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Ogawa

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[54] **TRANSFER TYPE ELECTROPHOTOGRAPHIC DUPLICATING APPARATUS**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** **355/14,** 355/8, 355/11

[51] **Int. Cl.** **G03g 15/00**

[58] **Field of Search** 355/14, 8, 3, 11

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[57] **ABSTRACT**

In an electrophotographic duplicating apparatus, a rotatable drum supporting the photosensitive material has a circumference slightly greater than the length of the original material to be copied and is rotated through $n+1$ revolutions, wherein n is the number of copies. During the first revolution of the drum the original image is formed on the photosensitive material. A sheet of copying material is transferred into position for the image to be transferred from the photosensitive material. During the second revolution of the drum the photosensitive material is cleaned in preparation for copying of another original.

3 Claims, 5 Drawing Figures

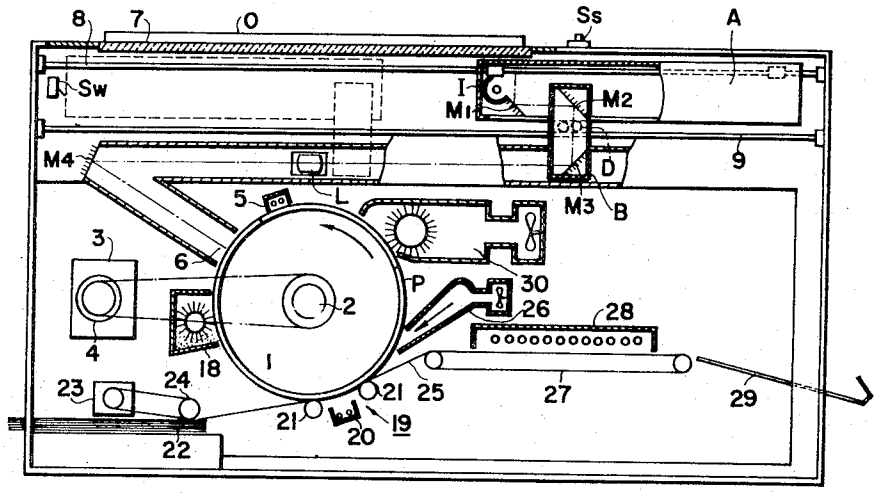


FIG. 1

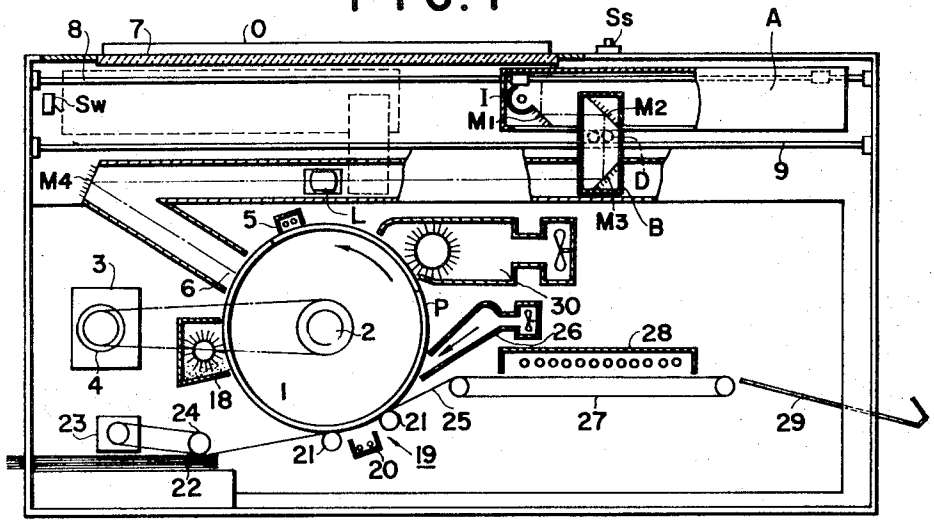


FIG. 2

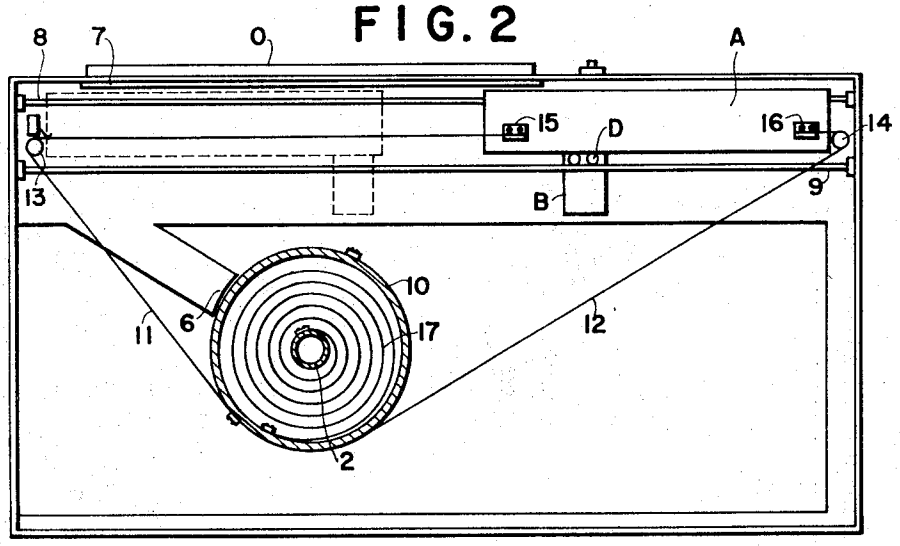


FIG. 3

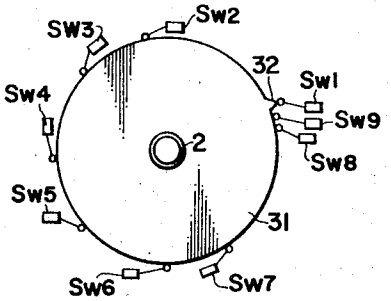
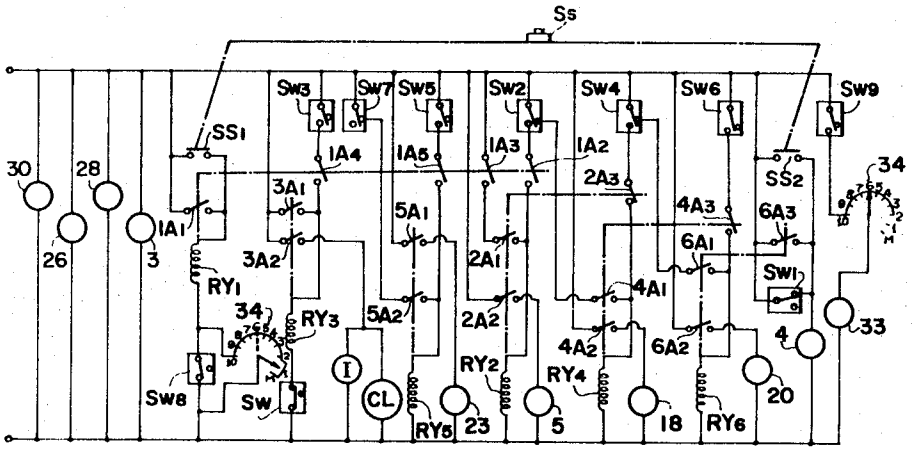


FIG. 4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Sw3
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Sw5
Sw2
Sw4
Sw6
Sw9
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SS2
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1A5
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4A3
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4A1
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Sw1
1A1
3A2
5A2
2A2
4A2
6A2
RY1
RY3
RY2
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Sw8
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I
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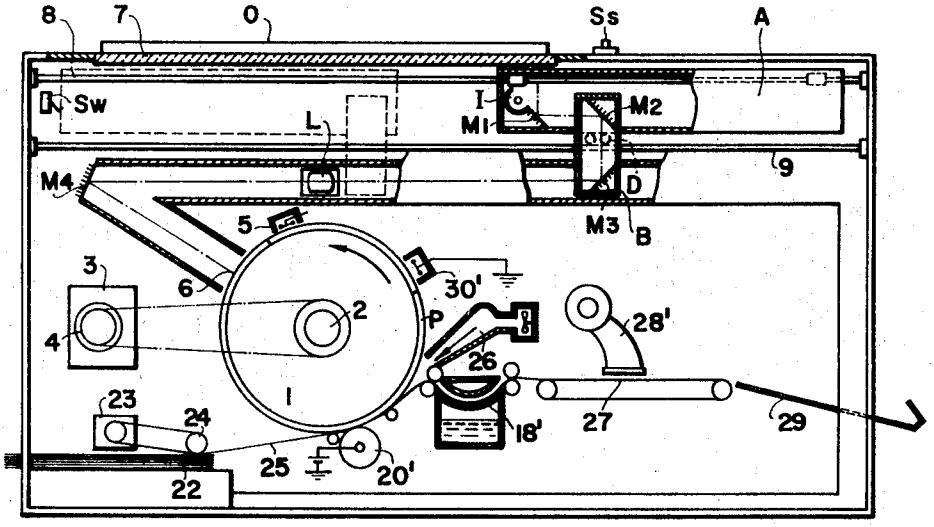
30
28
26
3
34
33
4
20
23
5
18

FIG. 5


8
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M2
M4
M3
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28'
26
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24
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18'
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29
25
20'
22

TRANSFER TYPE ELECTROPHOTOGRAPHIC DUPLICATING APPARATUS

BACKGROUND OF THE INVENTION

The present invention relates to a transfer type electrophotographic copying machine and, more particularly, to an electrophotographic copying machine in which a photosensitive sheet is exchangeably mounted on a rotary drum whereby, and electrostatic image is formed on the photosensitive sheet and the image is copied on a transfer sheet.

It is well known that there exist two modes of transfer type electrophotographic copying machines, and that one of them is a toner image transfer type in which an electrostatic latent image formed on a photosensitive sheet is developed and then transferred to a transfer sheet, and the other one operates such that an electrostatic latent image formed on a photosensitive sheet is electrostatically transferred to a transfer sheet and then the already transferred latent image is developed. The present invention is applicable to both modes described above.

It is also known that there are various kinds of transfer type electrophotographic copying machines involved in both modes described above, and particularly in one kind of the former mode where a photosensitive surface is formed on the rotary drum, an electrostatic latent image is formed on the photosensitive surface by providing an electric charge thereon. A toner is applied to the photosensitive surface corresponding to the electrostatic image, then the developed image is transferred by means of a transfer device to a transfer sheet contacting the photosensitive surface. The transfer sheet is thereafter fused to complete a copy. In one kind of the latter mode, a photosensitive surface is formed on the rotary drum, an electrostatic latent image is formed on the photosensitive surface thereon while it is being rotated. The transfer sheet is pressed into contact with the photosensitive surface and the electrostatic latent image on the photosensitive surface is transferred to the transfer sheet by means of a transfer system. Thereafter a development and fixing process for the latent image on the transfer sheet is carried to effect a complete copy.

In these previously known types of copying machines, a photosensitive plate is integrally formed on the rotary drum, and the functional sections to carry out each aforementioned operation are arranged around the periphery of the drum. Furthermore, the length of the photosensitive substance on the drum is actually less than one-half of the circumference of the drum and approximately equal to one quarter thereof. This results in that the required diameter of the drum is undesirably large and the overall volume of the copying machine which is primarily determined by the diameter of the drum becomes thereby voluminous. Moreover, when the photosensitive substance is degenerated on account of the fatigue phenomenon due to its repeated use, it is required to exchange it as one body with the drum. Additionally, in the case where plural sheets of copies for an identical picture image are continuously required, the time interval between the first copy and the second copy is effectively increased.

OBJECTS OF THE INVENTION

It is an object of the present invention to provide a transfer type electrophotographic copying machine which is built up in a small size by virtue of a smaller diameter of the rotary drum.

It is another object of the present invention to provide a transfer type electrophotographic copying machine in which, for the purpose of decreasing the diameter of the rotary drum the copying process is carried out during two complete revolutions of said drum.

It is still another object of the present invention to provide a transfer type electrophotographic copying machine wherein the copying operation is speeded up for obtaining plural copies of originals in such a way that during the second revolution of the drum, concurrently with the conveyance of the transfer sheet for the first copy having already been transferred during the first revolution of the rotary drum and the cleaning of the photosensitive sheet on the rotary drum, the electric charge on the photosensitive sheet and the image formation thereon for the second copy and then the transfer of the image onto the transfer sheet for the second copy are performed.

It is a still further object of the present invention to provide a transfer type electrophotographic copying machine by means of which, when a continuous copying operation is carried out, n sheets of transferred copies are obtained as a result of the continuous $n+1$ revolutions of the rotary drum.

It is one of the other objects of the present invention to provide an electric control circuit including a plurality of micro-switches and relays which are activated by the rotary drum of the transfer type electrophotographic copying machine in order to attain all objects described above.

SUMMARY OF THE INVENTION

The present invention relates to a transfer type electrophotographic copying machine wherein a photosensitive surface on the rotary drum is nearly the same size as that of an original to be copied and is exchangeably mounted on said rotary drum. The axial length of the drum is slightly longer than the length of one side of the photosensitive surface and its circumference slightly longer than the length of another side of the photosensitive surface. During the first revolution of the rotary drum, a switch circuit operates so that an image of a stationary original is projected by means of a slit type exposure optical system to form an electrostatic image on the photosensitive surface. The electrostatic latent image is then transferred onto a transfer sheet, and thereafter the transfer sheet is separated from the rotary drum. During the next revolution of the rotary drum, the switching circuit is operated so as to clean the photosensitive surface and convey the transfer sheet. But in the case where plural copies are continuously produced, the switching circuit is operated by virtue of the indication of a copy sheet counting device in such a way that carried out in the period of the second revolution of the rotary drum are operations of the image formation on the photosensitive sheet and the transfer thereof which operations are both achieved in the same manner as in the period of the first revolution of the rotary drum, as well as the conveyance of the already transferred transfer sheet and the cleaning of the photosensitive sheet, whereby, n sheets of copies can be obtained by virtue of the $n+1$ revolutions of the rotary drum.

Since the peripheral surface of the rotary drum is made slightly larger than the area of an original to be copied, as described above, the diameter of the rotary drum is decreased and the volume of a transfer type electrophotographic copying machine is also minimized. Moreover, the exchange of the photosensitive surface can be easily carried out, because the photosensitive surface according to the present invention is exchangeably mounted with respect to the rotary drum.

In addition, the present invention contributes to the improvement of the copying efficiency not only by speeding up the rotational angular velocity of the rotary drum in such a way that a copy of one sheet is completed at the termination of the two revolutions of the rotary drum, but also by eliminating the wasteful rotation of the rotary drum in each copying cylce, in the case where a large number of copies are continuously produced. The switching circuit is operated so as to complete the copying cycle of the first copy in the period of the second revolution of the rotary drum, and also to concurrently carry out the image formation for the second copy onto the photosensitive surface and the transfer thereof in the identical period of the second revolution thereof, whereby, *n* sheets of copies can be produced by virtue of the *n*+1 revolutions of the rotary drum.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a partially broken away side view showing the construction of the essential parts of an embodiment of a transfer type electrophotographic copying machine in accordance with the present invention;

FIG. **2** is a segmentary elevational sectional view showing a mechanism for synchronizing the rotary drum with a slit type exposure otical system for the same embodiment as FIG. **1**;

FIG. **3** is a side view showing the relationship of the rotary drum and a microswitch group of a switching circuit for the same embodiment as FIG. **1**;

FIG. **4** is a control switching circuit diagram for the same embodiment as FIG. **1**; and

FIG. **5** is a partially broken away side view showing the construction of essential parts of an alternative preferred embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIGS. **1–4** show an embodiment of the toner image transfer type copying machine in accordance with the present invention. With reference to FIG. **1**, reference numeral **1** is a rotary drum of a small diameter having its peripheral surface made slightly larger than that of a photosensitve surface P which is of a nearly the same configuration as an original so that the photosensitive surface P is capable of being exchangeably mounted thereover. The rotation of a motor **3**, which is always running during the operation as a drive source, is transmitted via an electromagnetic clutch means **4** to the rotary drum **1** which is thereby rotated about its shaft **2** journaled to the main body of the copying machine. Numeral **5** denotes an electric charging device, such as a direct current corona discharge unit, which is mounted on the main body proximate to the rotating peripheral surface of the rotary drum **1**, and which is capable of providing the photosensitive surface P with an electric charge. Numeral **6** denotes an exposure window of a slit type exposure system. The exposure system comprises a pair of guide rails **8** and **9** which are fixed to the main body so as to be parallel with an original O placed on an original station **7** which is also fixed atop the main body of the copying machine. A second carrier B which is provided with two mirrors M_2 and M_3, is capable of travelling along the rail **9** by virtue of rollers D. A first carrier A which is provided with an original illuminating device I and a first mirror M_1 is disposed on the rollers D so as to be capable of travelling under the guidance of the rail **9**. Further disposed on and fixed to the main body are an objective lens L which is positioned in the path of the lightrays reflected by movable mirror M_3 and a fixed mirror M_4. The lightray transmitted through the objective lens L is then reflected towards the exposure window **6**.

As shown in FIG. **2**, a wheel **10** which is coaxial with and of the same diameter as the rotary drum **1** is affixed by a normally run belt **11** and an inversely run belt **12** which are individually wound on the peripheral surface thereof.

Belt **11** is connected to a connector **15** fixed to the fore end of the first carrier A via a pulley **13** which is located between both guide rails **8** and **9** and rotatably fixed to the main body. Similarly, belt **12** is connected to a connector **16** fixed to the back end of the first carrier A via a pulley **14**. A spiral spring **17** is located between the inner face of the wheel **10** and the peripheral face of the shaft **2**, and partially wound on and fixed to the shaft **2**, as shown in the drawing.

The first carrier A and second carrier B are mutually connected through rollers D mounted on second carrier B in such a way that, when the first carrier A is travelling in a given direction the second carrier B is forced to travel in the same direction at a speed of one-half as much as that of the first carrier A.

Further provided between the rotary drum **1** and the wheel **10** is an electromagnetic clutch CL which is shown in FIG. **4**. Members **1** and **10** being constituted so as to be mutually connected by virtue of the electromagnetic clutch CL so that both members can be rotated as a body, or to be released from each other by the clutch means. That is, when both members are connected, the rotary drum **1** drives the wheel **10** so as to have it rotated at the same peripheral speed. The wheel **10** is thereby rotated counterclockwise as shown in FIG. **2** so as to have the spring **17** wound up. Belt **11** causes the first carrier A to travel at the same speed as said peripheral speed from the right to the left, and the illuminating device I illuminates the original O successively from the right to the left.

Consequently, the reflected lightrays of the original O are successively reflected by the mirrors M_1, M_2 and M_3. Mirrors M_2 and M_3 are mounted on the second carrier B which is interconnected through roller D with the first carrier A so as to be carried at a speed of one-half as much as that of first carrier A. The mirrors M_2 and M_3 are both capable of functioning so as to keep the length of the light path between the objective lens **1** and the original O at a constant value at all times. The scanned lightrays are sequentially reflected by the fixed mirror M_4 towards the exposure window **6** where the lightrays sequentially provide the exposure to make an image on the photosensitive surface P on rotary drum **1** while said drum is passing under the exposure window **6** synchronously with the scanning operation of the original O.

At the end of the normal stroke of the first carrier A, a return switch SW is located which is operated by the front end of the first carrier A during its leftwards motion. The electromagnetic clutch CL then disconnects the wheel **10** from the rotary drum **1.** The wheel **10** is thereby rotated in a reverse direction due to the returning force of the energized spring **17,** so that both carriers A and B are returned to their respective initial positions by virtue of the reversely run belt **12** as shown in FIG. **2.**

Referring again to FIG. **1,** numeral **18** denotes a development device which develops an electrostatic latent image formed on the photosensitive surface P by means of a toner, and numeral **19** denotes a transfer system consisting of a corona discharge unit **20** and two transfer sheet pressing rollers **21** and **21'**. This transfer system **19** transfers a toner image formed on the photosensitive surface P onto a transfer sheet **25** which is fed one by one from a transfer sheet reservoir **22** by means of a feeding roller **24** driven by a motor **23.**

Reference numeral **26** denotes a separating device which separates the transfer sheet **25** from the photosensitive surface P by means of air injection.

Reference numeral **27** denotes a conveying device consisting of an endless belt for carrying the transfer sheets separated from the photosensitive surface P and a pair of rollers. Numeral **28** denotes a fixing device consisting of an electric heater which is arranged in the passageway of the conveying device **27.** Further, numeral **29** denotes a storage tray for completed copies, and numeral **30** denotes a cleaner for cleaning the photosensitive surface P in order to prepare for the next image formation thereon upon completion of the preceding transfer process.

With reference to FIG. **3** and FIG. **4,** in this preferred embodiment, a cam plate **31** as shown in FIG. **3** is integrally made up so as to be of the same diameter as that of, and coaxial with, the rotary drum **1,** and a control projection **32** is formed on the cam plate **31** around which are arranged a plurality of microswitches SW_1, SW_2, SW_3, SW_4, SW_5, SW_6, SW_7, SW_8 and SW_9. Thereby, the control projection **32** is capable of successively activating these microswitches in response to the revolution of the rotary drum **1.** At the starting time of a copying operation, the microswitch SW_1 is opened by the projection **32,** and the electromagnetic clutch **4** is accordingly released to have the rotary drum **1** stopped.

In FIG. **4,** if the power source is switched on, a current is at all times provided to actuate the drive motor **3,** the separating device **26,** the heater **28** of the fixing device, and the cleaner **30.**

Now, if a starting switch S_S shown in FIG. **1** is manually pressed, switches S_{S1} and S_{S2} are both closed, a relay RY_1 is actuated by the closed switch S_{S1} so as to close relay switches $1A_1$, $1A_2$, $1A_3$, $1A_4$ and $1A_5$, and concurrently with this closing motion, the relay RY_1 is placed under the self holding status due to the closed switch $1A_1$. Simultaneously, the electromagnetic clutch **4** is connected to the drive motor due to the closed switch S_{S2} to get the rotary drum **1** to start its revolution. Immediately after the rotary drum **1** has started its revolution, the microswitch SW_1 is closed by the projection **32** of the cam plate **31.** Accordingly, even if the starting switch S_{S2} is thereafter opened, the electromagnetic clutch **4** is capable of keeping its connection with the drive motor **3** so as to maintain the continuous revolution of the rotary drum **1.** When the microswitch SW_2 is closed by the projection **32,** a relay RY_2 is activated via the closed relay switch $1A_2$, so that it closes both relay switches $2A_2$ and $2A_3$, as well as is in a self holding mode owing to the functioning of both relay switches $1A_3$ and $2A_1$.

By virtue of the closed relay switch $2A_2$, the charging device **5** is energized to actuate the corona discharge. The photosensitive sheet P on the revolving rotary drum **1** is thereby endowed successively with a uniform electric charge.

When the microswitch SW_3 is closed by the projection **32,** a current flows through a relay RY_3 via the relay switch $1A_4$ in the closed status so that the relay RY_3 is activated to get a relay switch $3A_1$ to close, thereby it keeps a relay switch $3A_2$ closed as well as the relay RY_3 which is held owing to the relay switch $3A_1$. Accordingly, the rotary drum **1** and the wheel **10** are connected by virtue of the energized electromagnetic clutch CL, so that the wheel **10** also begins to rotate. Consequently, as described hereinbefore, the first carrier A and the second carrier B are carried leftwards, and the illuminating device I is simultaneously lighted. Accordingly, an image of the original O is successively projected onto the uniformly charged photosensitive surface P.

When the microswitch SW_4 is closed by the projection **32,** a relay RY_4 is activated via closed relay switch $2A_3$, so that it is self-held due to the microswitch SW_2 and a relay switch $4A_1$, as well as it closes relay switches $4A_2$ and $4A_3$. Consequently, the development device **18** is actuated by the closed relay switch $4A_2$, so that the photosensitive surface P having an electrostatic latent image formed thereon is successively developed by means of the toner process while the photosensitive surface P is passing through the development device **18.**

When the microswitch SW_5 is closed by the projection **32,** relay RY_5 is activated via closed relay switch $1A_5$, so as to close the microswitch SW_7 and its relay switch $5A_2$, thereby the relay RY_5 is self-held, as well as closes a relay switch $5A_1$ so as to actuate motor **23** for feeding transfer sheets. Accordingly, the feeding roller **24** begins to feed one of the transfer sheets into the transfer system **19.**

Subsequently, when the microswitch SW_6 is closed by the projection **32,** a relay RY_6 is activated via closed relay switch $4A_3$, so as to close the microswitch SW_4 and a relay switch $6A_2$, thereby the relay RY_6 is self-held as well as closes a relay switch $6A_2$. Consequently, the corona discharge unit **20** of the transfer system **19** is actuated and a toner image formed on the photosensitive surface P is thereby transferred onto the transfer sheet **25.**

When the microswitch SW_7 is operated by the projection **32,** the relay RY_5 is released so as to deactivate motor **23.** The transfer sheet having an image thereon is separated from the photosensitive surface P by the air injection of the separating device **26** which is always working, and the separated transfer sheet is sent to the fixing unit **28** where it is heated and fixed by a heater.

When the microswitch SW_8 is operated by the projection **32** of the cam plate **31,** in the case where one copy is indicated by the copying sheet counter device **34,** the relay RY_1 is released so that the corona discharge by the electric charging device **5** is terminated.

Finally, when the microswitch SW_9 is operated by the projection **32**, if one copy is indicated by the copy sheet counting device **34** as described above, a solenoid **33**, which is usually functional to lessen said indicated number one by one, is released from the operation as described above.

When the projection **32** is rotated so as to open the microswitch SW_1, the electromagnetic clutch **4** is still kept actuated through the relay switch $6A_3$ which is then kept closed, thereby the clutch **4** is still kept connected with the drive motor **3** so as to maintain the continuous revolution of the rotary drum **1**. Accordingly, the photosensitive surface P is capable of being cleaned by the cleaner **30** which is working at all times.

Meanwhile, the first carrier A of a slit type exposure device is moved to the left end of the guide rail **8**. (The location is shown by broken lines in FIG. **1** and FIG. **2**.). Just before the trailing end of the photosensitive surface P has passed through under the exposure window **6**, and thereby acts on the return switch SW so as to have it opened, the illuminating device I is accordingly extinguished, and the clutch CL connecting the rotary drum **1** with the wheel **10** is concurrently released. The wheel **10** is thereby rotated counterclockwise by the energized spring **17**. Consequently, the first and the second carriers A and B of the slit type exposure system are returned to their respective right ends. (The positions are shown by full lines in FIG. **1** and FIG. **2**.). This return operation is quickly accomplished by suitably setting the biasing force of the spring **17** so as to get the return motion to be completed before the microswitch SW_2 is again operated by the projection **32**.

On account of the further revolution of the rotary drum **1**, even if the projection **32** is situated so as to act again on the microswitch SW_2, since the relay switches $1A_2$, $1A_3$ have been already opened, the relay RY_2 is not operated so that the electric charging device **5** is not actuated. However, since the relay RY_4 is thereby released from its self holding situation, the operation of the development device **18** is terminated.

The microswitch SW_3 is then actuated by the projection **32**; however, since the relay switch $1A_4$ has been already opened, the relay RY_3 is not actuated, the clutch CL is not therefore connected, the illumination device I of the slit type exposure system is not lighted, and the leftward movement of the first carrier A and the second carrier B does not take place.

The microswitch SW_4 is next actuated by the projection **32**; however, since the relay switch $2A_3$ has been already opened, the development device **18** is not actuated, but the relay RY_6 is released from its self-holding situation by the concurrent operation of the microswitch SW_4. Accordingly, the discharge by the corona discharge unit **20** of the transfer system **19** is terminated. That is, the trailing end of the transfer sheet **25** just passes through the transfer system **19** at this moment.

The microswitch SW_5, SW_6 and SW_7 are next actuated by the projection **32**; however, since the relay switches $1A_5$ and $4A_3$ have been already opened, the relays RY_5 and RY_6 are not operated, the feeding device **23** and **24** is not actuated, and the corona discharge unit **20** of the transfer system **19** is also not operated.

After the projection **32** has passed through the microswitches SW_8 and SW_9, if it opens the next microswitch SW_1, since the relay switch $6A_3$ has been already opened, the electromagnetic clutch **4** is disconnected, so that the revolution of the rotary drum **1** is terminated. That is, this microswitch SW_1 is a functional switch for detecting the leading end of the photosensitive surface P on the rotary drum **1**.

Additionally, since the photosensitive surface P is cleaned by the cleaner **30** two times, i.e., in the period of the first revolution of the rotary drum **1**, and in the period of the second revolution thereof, accordingly, the cleaning thereof is fully carried into effect.

Furthermore, during the second revolution of the rotary drum **1**, the transfer sheet **25** which has been transferred during the first revolution thereof is sent out through the conveying passage **27** while it is concurrently heated and fixed by the fixing unit **28**, and finally put in a tray **29** for the storage of completed copies.

The descriptions shown hereinabove are all concerned with such a case where the indication of a counting device **34** for setting the number of sheets to be copied is set to "1" in order to obtain only one copy of an original. However, in the case where the device is set for two sheets or an unlimited number M of sheets, each contact point of the indicating scale and its pointer are short-circuited across the microswitch SW_8. Therefore, even though the projection **32** acts on the microswitch SW_8 during the first revolution of the rotary drum, the self-holding of the relay RY_1 is maintained, and the relay switches $1A_1$, $1A_2$, $1A_3$, $1A_4$ and $1A_5$ are also kept in the closed status. Consequently, the same operation as that carried out during the first revolution of the rotary drum **1**, after the microswitches S_{S1} *and* $_{SS2}$ are closed by pressing the starting button S_S for starting the first revolution of the rotary drum **1**, is again carried out during the second revolution. That is, during the second revolution of the rotary drum the surface P of the drum is cleaned after the exposure and fixing of the first copy and the transfer of the first transfer sheet. The second image formation on the photosensitive surface P and the transfer of the image thereof to the next transfer sheet for the purpose of obtaining the second copy is also effected. On account of the operation of the switch SW_9 which is actuated by the projection **32** after the switch SW_8 has been actuated thereby, a solenoid is actuated so that the indication of the copying sheet amount pre-set device **34** is lessened by one step.

Accordingly, if, in general, the indication of the copy sheet counting device has been manually set in advance so as to obtain n sheets of copies, when the starting button S_S is pressed, n + 1 revolutions of the rotary drum **1** are automatically carried out so that n sheets of copies are continuously produced.

The second embodiment of the present invention shown in FIG. **5** is concerned with an electrophotographic copying machine of the latent image transfer type, wherein, the development device **18** confronting the rotary drum **1** is removed, and a wet development device **18'** is instead disposed in the path of the conveying passage of the transfer sheet. Also disposed instead of the corona discharge unit **20** of the transfer device **19** is a conductive roller **20'** which has been grounded or charged by a potential of the inverse polarity with that of the electrostatic latent image. Moreover, the cleaning device **30** is replaced with another cleaner **30'** which is functional to wipe out the residual electrostatic image, and a dry fixing unit **28'** is arranged in-

stead of thermal fixing unit **28.** Also removed are the microswitches SW_4 and SW_6 which have controlled both operations of development device **18** and corona discharge unit **20.** Therefore, the relay switch $6A_3$ of the relay RY_6 which has been operated by the removed microswitch SW_6 for activating the second revolution of the rotary drum **1** is now functional as a relay switch of the relay RY_3 which is operated by the microswitch SW_3.

What is claimed is:

1. A transfer type electrophotographic copying machine comprising: a rotatable drum for supporting photosensitive material and having a circumference greater than the length of original material to be copied; an electromagnetic clutch for connecting said drum to a driving source; means for forming an original image on the surface of photosensitive material supported on said drum; means for supplying copying material; transfer means for transferring the original image on said photosensitive material surface to said copying material; means for cleaning the residual original image on said photosensitive material surface; a starting switch; means for actuating said electromagnetic clutch to rotate said drum through two revolutions with each closing of said starting switch; control means for operating said means for forming the original image, said means for supplying copying material, and said transfer means during the first revolution of said drum, said control means deactuating said means for forming an original image, said means for supplying copying material and said transfer means during the second revolution of said drum.

2. A transfer type electrophotographic copying machine comprising: a rotatable drum for supporting photosensitive material and having a circumference greater than the length of original material to be copied; an electromagnetic clutch for connecting said drum to a driving source; means for forming an original image on the surface of photosensitive material supported on said drum; means for supplying copying material; transfer means for transferring the original image on said photosensitive material surface to said copying material; means for cleaning the residual original image on said photosensitive material surface; a starting switch; means for actuating said electromagnetic clutch to rotate said drum through $n+1$ revolutions with each closing of said starting switch, wherein n is the number of copies to be duplicated; control means for operating said means for forming the original image, said means for supplying copying material, and said transfer means during n revolutions of said drum, said control means deactuating said means for forming an original image, said means for supplying copying material and said transfer means during the last revolution of said drum; and means for setting the number of copies to be duplicated and wherein said means for actuating operates said electromagnetic clutch to rotate said drum $n+1$ revolutions.

3. A transfer type electrophotographic copying machine as in claim **2,** wherein said photosensitive material is mounted only in the position on said drum where the original image is formed.

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