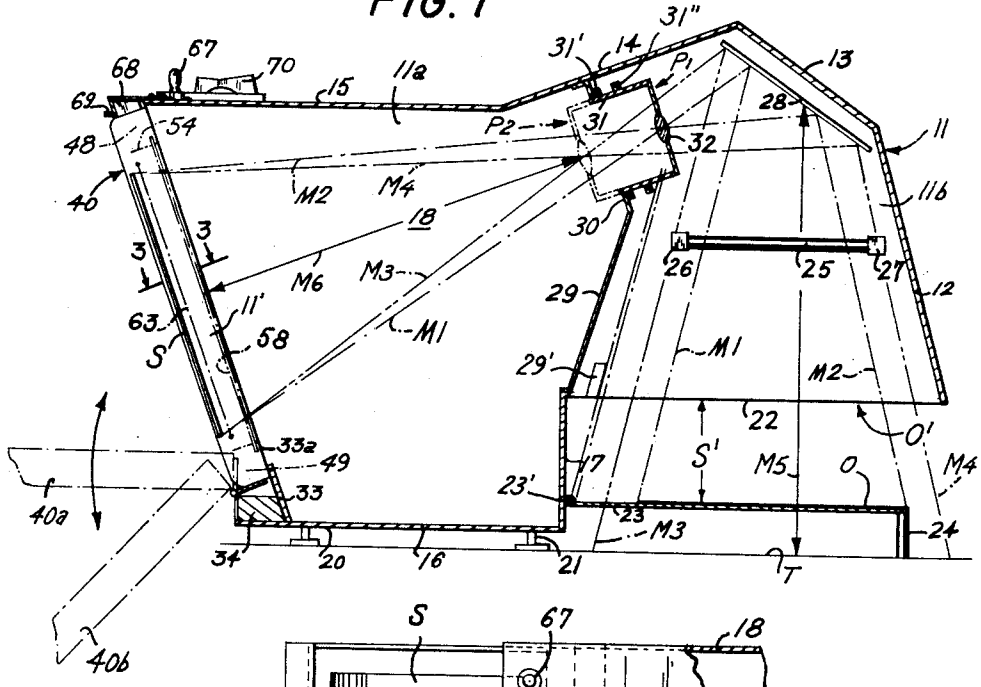
Sept. 22, 1964 J. J. SCHULZE 3,149,546

ELECTROPHOTOGRAPHIC DESK COPIER

Filed Feb. 8, 1963 2 Sheets-Sheet 1

FIG. 1



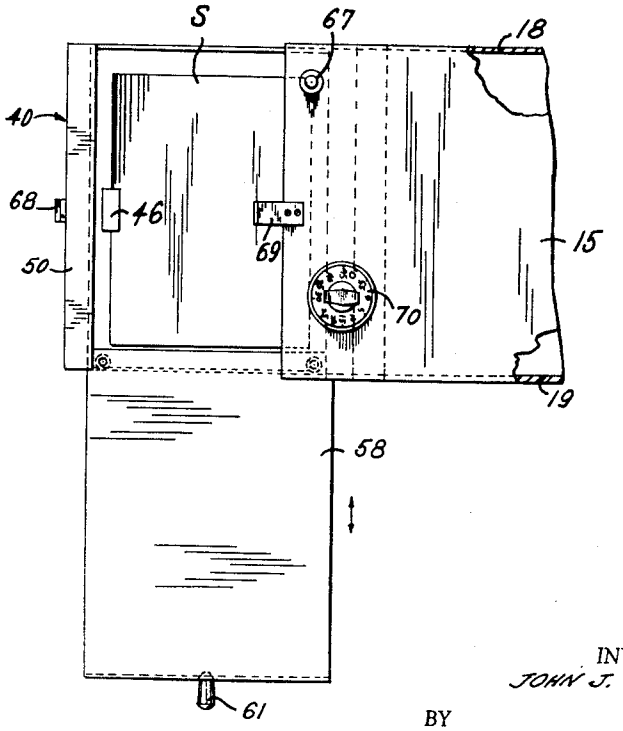


FIG. 2

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Sept. 22, 1964 J. J. SCHULZE 3,149,546

ELECTROPHOTOGRAPHIC DESK COPIER

Filed Feb. 8, 1963 2 Sheets-Sheet 2

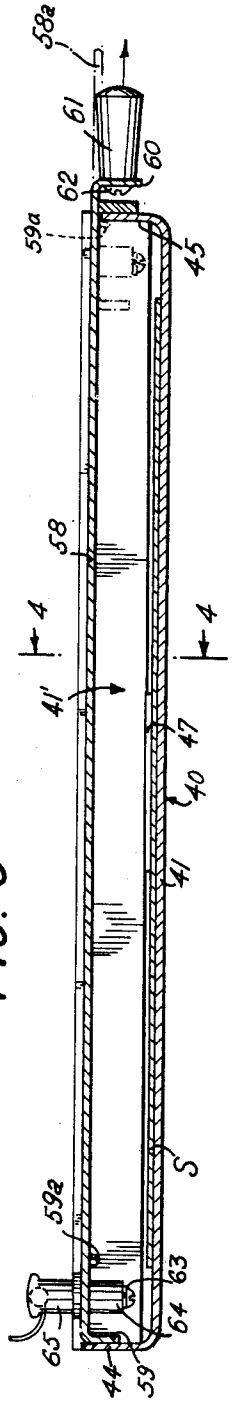


FIG. 3

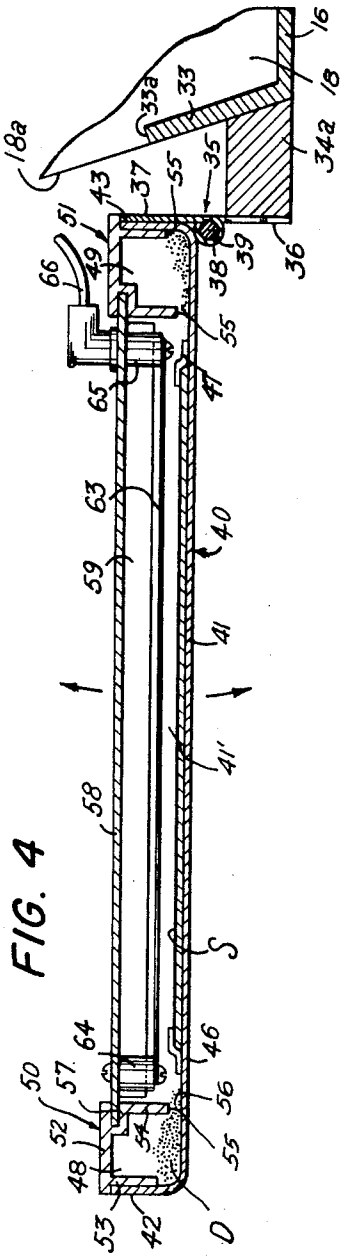


FIG. 4

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United States Patent Office 3,149,546 Patented Sept. 22, 1964

3,149,546

ELECTROPHOTOGRAPHIC DESK COPIER

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Filed Feb. 8, 1963, Ser. No. 257,317
7 Claims. (Cl. 95—1.7)

This invention relates to electrophotographic copying machines, and more particularly, to a novel desk-type electrophotographic copier which is unique in its simplicity and compactness.

In the electrophotographic art, a photoconductive insulating surface is first electrostatically charged and then exposed to a light image of the original to be copied to form a latent electrostatic image in the surface. This image is then developed by applying electroscopic powder bearing a suitable electrostatic charge. The photo-conductive surface may be on a reusable plate, in which case the image of powder particles is transferred to a sheet of paper and fused thereto or otherwise formed thereon, or the photo-conductive surface may be formed directly on the paper itself so as to eliminate the transfer operation.

While electrophotographic copying machines have been developed for automatically performing the charging, exposing, developing and fixing operations, most of these machines are relatively complex, large and expensive. There is a need in the office copying field for a compact, relatively small, electrophotographic copier which can be produced to sell at a relatively low cost and which can be used to make good quality electrophotographic copies, particularly where only a few copies of originals are required and hence the greater initial expense or fixed cost of presently available automatic copiers cannot be justified.

It is therefore a primary object of the present invention to provide an electrophotographic copier which is simple in construction and operation, of low initial cost, inexpensive to maintain and operate, and sufficiently small and compact to be placed conveniently on a desk, table or other surface.

Another object of this invention is to provide such a compact copier in which after placing the electrophotographic member therein, the charging, exposing and developing can be carried out without requiring the electrophotographic member to be replaced or otherwise manually handled until the developed copy is ready to be removed from the copier.

A specific object of this invention is to provide a compact copier which has the capability of quickly and simply being converted so as to produce a copy reduced in size of an original.

For convenience of description, the end of the copier where the electrophotographic element or electrophotographic plate is exposed will be considered the front end and the rest of the structure oriented accordingly. It will be understood however that the invention is not to be limited thereby to copiers in which for example the exposure location is positioned closest to the user and hence should be considered the front end in this sense.

In the preferred embodiment of the invention disclosed for purposes of illustration, the copier housing has a front end opening and a generally rectangular tray pivotally mounted on the housing for swinging movement to a closed position over the opening. The tray is adapted to receive an electrophotographic member, the latter being suitably secured to the inside flat surface that forms the face of the tray which is within the housing when the front opening is closed. Thus, when the tray is in the aforesaid position, the electrophotographic element is properly positioned within the housing for exposure. A

plate slidably mounted in super position over the inside flat surface of the tray cooperates with the inside face, which is otherwise open, to provide in the closed position a light-tight enclosure within which the electrophotographic member having the latent image thereon can be developed. The plate is provided with a corona charging wire exposed to the face of the tray, which when the plate is moved over the face of the tray the photo-conductive surface of the electrophotographic member thereon, receives an electrostatic charge.

The tray has a pair of chambers extending along and parallel with the opposite edges of said tray and disposed transverse to the path taken by said tray when it is set in swinging motion, each chamber having longitudinally extending slots at the base of each chamber through which each chamber communicates with the interior portion of the tray therebetween. Developing powder flows by gravity from one chamber through the slot at its base into and across the face of the tray over the sheet therein and thence through the slot of the other chamber thereinto. The tray can be manually oscillated several times between upwardly and downwardly inclined positions to cause the developing powder to be cascaded across the exposed sheet from one chamber to the other.

The developing powder can be any of the electroscopic developers employed in the electrophotographic art, including mixtures of magnet or non-magnetic carrier particles, such as iron or magnetic ferrites, glass beads, steel balls, etc., and toner particles such as pigmented resins, e.g., pigmented or dyed polystyrene resin, asphalts, rosin and the like.

During this developing operation, the plate, which has previously been reciprocated to charge the sheet, now serves the additional functions of maintaining the interior of the tray light-tight to prevent premature discharge of the latent image thereon by prematurely exposing it to light and acting as a cover or closure for the tray to prevent the cascading developing powder from being spilled from the tray.

The housing has a rear opening extending in a generally horizontal plane above the supporting surface which serves as an access for receiving the original to be copied and removing it once exposed, i.e., a light image thereof has been projected onto the electrophotographic member in the tray. Located above the support for the original is the source of illumination for the original and an inclined mirror for reflecting the light rays that are transmitted upwardly from the original onto the face of the tray at the front end of the copier. A lens focuses these light rays at the image plane occupied by the electrophotographic member when the tray is in position over the front opening of the housing, to project a light image of the original onto the electrophotographic member. Preferably the lens mounting is so constructed and arranged that an operator can reverse the lens and thereby change the relative distances between (*a*) the lens and the plane of the image and (*b*) the lens and the plane of the original. For each position of the lens there is a support for the original so positioned relative to the lens, as to result in proper focusing of the light image onto the electrophotographic member in the tray. Thus depending on the position of the lens, with the original placed on the support intended for use with such position of the lens, full size copies or reductions in size, can be made, as desired. Employing a conventional wide angle symmetrical condenser lens system having an 8.25" focal length and a *f*/6.8 opening, the lens mounting and position, relative to the position of the original, and the desk copier can be so dimensioned to give a full size reproduction in one position of lens and original and a desired size

reduction, e.g. ⅔ in the reverse position of the lens and in the second position of the original, and this while maintaining the desk copier relatively small and compact.

The electrophoto-conductive member can be the known photo-conductive sheets, including the known paper sheets having a photo-conductive coating thereon, disclosed, for example, in U.S. Patent 2,959,481 granted November 8, 1960. Using such paper and the procedure hereinabove described, a direct reading copy of the original is obtained. The copier of the present invention, however, can also be utilized to charge, expose, and develop electrophotographic members in the manner herein described, and the image can be transferred to a sheet of translucent paper that had been superimposed on the powder image. To accomplish such a transfer of the developed image, the slidable charging plate is reciprocated to impress a charge on the translucent paper and thereby the powder image is transferred to the paper which can then be fixed by fusion or some other suitable method. This technique is of particular advantage in creating translucent originals usable in contact printing processes, such as, for example, the diazo and blueprint process.

In the circumstance where the light image of the original is projected directly onto the charged plate rather than from a mirror reflected image of said original, the image that is transferred to a suitable paper will be right reading. Accordingly, the copy produced after this transferred image has been properly fixed, such as by fusion, may then be used to advantage as a lithographic master. Such a direct exposure would of course require positioning of the original in line with the face of the tray with the lens system disposed therebetween.

In the accompanying drawings, showing a preferred embodiment of this invention for illustrative purposes to which embodiment, however, the present invention is not limited.

FIGURE 1 is a transverse vertical sectional view of the electrophotographic copier, hereinafter referred to as a copier for the sake of brevity;

FIGURE 2 is a top plan view of the front portion of the copier showing the tray in a horizontal position and the plate pulled outwardly;

FIGURE 3 is a sectional view of the tray taken on line 3—3 of FIGURE 1; and

FIGURE 4 is a vertical sectional view of the tray taken on line 4—4 of FIGURE 3 and also shows a portion of the housing on which the tray is hingedly mounted.

Referring first to FIGURE 1, 11 indicates generally the copier housing which is substantially light-tight except for front and rear openings to be described below. Housing 11 comprises a forwardly inclined rear wall 12 joined at its upper edge to an upwardly inclined top wall 13 which is contiguous with the rear edge of a downwardly inclined top wall 14 in turn joined at its forward edge with a horizontal top wall 15. A bottom wall 16 is connected at its rear edge to the lower edge of a vertical wall 17.

All of the walls thus far described extend entirely across the width of housing 11 and their lateral edges are joined to the respective edges of a pair of spaced parallel vertical side walls 18, 19. Housing 11 can be supported on the top of a desk, table or other suitable flat surface indicated by the reference letter T by four legs secured to bottom wall 16, two of the legs being shown at 20, 21. Side walls 18, 19 are formed with horizontal lower edges 22 extending rearwardly from the upper edge of vertical wall 17 to the lower edge of rear wall 12. These lower edges 22 and the lower edge of wall 12 and upper edge of vertical wall 17 define a generally rectangular opening O' lying in a horizontal plane and spaced above a horizontal platform or support 23 for an original O to be copied. Platform 23 is hingedly secured at its forward end 23' to vertical wall 17 and its rear edge rests on legs 24 in its horizontal position. It can be swung into the rearward compartment and retained against the partition 29 by suitable means such as a magnet 29' fixed to side wall 18, thereby exposing the table top T to the mirrored reflecting surface 28. With the plaftorm 23 in a horizontal position, the distance from the original O thereon to the mirrored surface 28 is less than the distance from the mirror 28 to the original O placed on table top T. The difference in these distances is equal to the vertical distance between table top T and the upper surface of platform 23 when positioned in a horizontal plane to support the original O. The latter is placed on table top T when it is desired to make a reduction in the size of the reproduction to be made of the original; this also requires adjustment to be made in the lens mounting which will be described hereinafter. The opening O' is in spaced relation to the surface of the platform 23 as well as from the table top T when the platform is swung into the rearward compartment which permits the convenient and ready placement of an original O in position for exposure on the table top.

In order to illuminate original O, a pair of lamps 25 mounted within sockets 26, 27 are secured to side walls 18, 19 respectively. Although FIGURE 1 shows only the lamp 25 mounted on side wall 18, it will be understood that the second lamp on the other side wall 19 is identical thereto. As indicated by the marginal light rays M1, M2, the light radiated by lamps 25 is reflected by original O upwardly through the rear opening O', and strikes a mirror 28 mounted adjacent top wall 13. It will be understood that instead of the two lamps 25, one or more lamps can be used to provide uniform illumination of the original to produce a light image thereof.

Housing 11 is divided into forward and rearward compartments 11*a* and 11*b* by a rearwardly inclined partition wall 29 extending upwardly from the upper edge of wall 17 and a forwardly inclined partition wall 30 extending from the upper edge of wall 29 to an intermediate portion of top wall 14. Wall 30 is provided with an opening within which is mounted the barrel 31 of a lens 32. The barrel 31 is frictionally held in position within the opening by the wall 30 and is adapted for insertion so that the lens 32 is situated in the rearward compartment in position P1 or in the front compartment in corresponding position P2. On the outside of the barrel wall are a pair of annular stop rings 31' and 31'' which are adapted to abut the wall 30 limiting the movement of the barrel into said wall. In position P1 the open end of the barrel is first inserted into the wall 30 until the annular ring 31' abuts the wall and in this position the distance from the lens 32 to the face of the tray S is fixed as M3. This provides a 1/1 exposure of the original O which is placed on the platform 23 in the horizontal position.

To reduce the size of the original O, the lens 32 is inverted and inserted into the opening as shown in dotted lines in FIGURE 1 until the second annular ring 31'' abuts the wall 30. In this position P2 the stop ring 31'' fixes the distance M6 from the face of the tray S to the lens 32. The platform 23 is swung upwardly into the rearward compartment and brought to rest against the magnet 29', which holds it in this rest position. The original is placed on the table top T; its distance from the mirror 28 is shown at M5. Thus the image is reduced in size as indicated by the marginal light rays M3, M4 emanating from the original O on the table top T.

The lens 32 can be any type such as a wide-angle, symmetrical, condenser lens having an 8.25 inch focal length and an *f*/6.8 opening that is suitable for copying; it focuses the light rays reflected from the mirror 28 onto the photo-conductive sheet or plate positioned at the front of the housing 11 in a manner to be described below.

The forward edges 18*a* (FIGURE 4) of side walls 18, 19 are inclined upwardly and forwardly. Lying in the inclined plane of edges 18*a* is a front wall 33 extending upwardly from the forward edge of bottom wall 16 (FIGURE 4). The upper edge 33*a* of front wall 33 to-

gether with edges **18***a* of side walls **18, 19** and the forward edge of top wall **15** define a front opening **11'** of housing **11**; opening **11'** in the embodiment shown in the drawings is generally rectangular.

Secured to the front lower edge of housing **11** and extending longitudinally thereacross is a forwardly projecting ledge member **34**. A hinge **35** comprising a pair of sections **36, 37** pivotally connected by integral cylindrical portions **38** encircling a pivot pin **39** is provided for mounting a tray **40** to housing **11**. Hinge section **36** is suitably secured to the outer edge of ledge member **34** and the axis of pivot pin **39** is so located adjacent the lower edge of front opening **11'** that the latter may be closed by swinging tray **40** upwardly to the position shown in full lines in FIGURE 1. One or more such hinges can, of course, be used to mount the tray **40** for pivotal movement about on axis extending parallel to the lower longitudinal edge defining front opening **11'** above and below the horizontal.

Tray **40** comprises a flat base or body portion **41** formed integral with walls **42, 43** along its opposite horizontal edges and with walls **44, 45** along its opposite lateral edges. Tray wall **43** is suitably secured to hinge section **37**. Base **41** serves as a backing member or support on which is placed the photo-conductive sheet S held in place by spring clips **46, 47** suitably positioned to engage the edges of the sheet S, e.g., along its horizontal edges.

Extending longitudinally along and parallel to the respective opposite horizontal edges of base **41** and disposed transverse to the path taken by said tray when it is set in swinging motion are a pair of pockets or chambers **48, 49** for containing developing powder indicated at D. These chambers extend substantially the full length of the tray **40**. The chambers **48, 49** are formed by the channel members **50, 51** each comprising an intermediate web portion **52** formed integral with the two spaced parallel leg portions **53, 54**. Each leg portion **53** of the channel members **50, 51** is secured to its tray wall **42** and **43** respectively and the edge **55** of each of said leg portion **54** is spaced from said base **41** to form a longitudinally extending opening **56** therealong communicably connecting each chamber **48, 49** with the intermediate portion **41'** of the tray **40**.

Thus when tray **40** is manually pivoted about the axis of hinge **35** to an upwardly inclined position, developing powder D will flow by gravity from chamber **48** through opening **56** and across the sheet S into the other chamber **49**. Similarly, when tray **40** is pivoted to a downwardly inclined position **40***b*, below its horizontal position **40***a*, powder D will flow in the opposite direction from chamber **49** across sheet S and into chamber **48**. Thus cascade development of photo-conductive sheet S is effected by simply manually oscillating tray **40** about hinge **35** above and below the horizontal; hinge **35**, it will be noted, is of a type to permit such pivotal movement of the tray **40**.

Each of the members **50, 51** is provided with a slot **57** extending longitudinally therein, near the top thereof, for slidably mounting the opposite horizontal edges of a plate **58**. As shown in FIGURE 3, the lateral edges of plate **58** are formed with integral flanges **59, 60**. Flange **59** is adapted to abut tray wall **44** to limit the sliding movement of the charging plate **58** in the left hand direction viewing FIGURE 3, i.e., to its closed position shown in solid lines in FIGURE 3. Movement of plate **58** in the opposite direction, to the open position shown in FIGURE 2 is limited or stopped by the abutment of a stop **59***a* (FIGURE 3) with tray wall **45**. Flange **60** has a handle **61** secured thereto by a screw **62**.

The side walls **54** of members **50, 51** and the tray walls **44, 45** at right angles to walls **54** define the rectangular open face of the tray, which rectangular open face serves both as an access opening to the interior of the tray and as an exposure opening. The open face of the tray can be closed manually by sliding plate **58** to its closed position shown in full lines in FIGURE 3. In this position of plate **58** the interior of tray **40** is light-tight. When moved to the open position shown in FIGURE 2, and indicated by dash-dot lines at **58***a* in FIGURE 3, the interior of tray **40** is accessible through the then open face. Plate **58** thus serves both as a light shielding slide to render the interior of tray **40** light-tight and also as a cover to prevent spillage of the developing powder during the oscillating cascade development operation of tray **40**.

Charging plate **58** has thereon a corona charging wire **63** extending longitudinally adjacent and parallel to flange **59** and mounted on plate **58** by a pair of insulator mounts **64, 65**. The charging wire extends across plate **58** in a direction at right angles to the longitudinally extending guide slots **57** for the slidable plate **58**. A lead **66** is electrically connected to one end of charging wire **63** and communicates with a suitable power supply (not shown) well known in the art, for applying a sufficiently high potential to wire **63** to cause a corona discharge from the latter in response to manual actuation of a switch **67** (FIGURE 1) which controls the supply of current to wire **63**. While wire **63** is maintained at charging potential, plate **58** is manually reciprocated several times so as to move wire **63** back and forth over the surface of photo-conductive sheet S. The corona discharge from wire **63** to sheet S causes the latter to acquire a uniform electrostatic charge throughout its area.

During the charging and exposing steps, tray **40** is maintained in its closed upper position, closing off the front of the housing **11**, shown in solid lines in FIGURE 1, by a detent **68** secured to member **50** and engaged by a spring clamp **69** mounted on housing top wall **15**. During the exposing step, plate **58** is in its full retracted position, not covering the face of the tray.

An exposure timer **70** of any well known type is mounted on top wall **15**. This timer can be of the known clock type in circuit with lamps **25** so that, when the timer is actuated by turning the timer dial to any desired setting, lamps **25** are energized and remain energized for selected time interval for which the timer has been set.

Operation

Tray **40** is first swung downwardly to its horizontal loading position indicated in dash-dot lines at **40***a* in FIGURE 1 and handle **61** is pulled to slide the plate **58** to its open position. A photo-conductive sheet S is placed on the base **41** of tray **40** and held in place by spring clips **46, 47**. Tray **40** is then pivoted upwardly to its closed position and switch **67** is actuated, thereby to supply current to charging wire **63** while the operator manually reciprocates plate **58** several times, thereby passing charging wire **63** over the surface of sheet S to charge it. After this charging operation plate **58** is left in its open position for the exposure step.

An original O to be copied can be placed on platform **23** either before or after the above-described loading and charging steps. The exposure timer **70** is actuated to energize lamps **25** and obtain the desired exposure. The light rays radiated from lamps **25** are reflected back upwardly from original O, strike mirror **28** and are then reflected forwardly through lens **32** which focuses the rays to form an image in the plane of the surface of sheet S.

This exposure of charged sheet S causes the charge to be dissipated from the exposed areas while remaining on the unexposed dark areas, thereby resulting in a latent electrostatic image. Plate **58** is then moved to its closed position and tray **40** is oscillated about the axis of hinge **35** between a downwardly-inclined position shown in FIGURE 1 by dash-dot lines at **40***b* where the tray is positioned in a plane at an obtuse angle to the plane in which lies the front opening of the housing **11**, and an upwardly-inclined position of the tray **40** resulting in sat-

isfactory movement of the developer powder across the base of the tray. This swinging movement of tray **40** results in cascade development of the latent image as developing powder D flows back and forth over the surface of sheet S, the powder adhering only to those areas which are charged. Plate **58** is then moved to its open position and the developed sheet S is removed for fixing in the usual manner, such as by heat fusion of the powder to the sheet, using any conventional fuser. The result is a direct reading copy.

To obtain a reverse reading translucent copy, a metal plate with a photo-conductive coating thereon is mounted in tray **40** instead of paper sheet S. The successive charging, exposing, and developing operations are then performed on the photo-conductive plate in the manner described above for sheet S. Tray **40** is then pivoted to loading position *40a*, plate **58** is moved to its open position, and a translucent sheet of paper is placed over the powder image on the photo-conductive plate. The charging switch **67** is then held closed while reciprocating plate **58** to move corona charging wire **63** over the translucent sheet. This causes the powder image to be attracted to the translucent sheet to which it adheres when the sheet is removed from the photo-conductive plate. The adhered image may be fixed on the translucent sheet in the usual manner, such as by exposing the sheet to a heat source which will fuse the powder thereon. This produces a reverse reading translucent copy which can now serve as an original in contact printing processes such as diazo prints.

The expression "photoconductive plate" as used in the claims is intended to be generic to both paper sheets which constitute the final copy and metal or other plates from which the powder image is transferred to a paper sheet.

It will be noted that the electrophotographic copier of the present invention is unusually simple in construction and design, can be mass produced to sell at relatively low initial cost, is inexpensive to maintain and operate, and sufficiently small and compact to be placed on a desk, table, or other surface and occupies relatively little space.

It is understood that the specific embodiment disclosed herein is illustrative of a preferred embodiment of the invention, that modifications can be made without departing from the scope of the invention as delineated in the appended claims, and that the claims are to be construed as broadly as permitted by the prior art.

What is claimed is:

1. A desk-type electrophotographic copier comprising, in combination, a housing having a rear opening and a front opening, an open face tray adapted to overlie and completely close said front opening, means in said tray for supporting a photo-conductive plate therein, said tray being movable to position said photo-conductive plate for exposure adjacent said front opening in said housing, plate means slidably mounted on said tray from a position in which said plate means closes the open face of said tray to render it light-tight, to a position in which the open face of said tray is unobstructed to permit exposure of the photo-conductive plate therein, means on said plate means for charging said photo-conductive plate, means for supporting an original adjacent said rear opening, illumination means within said housing for projecting light onto said original, a lens for focusing a light image reflected from the original onto said plate to form a latent image thereon when said tray is positioned to overlie and close said front opening, said tray having developer powder chambers along the opposite sides thereof adjacent the opposite sides of said photo-conductive plate, said chambers having openings therein placing said chambers in communication with the interior of said tray containing said plate, said tray being pivotally mounted on said housing along a side that is parallel to the length of said chambers for swinging movement about its pivotal mounting above and below a horizontal plane passing through the pivotal connection of said tray to said housing effecting cascading of developing powder over said photo-conductive plate in said tray.

2. A desk-type electrophotographic copier as defined in claim 1 wherein said developer powder chambers extend longitudinally along respective opposite horizontal edges of said tray, the walls of said chambers which separate them from the portion of said tray containing said plate each having a longitudinally extending opening near the base thereof providing communication between said chambers and the interior portion of said tray for developing powder to reciprocally flow by gravity between the chambers into the interior portion, whereby the developing powder may be cascaded across the photo-conductive plate to the other chamber by manually oscillating said tray between upwardly inclined and downwardly inclined positions about the axis of the pivotal mounting between the tray and said housing.

3. A desk-type electrophotographic copier as defined in claim 2 wherein said tray has longitudinally extending slots, said plate means being mounted for reciprocal movement in said slots from a first position closing the otherwise open face of said tray to a second position where the open face of said tray is not obstructed by said plate means and a corona charging wire secured to said plate means on the side facing the interior of said tray, and extending there across in a direction substantially at right angles to said longitudinally extending guide slots.

4. A desk-type electrophotographic copier as defined in claim 3 wherein said housing has a partition therein forming front and rear compartments, said rear compartment containing said rear opening disposed in a substantially horizontal plane near the base thereof, with said illumination means being positioned in said rear compartment, a mirror positioned in said rear compartment to reflect the light image from said rear opening to said front compartment, and said front compartment being light proof when said tray is positioned to overlie and close said front opening and said partition having lens means positioned therein to focus said light image of the original reflected by the mirror onto said photo-conductive plate in said tray when the latter is in the aforesaid position closing said front opening.

5. A desk-type electrophotographic copier comprising, in combination, a housing having a rear opening and a front opening, an open face tray having its lower side pivotally mounted on the housing near the base of said front opening moveable between a closed position to overlie and completely close said front opening and an open position where said tray is disposed in a plane at an obtuse angle to the plane in which said front opening is disposed, means in said tray for supporting a photo-conductive plate therein, said tray being movable about its pivot to position said photo-conductive plate therein for exposure adjacent said front opening in said housing, plate means slidably mounted on said tray operable between a closed position which renders the open face of said tray light-tight to a closed position exposing the face of said tray to the interior of said housing to permit exposure of the photo-conductive plate therein, means on said plate means for charging said photo-conductive plate, means for supporting an original adjacent said rear opening, illumination means within said housing for projecting light on said original, said tray having developer powder chambers at the opposite sides thereof on the opposite sides of said photo-conductive plate in said tray, said chambers having openings therein along the sides thereof placing said chambers in communication with the interior of said tray containing said plate, whereby movement of said tray about its pivot above and below a horizontal plane passing through the pivotal connection of said tray to said housing effects cascading of the developing powder over said photo-conductive plate in said tray from one chamber on one side of said tray to the chamber on the opposite side of said tray, back and forth.

6. A desk-type electrophotographic copier comprising, in combination, a housing having a partition therein forming a front compartment and a rear compartment, said rear compartment containing an opening therein disposed in a susbtantially horizontal plane near the base thereof, said front compartment having a front opening therein, an open face tray having its lower side pivotally mounted on the housing near the base of said front opening for movement to overlie and completely close said front opening and also moveable to a position where said tray is disposed in a plane at an obtuse angle to the plane in which said front opening is disposed, said tray being adapted to contain a photoconductive plate and to position said photo-conductive plate for exposure adjacent said front opening in said housing and having developer powder chambers at the opposite sides thereof on the opposite sides of said photo-conductive plate in said tray, said chambers having openings therein along the sides thereof placing said chambers in communication with the interior of said tray containing said plate, whereby movement of said tray about its pivot above and below a horizontal plane passing through the pivotal connection to said housing effects cascading of the developer power in said chambers over said photo-conductive plate in said tray from one chamber on one side of said tray to the

chamber on the opposite side of said tray, back and forth, means for supporting an original adjacent said rear opening, illumination means within said housing for projecting light on said original, a mirror for reflecting a light image to said front compartment, said front portion being light proof when said tray is positioned to close said front opening and said partition having lens means positioned therein to focus a light image of the original reflected by the mirror onto said photo-conductive plate, said lens means being adapted for positioning in said partition to permit varying the distance between said lens and said photo-conductive plate when the latter is in the aforesaid position closing said front opening.

7. A deck-type electrophotographic copier as defined in claim 6 wherein said illumination means is positioned in said rear compartment, and said lens is positioned within said partition to focus a light image reflection by said mirror and reduced in size of the original, onto said photo-conductive plate in said tray when the latter is in position closing off said front opening.

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