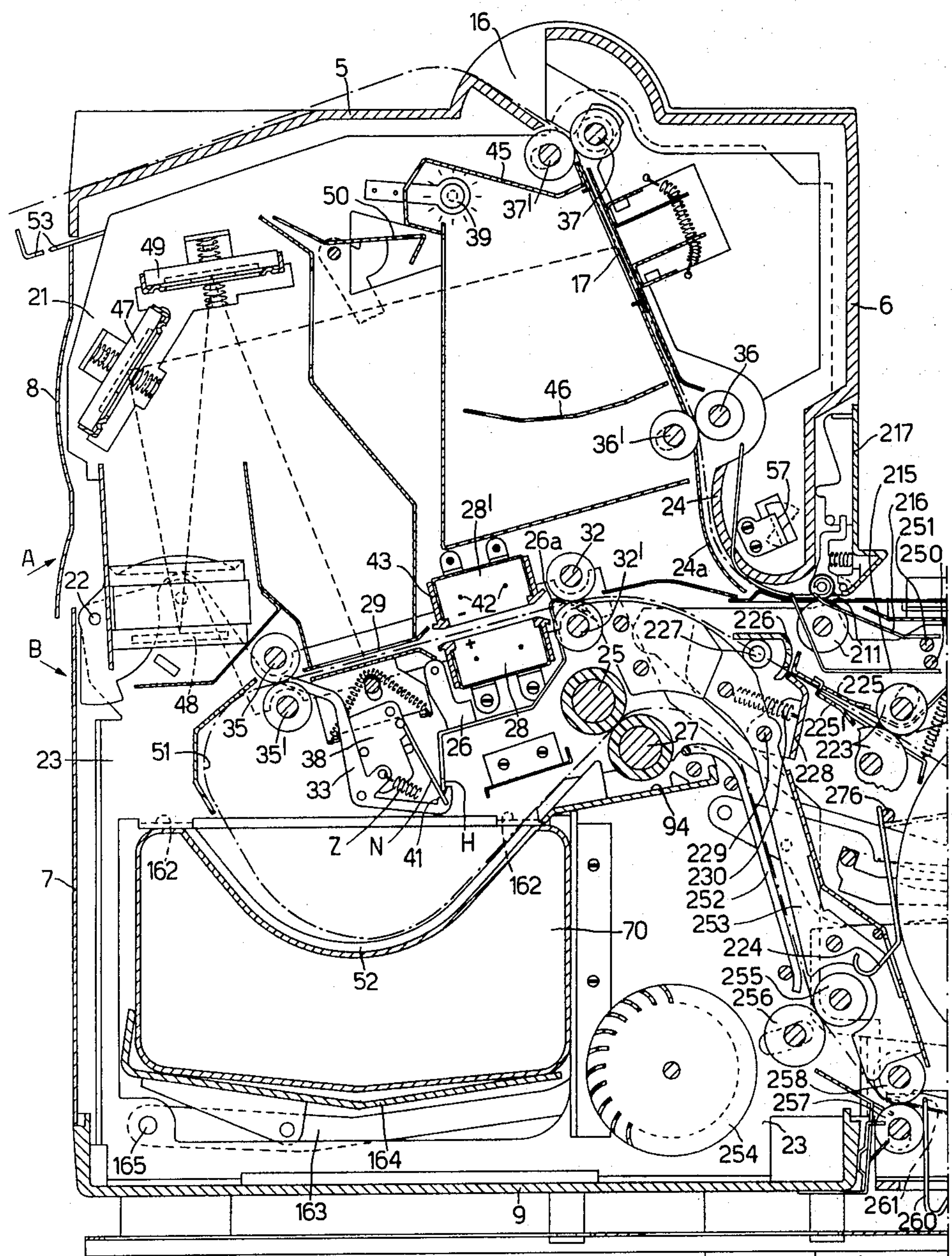

16
5
45
50
37'
37
39
53
49
17
6
21
47
8
46
36
36'
217
57
215
216
28'
24
251
250
A
22
43
26a
32
32'
24a
42
29
226
227
211
B
48
25
225
225'
223
35
35'
28
26
27
23
51
38
228
276
33
94
Z
N
41
H
229
230
7
162
162
252
70
253
52
224
255
256
258
257
165
164
254
23
163
9
261
260
210

Fig. 2 a

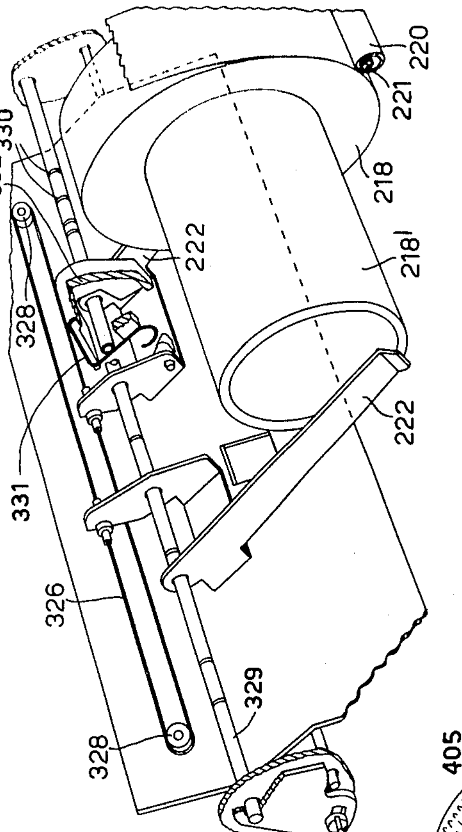

220
221
218
218'
222
222
332
330
328
331
326
329
328

Fig. 4

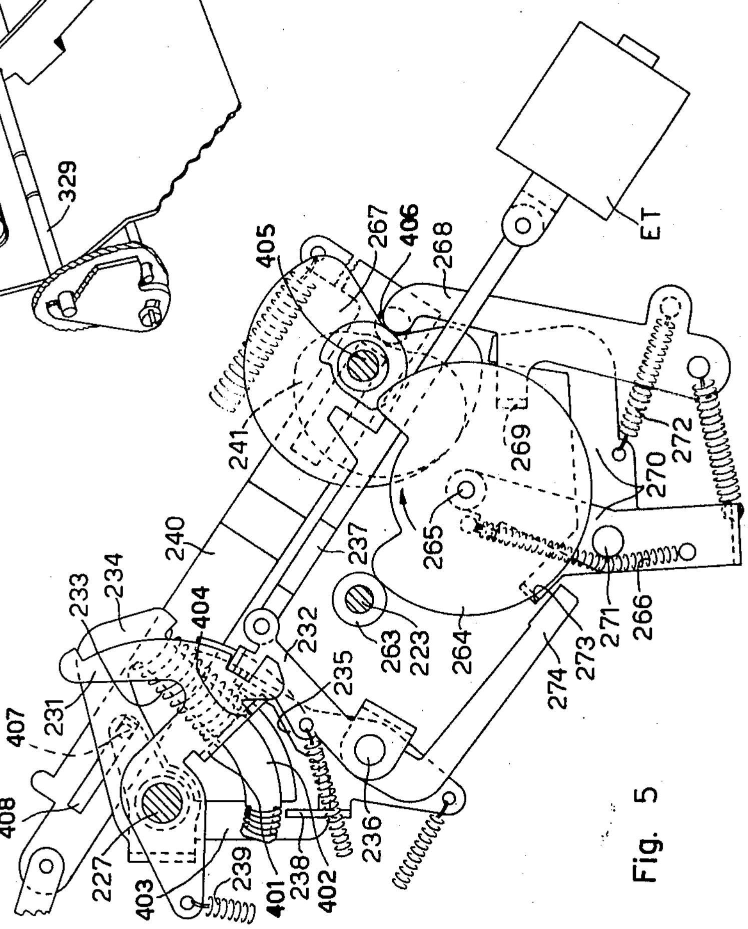

ET
405
267
406
268
241
269
272
270
240
237
265
266
271
273
274
264
223
263
232
235
234
233
404
231
407
408
227
403
239
401
238
402
236

Fig. 5

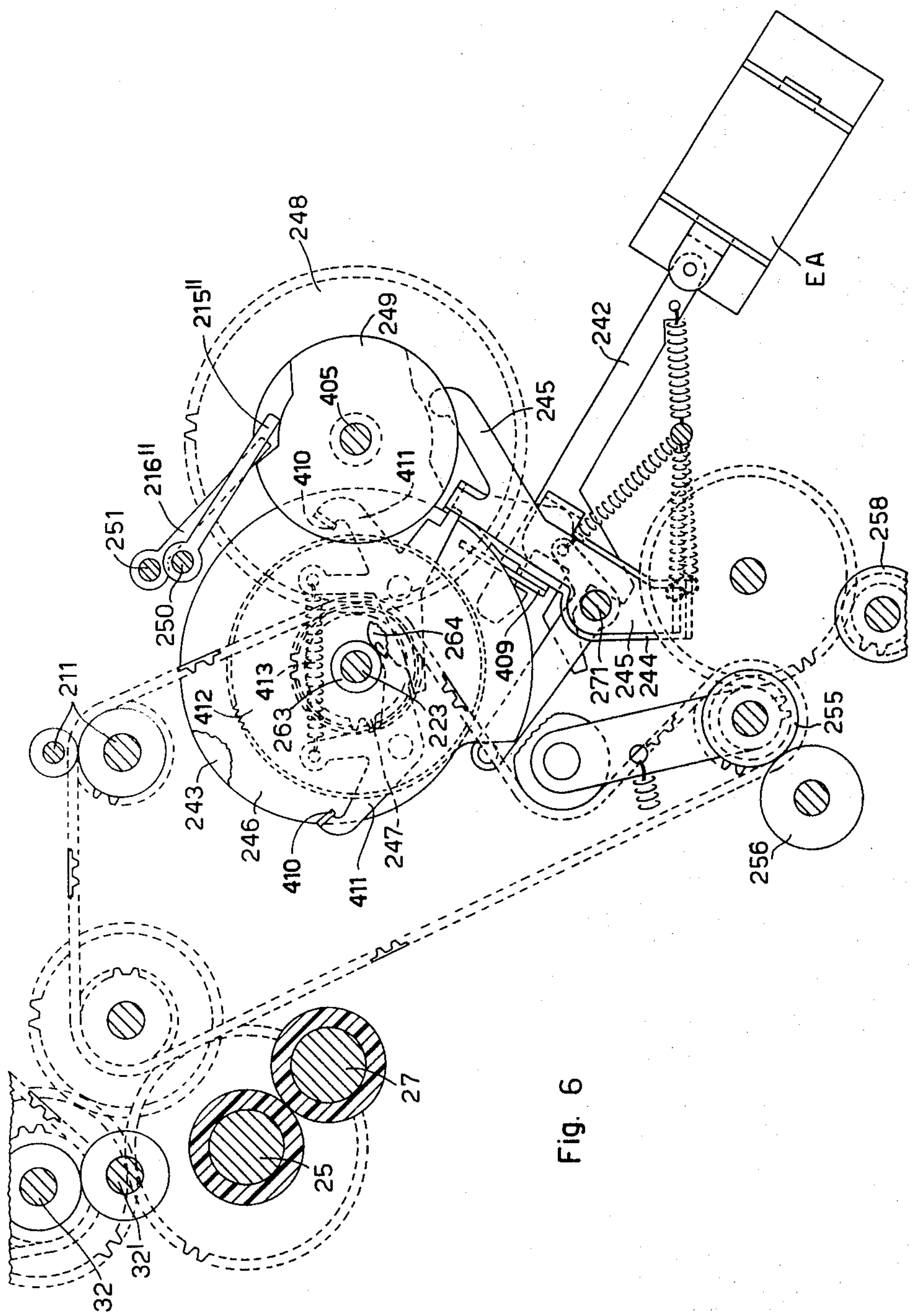

248
249
215''
405
245
242
EA
216''
251
410
411
250
264
409
258
211
413
412
263
223
271
245
244
255
243
246
410
247
411
256
27
25
32
32'

Fig. 6

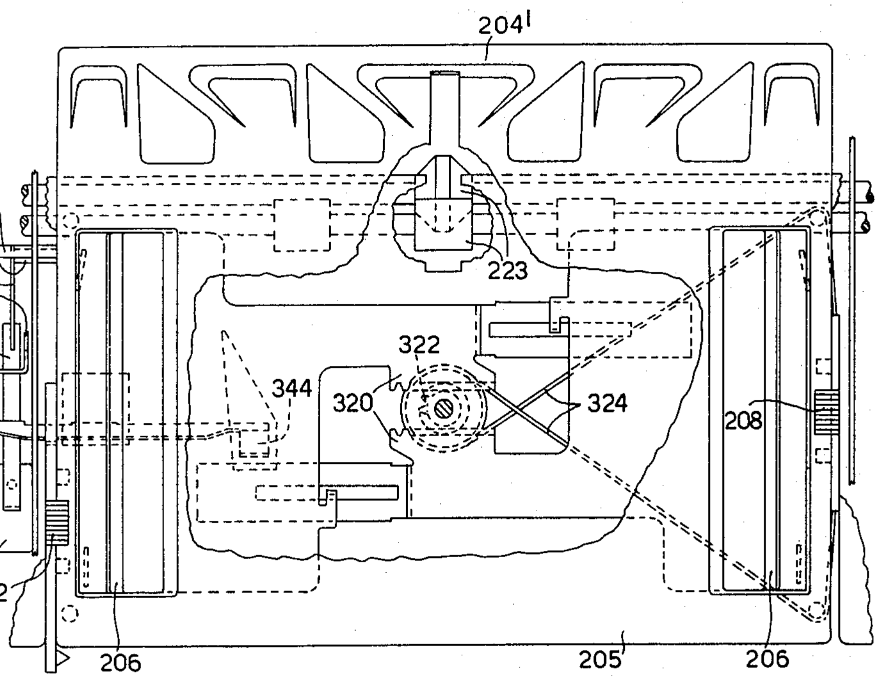

204'
251
250
216'
215'
285
M4
M3
286
342
223
322
344
320
324
208
206
205
206

Fig. 7

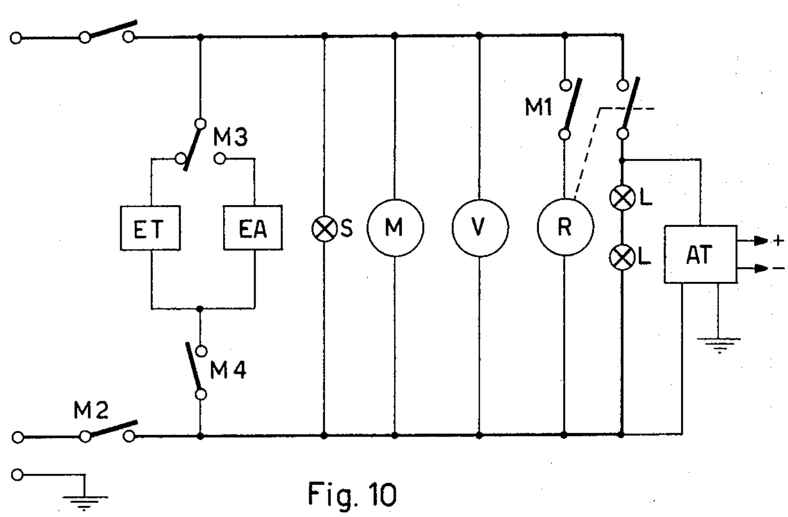

M3
ET
EA
S
M
V
R
M1
L
L
AT
+
-
M4
M2

Fig. 10

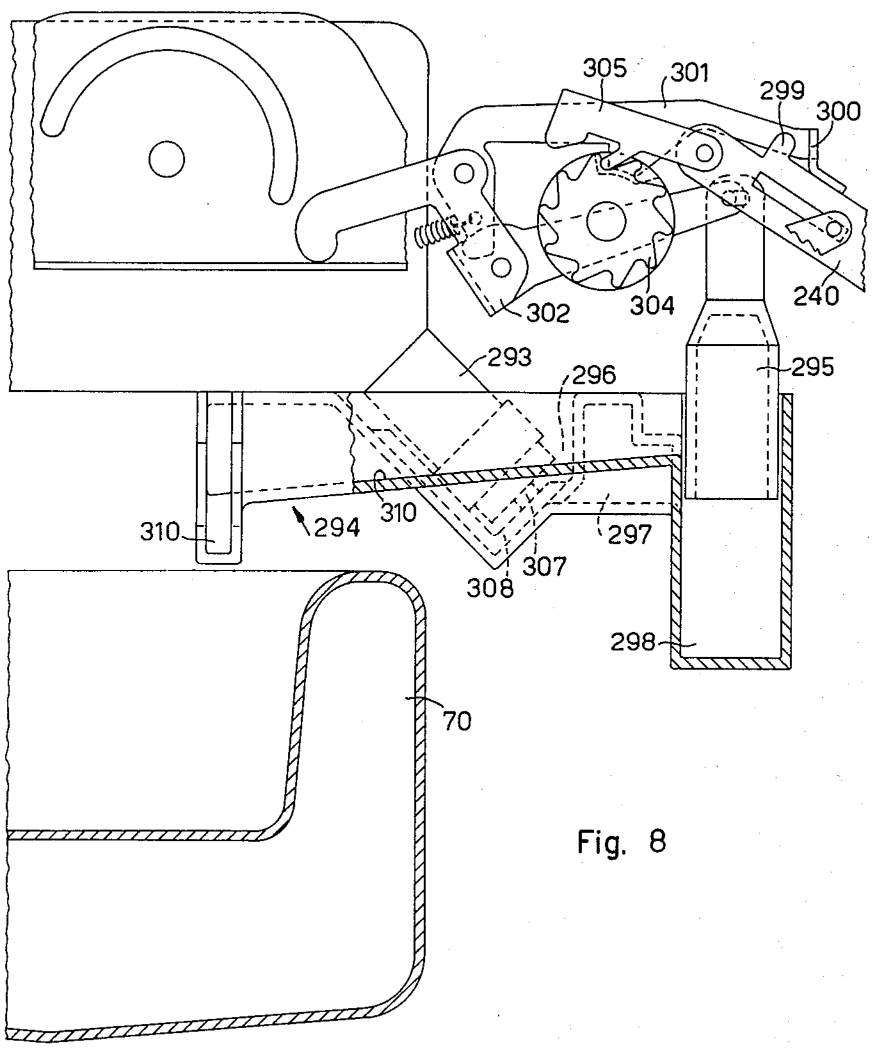

305
301
299
300
302
304
240
293
296
295
310
294
310
297
307
308
298
70

Fig. 8

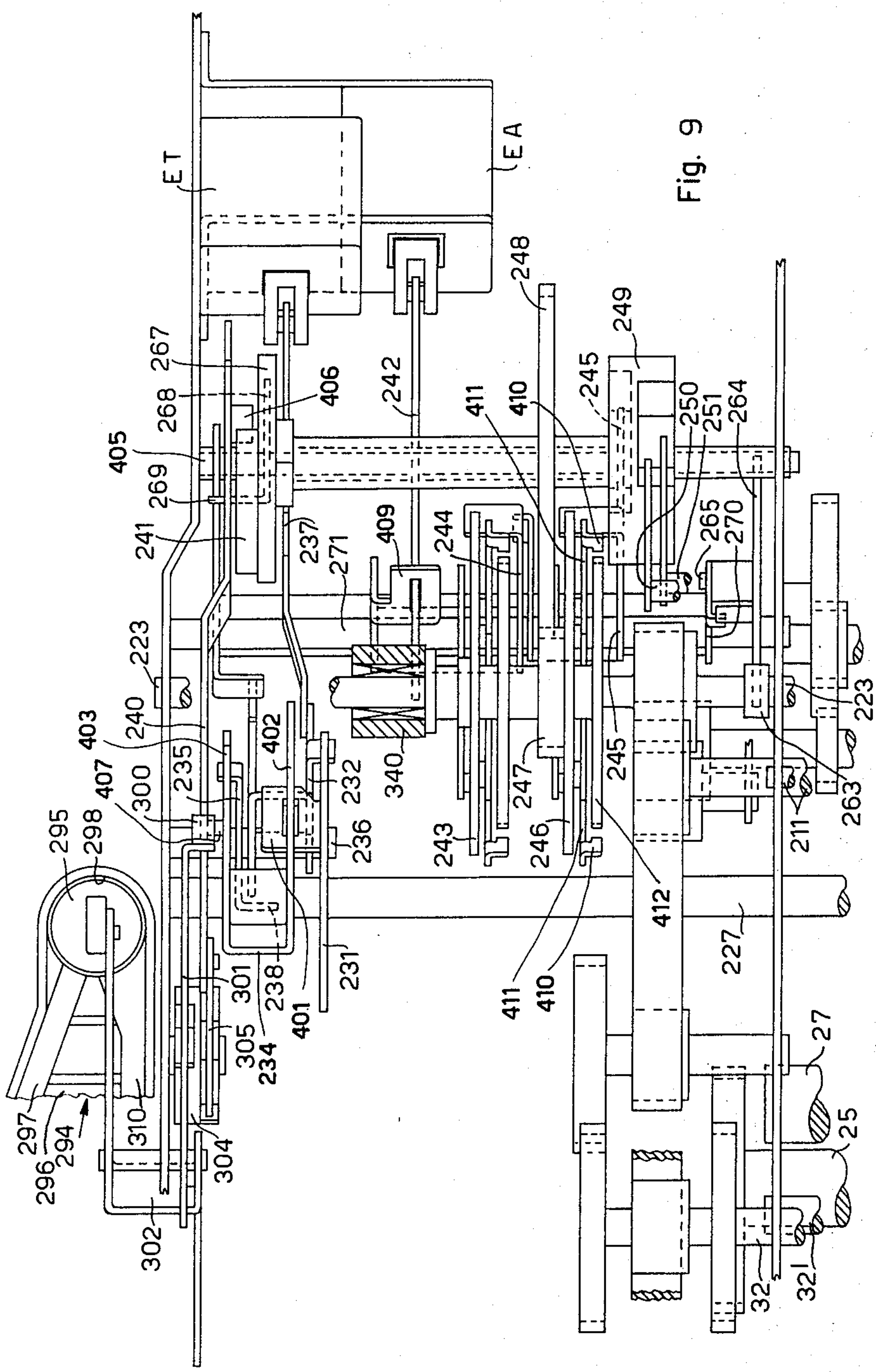


Fig. 9

COPYING MACHINE PARTICULARLY OF THE DESK-TOP ELECTROSTATIC TYPE

BACKGROUND OF THE INVENTION

The present invention relates generally to improvements in copying machines for copying sheet originals having an image on one or both sides, and more particularly to improvements in roll fed electrostatic copying machines.

U.S. Pat. application Ser. No. 74,817 filed on Sept. 23, 1970, and assigned to the assignee of the present invention describes a sheet fed electrostatic copying machine, which includes a stationary lower portion which contains the developing station for the photosensitive paper carrying the electrostatic latent image and an upper portion which is hinged to the lower portion and which contains the optical projection area and the apparatus for handling the original. The structure of the machine described in this application is such that the internal parts thereof are easily accessible both for supplying the developer and for inspecting the copy or original sheet feeding, with complete electrical and mechanical safety. This prior art machine has the limitation, however, that the copy sheet must be hand fed with the original which somewhat limits its range of application.

Other known copying machines attempt to overcome this limitation by storing the copy paper in roll form within the machine and providing means for cutting and feeding individual sheets from the roll. The apparatus provided in these machines is extremely complex, however, which makes the changing of rolls of paper by the operator very difficult especially when a roll of a different width than the previous one is to be loaded.

SUMMARY OF THE INVENTION

In order to overcome these and other limitations with existing copying machines, Applicants provide according to their invention a roll fed copying machine in which the roll housing system is arranged in such a manner as to make the substitution of rolls by the operator extremely easy, and, moreover, on the system concerning the paper driving, guiding and cutting operation from said paper roll, as also on systems coordinating the original guiding operation, the automatic concentrated developer (toner) replenishing the copy collection. The above mentioned main problem has been solved by the device according to the invention, characterized in that the sensitized paper roll bears on supporting rollers rotatable on shafts and is laterally positioned by means of displaceable stop members.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a left side front perspective view of a copying machine according to the invention.

FIG. 2 is a median sectional view made up of the FIGS. 2*a* and 2*b*, of the machine displayed in FIG. 1.

FIG. 2*a* is a partial left side median sectional view of the machine displayed in FIG. 2.

FIG. 2*b* is a partial view of the median sectional view of the machine displayed in FIG. 2.

FIG. 3 is a partial left side lateral view of the machine displayed in FIG. 2, the cover being removed in order to exhibit the paper roll out warning device.

FIG. 4 is a perspective view of the sensitized paper roll centering device.

FIG. 5 is a sectional side view of the driving system of the movable cutting blade and of the maximum copy sheet length.

FIG. 6 is a sectional side view of the paper feeding device.

FIG. 7 is a plan view of the original inserting platform.

FIG. 8 is a side view of the automatic concentrated developer adding device.

FIG. 9 is a plan view of the device shown in FIGS. 5, 6 and 8.

FIG. 10 is a schematic diagram of the electrical circuit which controls the machine operation.

DETAILED DESCRIPTION

FIG. 1 shows a desk-top electrostatic copying machine having a body **10** which is arranged in such manner as to ensure perfect light-tightness in the machine so as to avoid leakage of the charge from the copy sheet.

The cover **10** is formed of upper and lower parts A and B (FIG. 2). The lower part B comprises end sections **3** and **4** (FIG. 1), and central section therebetween (FIG. 2), all mounted on a base **9**. The upper section A can be swung upwardly as a whole on pivots **22** at the back of the machine and comprises a cover **5**, upper central section **8** and also an upper front section **6** which is hinged on the part A by hinges **57** allowing the section **6** to be swung forwardly through about 60° to open up the path of the original. Hinging up the part A (through about 35°) opens up the path of the copy sheet. The walls of the side sections **3** and **4** are removable for maintenance and interchanging the developer tank. Located in the recess of the top section **6** is a front portion **217** rockable about the pins **202** (FIG. 3).

The lower portion of the machine furthermore includes a part B′ (FIG. 2*b*), connected to part B (FIG. 2*a*). The part B houses the developing station and the associated apparatus, and part B′ houses the sensitized paper and the associated paper feeding control members. The top portion A houses the optical, illuminating and exposing stations.

Located on the machine front is a slot **204** (FIG. 3) for inserting the original D (FIG. 2*b*) along a plane **205** defined by the cover of the lower portion **201** and provided with two side positioning elements **206**. Located beneath the plane **205** and defined by the plane **212** is a slot **207** adapted for the manual insertion of the sensitized paper sheets, as an alternative to the use of the roll. The positioning members **206** are displaceable being controlled by a slide **208** located on the right side of the plane, so as to be always arranged in symmetric relation with respect to the machine central axis to ensure that the original is centered with respect to the optical system. The symmetric displacement of the two positioning members **206** is obtained by meshing a toothed rack portion **320** (FIG. 7) thereof with two diametrically opposed points of a single toothes wheel **322**. The slide **208** rotates the toothes wheel by means of a cord **324**.

The original D located by the operator on the plane **205** and fed between a pair of rollers **211** which rotate continuously while the machine is on. The rollers **211** feed the original D to the illuminating station **17** and ejection station **16** on the top portion A of the machine as displayed in FIG. 2a. Located directly below the slot **207** (FIG. 2*b*) of the lower section **201**, is an output housing member **209** (FIG. 3) wherein is inserted the drawer **210** which receives the copy sheets after processing, the drawer being extractable toward the machine front.

The copying machine is driven by an electric motor (not shown). Mounted on the element **5** (FIG. 1) of the cover is an ON/OFF knob **19** which controls the motor. Located beside the knob **19** is a lamp S which indicates when the machine is operating. Located on the other side of the knob **19** is a rotatable exposure control knob **20** by means of which the operator selects the most suitable illuminating intensity for copying the original.

The frame of the machine includes a pair of similar spaced flanks **21** (FIG. 2a), **21'** which support the upper portion of the cover **10** and the other internal parts. Each flank **21, 21'** is connected to a corresponding lower flank portion **23, 23'** of the machine frame by hinging means **22.**

The plate **205** (FIG. 2*b*) of the insertion station, over which the original is fed face down into the machine, is secured to the frame and is coplanar to the plate **212** which acts as a support and guide for the copy sheet when it is manually inserted as an alternative to the roll feeding. The plane **205** includes an upwardly inclined portion **204'** (FIG. 3) located close to the input slot **204**, for guiding the original. The original, upon being fed between the rollers **211** (FIG. 2*a*) operates the levers **216, 215** located immediately downstream from the rollers **211**, which levers actuate the microswitches M3 and M4 (FIG. 7) controlling the sensitized paper feeding and cutting operation, as it will be explained hereinafter. When the portion **6** (FIG. 2*a*) of the cover is opened by rocking it about the hinge **57** in order to reach the original path, the front portion **217** rocks about the pin **202** wherefore the top roller of the pair **211** is moved apart from the lower one, thus clearing an original if it is jammed between the rollers.

The sensitized paper wound on the roll **218** (FIG. 2*b*) is revolvable about the pin **219** and is accommodated in a housing portion covered by the portion **201** of the cover. The roll **218** bears on the rollers **220** rotatable on the shafts **221** (FIGS. 2*b* and 4). No sliding friction arises between the sensitized paper and the rollers **220** as their contact occurs on a rolling basis. This is very important in this case in order to prevent any damage of the electrophotographic coating of the copy paper with the consequent degradation of the finished copies.

The accommodation of the roll **218** on the support rollers **220** is particularly advantageous as it couples simple structure with extremely easy handling conditions for the operator. In prior art roll fed copying machines, the roll is usually positioned on a core shaft by side flanges which makes the changing of rolls a rather complex operation. Furthermore, when it is desired to mount in the machine a roll having a different width from the previous one, it is necessary to relocate both flanges and the associated side stop members on the shaft.

Conversely, according to the present invention, two arms **222** (FIG. 4), affixed to the machine and not connected to the paper roll **218**, determine the lateral position of the roll. The arms **222** are mounted for axial movement on the shaft **329** and are connected to opposite sides of a cord loop **326.** The loop **326** rides tautly on a pair of idler pulleys **328.** The translation of one arm **222** on shaft **329** is coupled by cord **326** to the other arm **222** so that the arms **222** move together or apart in unison remaining centered about the machine axis. Thus different size rolls **218** may be loaded into the machine and easily centered merely by bringing the arms **222** into contact therewith.

During operation of the machine, the roll **218** exerts axial pressure on the arms **222** which tends to separate them. In order to prevent them from separating and causing misalignment of the paper fed from the roll **218**, a plurality of circumferential grooves **330** are provided in the shaft **329** and a leaf spring **331** is mounted on one of the arms **222.** One leg of the spring **331** normally bears resiliently against the shaft **329** and when the arms **222** are properly aligned to accept a roll of paper **218** of a particular standard width, the leg drops into one of the grooves **330,** thereby preventing further movement of the arms **222.** The other leg of the leaf spring **331** is encased in a plastic member **332** which is shown in a partial cut away manner. The manual depression of the member **332** causes the free leg of the leaf spring **331** to come out of the groove, thereby allowing the adjustment of the arms **222** to accept rolls **218** of a different width. In a preferred embodiment the support rollers **220** extend across the whole roll length so as to facilitate the even feeding of paper from the roll by the medium of their rolling friction over the paper and thus to insure the paper motion in perpendicular relation to the axis of the roll **218.**

Similarly, the first roller pair **223** driving the paper fed from the roll **218** is arranged so as to pull the paper only on a restricted central area thereof, in order to prevent a difference in tension between the right and the left hand margin of the roll from causing a lateral diversion of the sensitized paper. Conversely, the accommodation of the rollers may be restricted to the central areas of the roll, but being required in this event to insure the correct driving action on the right and left hand margin of the paper.

Other embodiments may use supporting systems made of rotary elements contacting the roll only on a restricted transverse area.

The illustrated preferred embodiment allows a wide tolerance concerning the consequence of roll deformities on the uniformity of feeding of the paper, owing to the compensation and the self adaptation of the system to irregularities in the roll. An advantage deriving from the present system is the absence of any dimensional limitation for the roll core. When the portion **201** of the cover is opened a lever system (not shown) causes the feeding rollers **223** (FIG. 2*b*) to be separated from each other and a sensing member **224** to be separated from the roll **218,** the sensing member **224** indicating the exhaustion of the roll, thus making easier for the operator the insertion of the leading edge of the new roll between the rollers **223.**

The feeding of the sensitized paper is executed by the rollers **223.** In a preferred embodiment they are represented by two rollers driving the paper only on its central portion. In this way the system results in being less responsive to parallelism errors between the different axes, which may affect the paper motion by causing lateral displacements. Furthermore, if the operator inserts the leading edge of the paper between the rollers **223** in a skewed fashion, the rollers **223** tend to automatically reset it into the correct position. The leading edge of the paper is fed by rollers **223** through the guides **225, 225'** which transfer it toward the cutting device. The guide **225'** may be lowered for facilitating the extraction of the paper sheets stopped on the area located immediately before the cutting device. The latter is made of a cutting blade **226** rotatable about the shaft **227.** The cutting surface is cylindrically shaped with axis thereof corresponding to the shaft **227.** The cutting edge has a helical shape so that it cooperates with blade **228** to cut the paper in a scissors-like fashion. The counter-blade **228** which is capable of executing small rocking motions about the shaft **229** is held in contact with the blade **226** by the spring **230.** The shafts **227** and **229** are slightly skewed with respect to one another so as to further ensure the counter-blade **228** is in contact with only a single point of the cutting edge of the blade **226** at any given time during its rotation.

The system for operating the movable blade **226** is displayed in detail in FIG. **5** in conjunction with FIG. **9.** The lever **231** is mounted on shaft **227** for movement with blade **226** (FIG. **2***a*). Lever **231** normally bears against the pawl **232** being urged thereagainst by the compression spring **233** which bears against lug **401** on lever **231.** The other end of the spring **233** bears against the arm **402** of the bridge lever **234** which extends through aperture **404** in lug **401.** Bridge lever **234** is in turn held in place by the lever **235** which bears against the other arm **403** of the bridge lever **234.**

When the electromagnet ET is activated by the signal to cut the paper (generated by the actuation of microswitches M3 and M4 (FIG. **7**) as will be explained below), the pawl **232** is rocked about its shaft **236** by the pull rod **237** which is connected to the electromagnet ET, and in this way the lever **231** (and the cutting blade **226** connected thereto) is released and rotates clockwise by the action of the spring **233.** Near the end of its travel the lug **401** on lever **231** strikes the lug **238** of the lever **235** which is thus rotated counterclockwise and allows the lever **234** to rock about its shaft under the bias of the spring **233.** The counterclockwise rotation of the lever **234** relaxes the spring **233** and allows the lever **231** to be reset by spring **239** thereby resetting the blade **226.** The blade resetting operation is necessary because of the requirement of having an opening between the blades **226** and **228** immediately after a copy sheet is cut in order to allow the subsequent portion of the roll **218** to be fed between the blades **226** and **228.**

The pull rod **240** controlled by the cam **241** mounted on shaft **405** through cam follower **406** mounted on rod **240** then resets the lever **234** through pin **407** on leg **403,** which pin **407** rides in slot **408** of rod **240,** thereby reloading the spring **233.**

As the original is inserted into the machine it controls downstream from the rollers **211,** first the microswitch M3 (FIG. **7**) by means of the lever **216** (FIG. **2a**) and then the microswitch M4 (FIG. **7**) by means of the lever **215** (FIG. **2***a*) which energizes the electromagnet EA (FIG. **6** in conjunction with FIG. **9**) so that the pull rod **242** coacts with arm **409** of V-shaped pawl **244** and releases the pawl **244** which had been locking the one-revolution clutch **243** (the clutch executes only one revolution after which it is locked again by the pawl **244**) and rotates the copy paper feeding rollers **223** connected to said clutch. The coupling operation between the clutch **243** and the roller **223** is made by means of a one-way clutch (not shown) so that the roller **223** keeps rotating and driving the paper even when the clutch **243** has concluded its revolution.

When the electromagnet EA is energized, the pull rod **242** through pawl **244** also rotates the V-shaped pawl **245** clockwise thereby engaging the clutch **246** by allowing the lugs **410** on the coacting elements **411** pivotally mounted on clutch **246** to engage the teeth on the driving member **412** under the bias of spring **413.** The clutch **246** rotates the cam **249** by means of the gears **247** (connected to the clutch **246**) and **248.** This cam **249** is provided with two tracks. The first has the object to hold back the pawl **245** for two full revolutions of clutch **246** so that the clutch **246** is disengaged only after it has completed three full revolutions. Since the gears **247** and **248** ratio is **1:3,** this corresponds to a full revolution of the cam **249.** Two levers **215'',** **216''** reside on the other track of cam **249,** being connected to the shafts carrying the levers **216, 215** respectively. Their control function will be described below. The motion transmission to the parts described in FIG. **6** is obtained by a transmission system known per se, connecting the parts by toothes wheels and belts.

As the trailing edge of the original leaves the pair of rollers **211** (FIG. **2***a*) it first releases the lever **216** thereby resetting the microswitch M3. As can be seen in FIG. **10,** in this way the electromagnet EA (FIG. **6**) is released and the electromagnet ET (FIG. **5**) is energized controlling the movement of the cutting blade of the sensitized paper. The electromagnet ET is deenergized when the lever **215** and the microswitch M4 are reset. The operation and the reset travel of the cutting blade have been already described above.

The function of the cam **249** with regard to the cutting operation is to prevent by its edge contacting the levers **215''** and **216'',** a too-short original from prematurely resetting the microswitches M3 and M4 which would result in the cutting of a piece of copy paper by the blade **226,** which is shorter than the maximum separation between the feed rollers (in particular the rollers **35, 35'** and **25, 27** preceding and following the developer container **70** respectively). Otherwise the copy could get stuck in the container **70.** Therefore, the periphery of the cam **249** is shaped in such a manner as to allow the microswitches M3 and M4 to be reset according to the aforesaid sequence and the copy to be cut according to a length which is slightly longer than the aforesaid separation. All these features are significant in the event the originals to be reproduced are shorter than the above mentioned critical separation existing between the feed rollers.

Another safety feature in the cutting system is represented by a device (FIG. **5**) ensuring in all events that the sensitized paper is cut into a given length, for example of 500 mms, in the event that no cutting has occurred previously. Normally, this device becomes operative:

a. when lacking the signal concerning the cutting occurring after the end of the original, owing to a microswitch malfunction or to another accidental event,

b. when the original is longer than a predetermined maximum length.

The reasons that this device was installed is both (*a*) to prevent the roll being unwound owing to the first accidental failure; and (*b*) to prevent the copy from being damaged as it would reach a dangerous tension if exceeding a certain length after the slack portion in the developer **70** is taken up, because it is pulled by the squeegee rollers **25, 27** at a speed which is higher than that of the feed rollers **35, 35'** located in a preceding position.

This device provides a rubber roller **263** mounted on the lower shaft of the roller pair **223** (FIG. 2*a*), the roller **263** contacting the disk **264** freely mounted on the pin **265** at every feeding cycle. The disk **264** is reset at every cycle to a fixed position by means of the resetting spring **266.** The cam **267** executes a full revolution at every paper feed cycle, being integral to the gear **248** (FIG. **6**). The cam **267** displaces the lever **268** at its initial revolution portion, the projection **269** whereof rocks the lever **270** about its fulcrum **271**, against the bias of the recall spring **272.** This displacement moves the disk **264** apart from the roller and resets it to the starting position under the influence of spring **266.**

After a revolution of the cam **267** the disk **264** starts rotating beginning from its rest position, being frictionally driven by the roller **263.** After approximately a full revolution of disk **264** which corresponds to the maximum copy length, an indentation of the disk edge makes the riding lever **270** to rock and the arm **273** displaces the projection **274** of the stop lever of the movable cutting blade **226**, thus initiating the copy cutting operation. Conversely, if the copy is shorter than the maximum length, the disk **264** stops on the position corresponding to the copy length. The rotation of the cam **267** during the subsequent feed cycle then resets the disk **264.**

The end of roll signalling device (FIG. 3) indicates by an acoustic signal that the roll has come to an end and concurrently it cuts off the electric circuit so that the insertion of an original into the machine does not affect the feed and the paper cutting devices. This device is made of a sensing member **224** (FIG. 2b) secured to the freely mounted shaft **276.** Secured to one end portion of the shaft **276** is a cam **277** whereon bears a pin of one arm of the bridge lever **278.** When the paper roll **218** is full, the sensing member **224** is biased against it by the spring **279.** Conversely, when the roll is nearly exhausted the sensing member **224** rocks in a counter clockwise direction and contacts the point **280** located on the paper roll rearside. As long as the last paper portion is pushed by the weight of the roll core **218'** against the point **281** of the support roller **220**, the sensing member **224** controlling the cam **277** holds the lever **278** in the starting position. When the end of the paper on the core **218'** is fed past the point **280**, the sensing member **224** rocks further in the counter clockwise direction under the bias of the spring **279** and the cam **277** rotates with it. The pin on the lever **278** is held against the lower portion of the cam **277** by the action of spring **284**, Fulcrumed on the point **282** on the other leg of the bridge lever **278** is the striker **283** which is downwardly biased by the spring **284.** The counterclockwise rotation of the cam **277** causes the projection **285** of the lever **278** to rock clockwise so as to lock the microswitches **286** (M3 and M4) thus preventing them from being controlled by the original. At the same time the striker **283** is lowered and moved into the path of the continuously rotating hammer **287.** The striker **283** is thus hit impulsively and will strike the bell **288** by inertia causing the emission of an acoustical signal.

During the opening of the movable portion **201** of the cover, portion **201** controls the cam **292** by means of the pull rod **289** connected to the slide **290** provided with the stationary pin **291**, thus causing the backward displacement of the sensing member **224** and its disengagement during the roll loading and replacing operation.

The cut sensitized paper follows its path through the charging, exposing and developing stations as is described in detail in the above mentioned Pat. application No. 74,817 and displayed in FIG. **2.** After the copy sheet passes between the squeegee rollers **25, 27**, it is transferred between the guides **252, 253** in front of the tangential blower **254** (FIG. 2*a*). The latter, along with the rollers **255** and **256**, has the function to dry the copy before it emerges from the machine. The copy is subsequently transferred between the rollers **257** and **258** to be dropped into the drawer **210.** The blower **254** blows an air flow toward the copy output area, in particular beneath the copy, so as to complete its drying and prevent a direct contact between the copy in motion and a copy already dropped into the drawer **210.** The pendulum **260** swinging about the shaft **261** performs the function to hold the training area of the already dropped copy lowered against the drawer **210** and to ensure the correct passage of the leading area of the subsequent sheet.

The drawer **210** may be extracted toward the machine front, sliding beneath the bottom of the machine, so as to be capable of receiving copies having different formats.

A sliding member **342** is located on the left side of the original insertion plate **205** of the machine. When the slide **342** is in the forward position, it locks the levers **215'** and **216'** of the microswitches M4 and M3 and prevents these levers from being controlled by the levers **215** and **216**, thereby preventing the feeding of roll **218.** In the other position, the slide **342** displaces element **344** which prevents the copy sheet from being manually inserted into the slot **207.**

According to a preferred embodiment of the invention, provided on the developing station (FIG. **8**) is an automatic concentrated developer adding device, which keeps constant the concentration of the liquid developer in the container by means of the automatic addition of a fixed quantity of concentrate after a predetermined number of copies are made.

The device comprises a concentrate cartridge **293**, a cartridge support **294**, a piston **295**, and a linkage **240** which lowers the piston, for example every ten copies. When the cartridge **293** is inserted into its seat in a recess in the support **294**, the seal **307** is opened, causin by pushing on the offset **308**, thus causing the emission of the concentrate. The concentrate then flows first into the chamber **296** and then into the chamber **298** through the duct **297.** When the rise of the level covers the seal opening, the concentrate emission stops at a level which is automatically reestablished every time the liquid is drained from the chamber **296.**

The slide **240** executes a reciprocal movement for every copy. Starting from the reset position the slide **240** is first displaced rightwards bringing its projection **299** to push against the lug **300** of the lever **301**, the displacement of the latter and of the bail **302** is thus capable of displacing the piston **295.** As the lever **301** resides on the cam **304** and latching of the lug **300** with the projection **299** is possible only for one position of the cam **304,** which accomplishes a full revolution, in the specific event every 10 copies, being rotated by the pawl **305** by 1/10 of revolution at every leftward travel of the slide **240.** After each 10 copies the piston **295** executes a travel of controlled length into the chamber **298,** thereby causing a predetermined quantity of liquid to overflow into the duct **310** which transfers it into the main container **70** of the developer.

The electrical schematic diagram displayed in FIG. **10** shows the continuously operated unit including the motor M, the blower V and the ON/OFF lamp S, and the cyclically operated units which are set into operation only when the copy sheet feeding operation is started.

What we claim is:

1. A roll fed copying machine comprising
a frame;
a bed for receiving a roll of sensitized copy paper, said bed including:
a pair of rollers for supporting said roll,
a pair of arms extending along either end of said roll for maintaining said roll therebetween,
a pair of idler pulleys,
a loop of flexible cord looped around said idler pulleys;
said arms being attached to said loop,
said pulleys and arms being disposed in alternating positions around said loop,
the movement of one of said arms with respect to the other arm acting to move said other arm in a symmetrical fashion with respect to said one arm;
and means for cutting and feeding sheets of said sensitized copy paper from said roll.

2. The copy machine of claim **1** in which the original to be copied is passed through said copy machine and wherein said cutting and feeding means include:
switch means for initiating the feeding of said copy paper from said roll upon sensing the leading edge of said original and for controlling the cutting of said copy paper upon the sensing of the trailing edge of said original,
and means for inhibiting the cutting of said copy paper until a predetermined length of copy paper has been fed indipendently from the sensing of said trailing edge.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,830,124 Dated August 20, 1974

Inventor(s) Giovanni Ravera and Nicola Cosmo

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the first page in "Foreign Application Priority Data" delete "May 5, 1971" and substitute --May 11, 1971--.

Signed and sealed this 21st day of January 1975.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents