May 8, 1962 W. LIMBERGER 3,033,095

APPARATUS FOR MAKING COPIES

Filed April 2, 1959 3 Sheets-Sheet 1

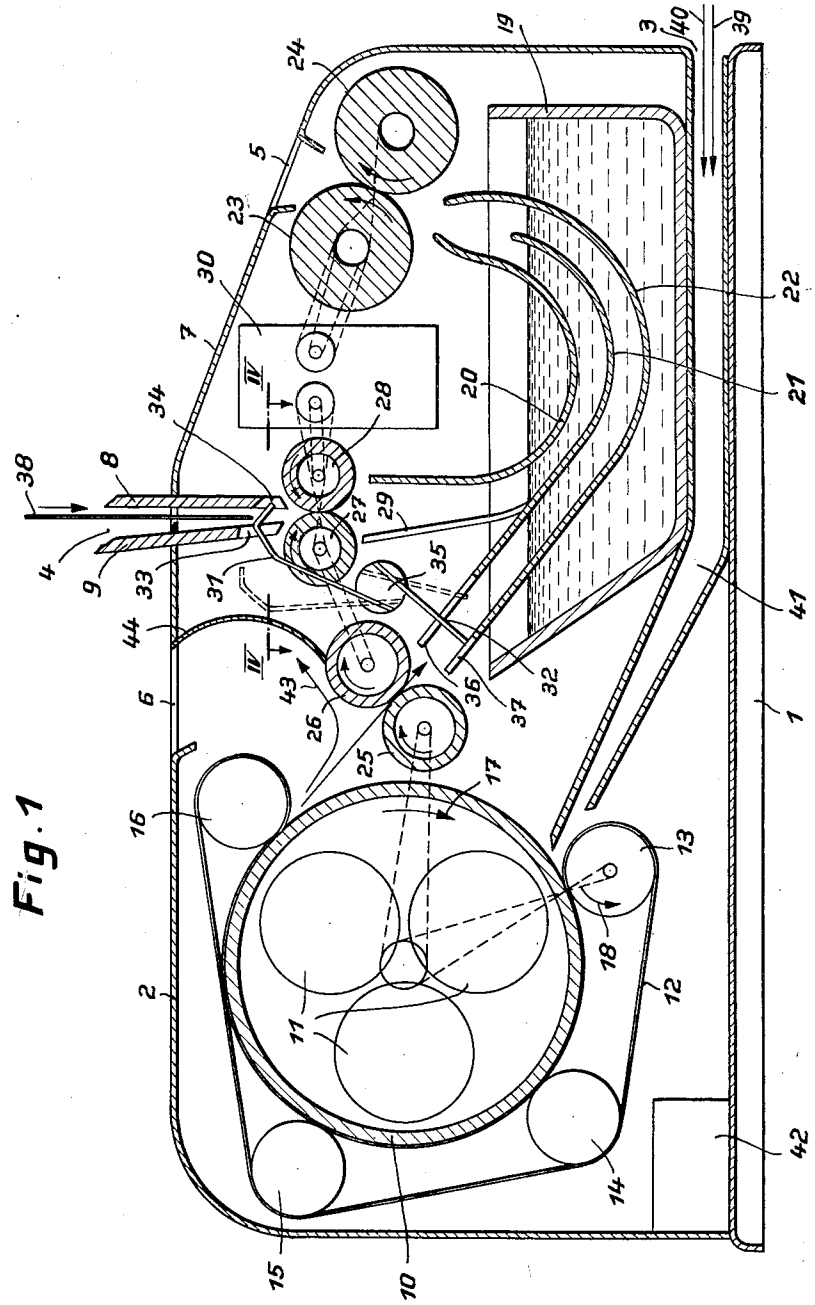


Fig. 1

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APPARATUS FOR MAKING COPIES

Filed April 2, 1959 3 Sheets-Sheet 2

Fig. 4

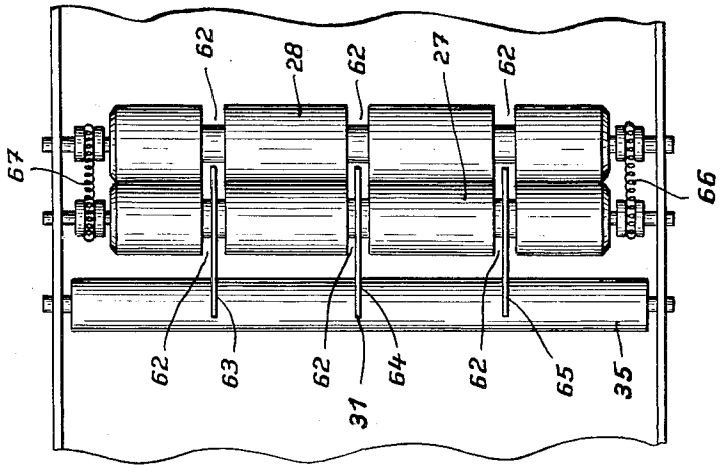


Fig. 3

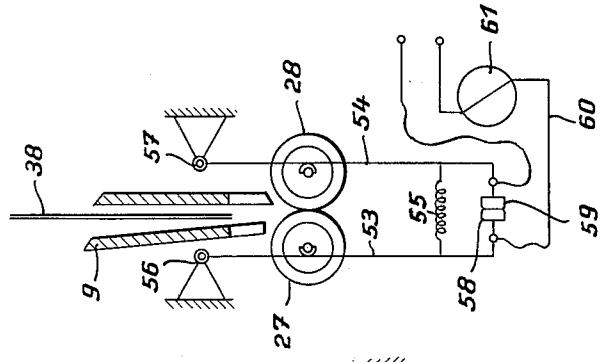
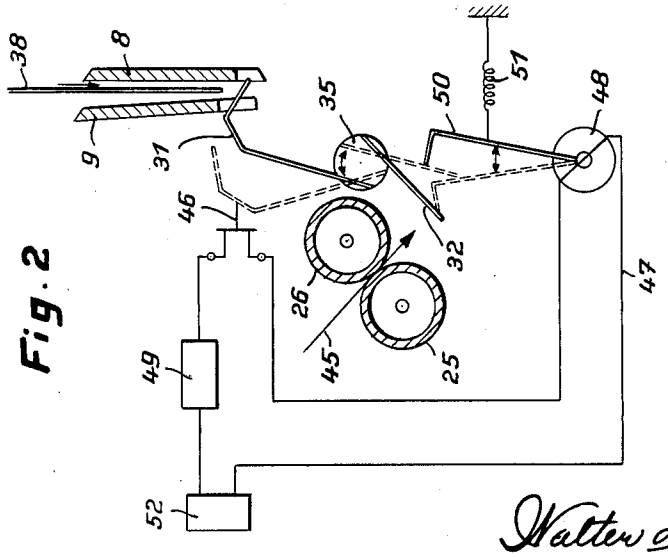


Fig. 2



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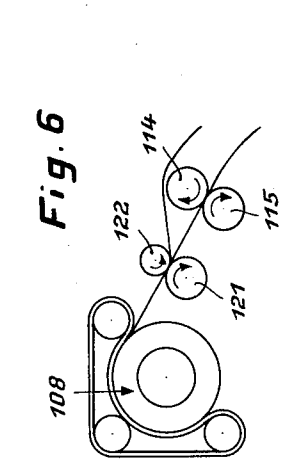


Fig. 6

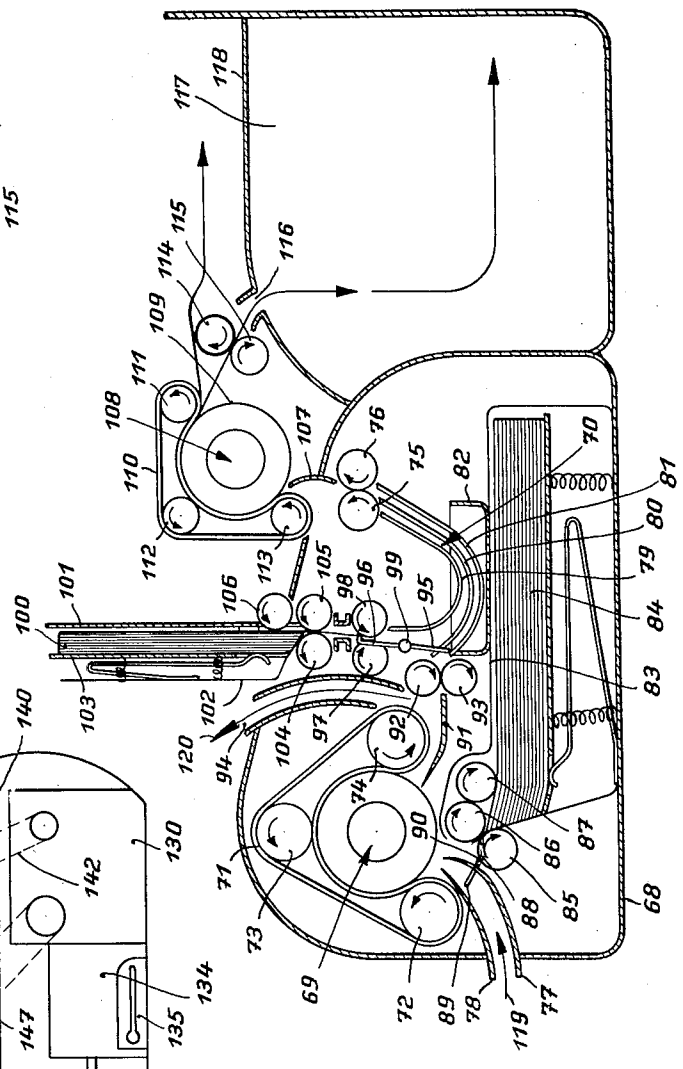


Fig. 5

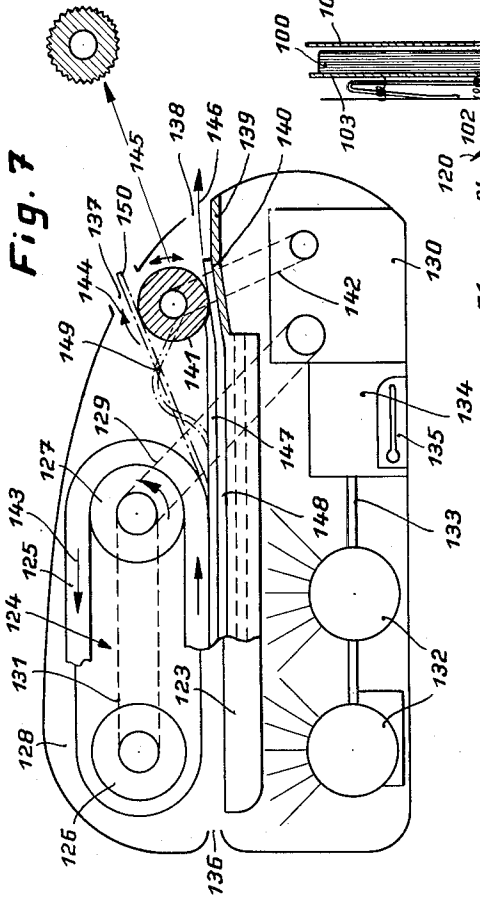


Fig. 7

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United States Patent Office

3,033,095

Patented May 8, 1962

3,033,095

APPARATUS FOR MAKING COPIES

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Filed Apr. 2, 1959, Ser. No. 803,718
Claims priority, application Germany Apr. 5, 1958
8 Claims. (Cl. 95—75)

The invention relates to an apparatus for making copies of an original in which two sheets of paper having light sensitive layers are guided over separate feeding paths to a treatment station.

In a particularly advantageous embodiment, the invention refers to an apparatus in which an exposure device and a developing device are arranged within a common housing.

Suitably, a developing device of the diffusion type with a liquid bath will be employed, through which the exposed negative and positive sheets of paper are guided to a pair of pressure rollers by means of guiding elements, the pressure rollers being arranged underneath the exit slot in the housing.

In known apparatus of this type, a separating device is provided between the exposure device and the developing device, by which the original is separated from the negative sheet of paper and guided to an exit slot, while the negative paper moves to the developing device.

Known apparatus of this type which may be placed on a table and which for reasons of economy and easy operation should be designed as simply as possible, involve the difficulty that the positive paper does not pass the exposure device but is supposed to enter the developing device simultaneously with the negative paper. For this purpose, it has already been proposed to advance the positive paper to the developing device simultaneously with the negative paper and the original, on a separate guide, so that both light sensitive sheets of paper reach the developing device at the same time. The insertion of several sheets of paper lying on top of one another, however, calls for a considerable amount of skill. This skill is necessary in particular where the individual papers are to be inserted into slots lying side-by-side or into one common but subdivided slot.

Furthermore, if a known apparatus is used in which the original and the negative sheet of paper are transported out of the apparatus in common, the negative sheet of paper and the positive sheet of paper must be again inserted in mutual alignment into two guide paths leading to the developing device. Subsequent to developing, the positive sheet of paper and the negative sheet of paper are transported out of the apparatus closely pressed together and must be separated by hand. A separation of the sheets is extremely difficult, if thin sheets are used.

It is known to provide a suction device with two suction cups, one of them engaging the negative paper and the other one the original. Such devices are, however, extraordinarily complicated and expensive if an advancing device is employed. The application of a stripper is not possible when thin sheets of paper are used.

Furthermore, an automatically working separating device is known in which one sheet of paper must be in advance of the other one, said advancing portion may then be seized by a gripping device. The adjustment of an advancing portion, however, on one hand entails a waste of material and, on the other hand, is no satisfactory solution because the adjustment of an advancing portion is contrary to the normal feeling of inserting the original and the negative paper in aligned relation; in addition, adjusting an advanced portion is often forgotten by the operator or it is adjusted insufficiently.

It is an object of the invention to improve the known apparatuses and to decisively simplify the operation of them, at the same time shortening the time required for making copies. According to the invention, this object is obtained by providing two feed guides for paper sheet material having blocking means, which may be inserted into the guide paths in order to block them, and removed in order to release them, said blocking means of associated guide paths being interconnected in such a way that they may be moved in the same sense.

In a preferred embodiment, the blocking means are arranged in the feed guides for the exposed negative sheet of paper and the positive sheet of paper. According to another embodiment of a device for making copies, it is also possible to provide such blocking means in feed guides for the original and the negative sheet of paper in such a manner that several originals are kept in readiness by the blocking means and are released after feeding the negative sheet of paper.

According to an advantageous embodiment, the blocking means are arranged in such a way as to be kept in the locking position by their own weight. Suitably, the arrangement will be such that on movement of the blocking means from one position to the other a dead center must be overcome, the movement of the blocking means out of the guide paths being effected by overcoming only an extremely small resistance and the re-positioning being effected for instance in dependence upon other parts of the apparatus, during the passage of the sheets perhaps in dependence upon the passage of the negative and positive sheets of paper through the pair of pressure rollers or by a timing device. According to an advantageous embodiment of the invention, weight and spring arrangements are provided for repositioning the blocking means into locked position.

Preferably, the device according to the invention comprises a feed guide cooperating with the blocking means, extending vertically or aproximately vertically, so that a sheet inserted into this guide rests on the blocking means. The end of the blocking means extending into the feed guide preferably has the form of a hook the free end of which is slightly sloped in a downward direction and may be moved out in a sideward direction in such a manner that the sheet may slide along the sloped end in downward direction and drop into the feed guide. In an advantageous embodiment, for instance, a roller covered with a material exerting only a slight frictional action is provided above the blocking means. This roll which may, for instance, be covered with a velvet coat is driven in such a direction, that it tends to transport the paper into the apparatus. The invention also includes the possibility of employing a pair of rollers.

Said roller or pair of rollers is continuosly driven. As long as the sheet is kept on the blocking means, the surfaces of the rollers slide along the sheet. Only upon release of the feed path a feed of the sheet is effected and ensures that no clamping or other obstructions occur.

According to an advantageous embodiment a feed roller arrangement is provided at a pile of paper sheets consisting of two rollers driven in the same sense of direction between which rollers a slot is formed. The width of this slot is less than the thickness of two sheets but in excess of the thickness of one sheet. The roller lying at the upper side of the pile rotates in such a way that the peripheral surface facing the slot between the rollers effects a transport of the uppermost sheet away from the pile.

Suitably, the blocking means for releasing the feed guide is associated to this feed roller arrangement. According to a particularly advantageous embodiment, a transport roller pair is arranged in rear of the feed roller arrangement, in the guide path, said transport roller pair

being driven at a higher speed than that imparted to the feed roller arrangement by the feed roller.

According to a suitable embodiment, a blocking member is arranged between the transport roller pair and the feed roller arrangement. As the drive being imparted to the one sheet by the feed roller of the transport roller arrangement is slower than the transport speed of the transport roller pair, there is a distance between the two positive sheets of paper in the region of the blocking means. The control of the blocking means is such that the feed guide is closed by the blocking means after the entry of the first positive sheet of paper, so that the positive sheet of paper subsequently advanced by the feed roller arrangement abuts the blocking means and is kept there in a position ready to start traveling as described until the feed guide is released anew by actuating the blocking means.

The blocking means arranged in the associated feed guide for the negative sheet of paper is suitably formed as a stop and serves to control the blocking means connected to it in such a way that the latter is moved into release position as soon as a sheet strikes the abutment.

In a preferred embodiment, the device according to the invention provides a common entry slot for the negative sheet of paper and the original which is not subdivided, a separate entry slot for the positive sheet of paper preferably lying at the upper side of the apparatus having an adjacent vertically extending feed guide, and an exit slot for the negative and positive sheets of paper at that side of the apparatus on which also the entry slot for the original and the negative sheet of paper is disposed. The exit slot for the original is arranged at the upper side of the apparatus.

In this arrangement, the entry slot for the original and the negative paper sheet is suitably provided in the lower part of the apparatus, and the guide path between this slot and the exposure device extends below the developing device. Thus the latter is situated at the rear portion of the apparatus, in which no operational slots are arranged.

According to a preferred embodiment, piles of copying sheets or layer carriers, preferably negative sheets of paper, are arranged on or within the housing of the apparatus in a light-tight manner, and a feeding device is provided for feeding a layer carrier from the pile to the guide path of the original which is releasable in dependence on the feed of the original.

When using positive and negative sheets of paper, also the positive sheets are arranged in a pile on or within the housing of the apparatus, close to a transport device for one sheet of the pile. The transport device may be switched on or released in dependence on the passage of the negative sheet of paper or the introduction of the original.

According to a preferred embodiment of the invention, the pile of negative sheets is arranged on the bottom of the housing, for instance in an extractable box.

Advantageously, an additional transport element is arranged in connection with the feed roller arrangement, preferably in the form of a driven roller acting by gripping a surface on the sheet to be withdrawn, this roller supported to be adjustable in height and acting continuously on the sheet to be withdrawn either by the action of a spring or a weight. According to a special embodiment, the pile is situated on a height-adjustable table which may be lifted by means of spring force in such a manner that the top sheet is pressed against the transport roller which at the same time serves as a stop to effect the height adjustment, so that the top sheet always lies between the transport roller pair in front of the slot.

Preferably, the pile of positive sheets is arranged at the upper side of the housing of the apparatus on a pile holder in front of a transport roller pair consisting of two rollers driven in the same sense of direction and leaving between them a slot corresponding to the thickness of

the paper sheet and is connected with an additional transport element acting on the sheet to be withdrawn in such a way that the latter on switching-on or releasing the transport roller pair is transported into the apparatus. For instance, the pile holder is arranged vertically, so that the sheets are positioned in a vertical plane and are pressed against the holder by means of a pressing device using for instance a spring. The invention includes an inclined arrangement of the pile holder so that the sheets will rest on the holder on account of gravity. The stop elements may actuate a switch controlling the drive of the transport roller pair and the transport element—for instance an additional roller—associated with the transport roller pair. According to a preferred embodiment, the transport rollers are always driven and the stops are connected with a mechanical locking bracket in front of the slot of the transport roller pair.

When using an apparatus according to the invention having an exposure, developing and drying device, the separating device for the original and the negative sheet of paper located behind the exposure device and for the negative sheet of paper and the positive sheet of paper located behind the drying device are formed by a roller pair, the two rollers of which are driven in the same sense of direction. The drive of all rollers of the transporting and separating devices as well as of the feed and pressure rollers is obtained from a driving motor.

In a particularly advantageous embodiment for separating the contacting sheets, they are fed to a rotating transport element, preferably a roller, driven in opposite direction to the direction of advance, said transport element pushing one sheet back in a direction opposed to the advance, lifting it at least for a time due to adherence between the sheet and the transport element, for instance the roller, and transporting the sheet separately corresponding to its direction of rotation.

In this operation, the temporary adherence occurring between the advancing edge of the sheet of paper and the peripheral surface of the roller is improved by the resulting upsetting of the sheet.

According to the invention, a separating device comprising a driven rotating transport element engaging one of the sheets is provided in the advancing path of the sheets, the circumferential movement of said transport element at the side facing the respective sheet being opposed to the advance of the sheets and its parts engaging the sheets enabling at times an adherence of at least the edge of the sheet being engaged. This transport element is, in accordance with a particularly advantageous embodiment of the invention, formed as a roller with a slightly rough and/or elastic surface.

In the advancing path of the sheets, preferably, a slot is provided, the one side of which serving as a guide for the sheets or being formed thereby, the other side being formed by the roller.

The slot extends over the whole width of the sheets. The slot opening corresponds exactly to the thickness of one sheet, i.e. that sheet passing through the slot. In order to meet the various thicknesses of the sheets, the roller is preferably height-adjustable. The invention further provides that within the range of the roller that side of the slot serving as a guide inclines towards the roller in the direction of advance.

The invention includes an embodiment according to which one side of the slot is defined by a roller arranged on top and rotating in the described manner, so that the circumferential surface facing the slot moves in a direction opposed to the direction of advance of the sheets, the other lever side of the slot being formed by a transport element rotating in the same direction and serving as transport element for the passage of the lever sheet. This transport element preferably consists of one or more rollers.

According to a preferred embodiment, the roller effecting the separation comprises a surface of rubber or

plastic material. Suitably the roller is made of a steel core provided with an elastic surface. The circumferential speed of the roller is higher than the advancing speed of the sheets, and the rotating direction is opposed to the advancing direction of the sheets.

Further advantages and features of the invention will become apparent from the following description of the examples of embodiment in connection with the drawing.

In the drawings:

FIG. 1 is a sectional side view of a device in accordance with the invention,

FIG. 2 is a detail of FIG. 1 to illustrate the re-positioning of blocking means arranged in the apparatus according to FIG. 1,

FIG. 3 is a schematic detail of another arrangement for releasing the re-positioning of the blocking means arranged in the apparatus according to FIG. 1,

FIG. 4 is a plan view on one part of FIG. 1, i.e. on a transport roller pair, taken on line IV—IV.

FIG. 5 is a sectional side view of another apparatus designed in accordance with the invention,

FIG. 6 is a sectional side view of a modified detail of FIG. 5,

FIG. 7 shows a special embodiment of the separating means according to the invention in the exposure device shown in sectional side view.

The apparatus according to FIG. 1 comprises a bottom plate **1** and a housing top **2**, having at its service side, above the bottom plate **1** an insert slot **3** for the original and the negative sheets of paper **39** and **40** respectively, an insert slot **4** for the positive sheet of paper **38**, an exit slot **5** for the negative and positive sheets of paper **40**, **38**, and an exit slot **6** for the original **39**. The top part of the housing has the form of a desk with a surface **7** inclined towards the service side on which the exit slot **5** is disposed. The insert slot **4** is located at the top side of the housing and is defined by guide walls **8**, **9** which suitably extend upwardly from the apparatus adapted to hold the positive sheet of paper **38** being inserted into the slot **4**. As already mentioned, it is possible to provide a so-called "feeder" for further guidance of the positive sheet of paper, the feeding speed of said feeder being lower than the working speed of the apparatus or the feeding speed of the sheets within the apparatus, respectively. In this embodiment, the guide path for the positive sheet of paper extends obliquely.

The opening **6** is located in spaced relation to rear of the insert slot **4** with respect to the service side of the apparatus.

The exposure device is arranged within the housing at the rear end of the apparatus with respect to the operating side. This device consists of a transport cylinder **10** which is driven and contains light sources **11** for the exposure. At the outer side of the cylinder, an endless belt **12** is running over rollers **13**, **14**, **15**, **16** in such a way that sheets arranged between the cylinder **10** and the belt **12** are transported. The cylinder and the roller **13** are driven in the direction of the arrows **17** and **18**, from which it will be seen that sheets to be transported over the cylinder must be fed to the location of the roller **13**.

The exposure device consists of a through like bath container **19**, through which guide paths formed by guiding elements **20**, **21**, **22** are extending and terminating in front of a pressure roller pair **23**, **24**, the latter being located below the exit slot **5**.

Between the entrance of the guide path formed by the guiding elements **21**, **22** and the exposure device, a separating device consisting of the rollers **25**, **26** is arranged, which on one hand effects the feed of the exposed negative paper from the exposure device into the channel formed by the guiding elements **21**, **22** and on the other hand the separation of the original guiding it out of the slot **6**. The rollers **25**, **26** are rotating in the direction of the arrows. There is a slot between them of a width of at least the thickness of the negative sheet of paper but less than the thickness of the negative paper and the original together. The rollers, especially the roller **26** has a roughened and/or elastic surface to which the original temporarily adheres at least with its advancing edge.

A transport roller pair **27**, **28** is arranged at the lower end of the guiding walls **8**, **9**. This transport roller pair effects the feed of the positive sheet of paper after having entered the apparatus on release of the guide path. When a feeder is employed the transport roller pair pulls the positive sheet of paper out of the feeder at a higher speed than that corresponding to the advancing speed which is imparted to that respective sheet by the feeder. The transport roller pair **27**, **28** effects the transport of the positive sheet of paper out of the insert slot **4** into the feed channel formed at the entrance of the developing bath by the upwardly bent guide elements **20** and **29**. The roller **27**, for example, may be provided with peripheral grooves or recesses to receive blocking means which will be described later on.

The moving parts may for instance be driven by a common motor **30** via chains running on sprockets arranged on the shaft-extensions of the rollers and the exposure cylinder, respectively. The required number of revolutions may be obtained by corresponding selection of the sprocket diameters.

It is obvious that the feed guide for the positive sheet of paper is formed by the guiding walls **8**, **9** and the transport roller pair **27**, **28** and the guiding elements **20**, **29**, while the feed guide for the exposed negative sheet of paper into the developing device is formed by the rollers **25**, **26** forming the separating device and the ends of the guiding elements **21**, **22** facing the exposure device.

Blocking means **31** and **32** are extending into these feed guides. The blocking member **31** is formed with a hocked end extending through slots **33**, **34** in the guiding walls **8**, **9**. It is designed in such a way that the portion extending between the guide walls **8**, **9** is sloping downwardly towards its free end, so that when extracting this blocking member **31**, the positive sheet of paper may slide towards the free end and to the transport rollers **27**, **28**. In order to avoid unforeseen operating disturbances in the embodiment shown, a special embodiment comprises a feed roller pair between the guiding walls **8**, **9**, above the blocking member **31**. These feed rollers are only loosely engaging the positive sheet of paper, i.e. with little friction, having surfaces which even at friction occurring at the positive paper do not damage the surface of this sheet. For instance one or both rollers are provided with a velvet coat.

If the sheet is kept on the blocking member, the coat surfaces of these rollers or the coat surface of one roller are sliding on one or both sides of the positive sheet of paper without moving it. However, after pivotally releasing the blocking member, the small amount of friction generated by the feed roller or rollers suffices to insure the feed of the positive sheet of paper into the transport roller pair **27**, **28**.

Attention is drawn to the fact that always several blocking members **31**, **32** are provided in spaced arrangement. For instance, three of four blocking members of the same type are spaced over the width of the device.

The blocking members **31**, **32** are interconnected, being arranged on a common pivoting axis **35** which is supported in the housing walls for instance on ball bearings or between center points with very little friction. Practically, the blocking members **31**, **32** form a double-armed lever.

The blocking member **32** extends into slots **36**, **37** of the guiding elements **21**, **22** and thus blocks the guide path for the negative sheet of paper into the developing device. The bearing of the shaft **35** with its extremely low friction serves the purpose of pivoting the arrangement consisting of the blocking members **31**, **32** and the

shaft 35 into a position shown in the drawing in dotted lines, as soon as the negative sheet of paper leaving the exposure device contacts it. By this, the guide paths for the positive sheet of paper and for the negative sheet of paper are released, so that both sheets are entering the developing device simultaneously. The guides are dimensioned with regard to the falling speed or the feed speeds, respectively, in such a way that the sheets are passing through the developing device in mating relation.

The blocking members 31, 32 are designed and with regard to the location of the shaft in relation to the guide paths arranged in such a manner that they are kept in their blocking position solely by means of their weight with the guide paths being closed. It is possible to provide a type of blocking members which will also close automatically after the passage of the negative sheet of paper. Preferably, however a dead center arrangement is provided by means of which the blocking members are brought into the open position after the negative sheet of paper contacts member 32. The return to the locking position may then, for instance, be effected by means of a control actuated in dependence upon the entry of the negative sheet of paper and the positive sheet of paper into the pressure roller pair 23, 24, or an arrangement of weights or springs may be provided for re-positioning.

A device for re-positioning is, by way of example, shown in FIG. 2. Here, only the guide walls 8, 9 of the entry slot for the positive sheet of paper and the separating and feed rollers 25, 26 arranged in the guide path for the negative sheet of paper are shown. The negative sheet of paper moves through the rollers 25, 26 in the direction of the arrow 45, while the original is lifted by the roller 26. The blocking members 31, 32 are arranged in the described manner on the rotatably supported shaft 35.

In the position shown in full lines, the blocking members are blocking the guide paths for the positive and negative sheets of paper. When the negative sheet of paper advancing as indicated by the arrow 45 runs up against the blocking member 32, the shaft 35 is rotated, so that the blocking members move into the position indicated in dotted lines in which they release the associated guide paths.

Obviously in this event the blocking member 31 closes the contact part 46 of a switch arranged in the circuit 47 of an actuating magnet 48, for instance a relay. The circuit 47 is connected to a voltage source 52. Furthermore there is a time control member 49 provided within the circuit.

The actuating magnet comprises a stop lever 50. A spring 51 connected with its one end to the stop lever 50 while the other end is fixed in the housing of the apparatus, is pulling the stop lever into the position shown in full lines, when the circuit to the actuating magnet 48 is opened.

If the switch 46 is closed as a result of the blocking elements being pivoted into released position, the actuating magnet 48 becomes excited through the time control member 49. By means of this arrangement, the actuating magnet 48 will respond only after a certain length of time which corresponds to the time required for the passage of the positive sheet of paper 38 past the blocking member 31. After this elapse of time, the lever 50 urges the blocking members 31, 32 back into the locking position, thus opening at the same time the circuit 47, switching-off the actuating magnet 48, while the lever 50 moves into the position shown in full lines, under the influence of the spring 51.

It is pointed out that the blocking members are kept in the blocking position as well as in the released position by their own weight.

Another embodiment of an auxiliary control for the blocking members or the employment of a pair of transport rollers or a feed roller arrangement, respectively, is shown in FIG. 3. In this case transport rollers 27, 28 are shown which in the arrangement according to FIG. 1 are arranged below the insert slot for the positive sheet of paper.

The rollers 27, 28 are each journalled in pivoting levers 53, 54. These pivoting levers are pivotally supported on the housing as at 56 and 57. A spring 55 pulls the free ends of the levers 53 and 54 together, so that the rollers 27 and 28 are forced together resiliently.

Contact points 58, 59 are arranged at the free ends of the levers in such a manner as to have direct contact when the rollers 27, 28 are contacting each other. If the rollers due to an entering sheet 38 are separated, the contacts 58, 59 are opened far enough to interrupt a circuit passing them.

By this means, a control circuit 60 which, for instance, may contain the actuating magnet 61, may be switched in dependence upon the passage of a sheet of paper through a transport roller pair. The actuating magnet may for instance work in the way of a closed circuit connection. This way it is possible to arrange the blocking members in rear of the guide path formed by the guiding elements 8, 9 and in front of the roller pair 27, 28 to which a corresponding blocking member in the guide path of another sheet is associated. If the last-mentioned blocking member is released by the entering sheet, the guide path for the sheet 38 is released simultaneously and the sheet drops. The rollers 27, 28 will move apart according to the thickness of the sheet thus opening the contact 58, 59. After the sheet 38 has passed the roller pair 27, 28, the circuit for the actuating magnet 61 is closed. By means of this, the blocking members are returned to their locking position, as for instance shown in FIG. 2.

It is pointed out that an additional switch may be arranged in the circuit 60 which is actuated in dependence upon the release of the blocking members in order to avoid that the blocking members must also move the arm of the excited actuating magnet on their whole way of adjustment, contrary to their sense of movement out of the guide paths.

FIG. 4 shows a plan view of the transport rollers 27, 28 for the positive sheet of paper. It will be seen that these rollers are respectively provided with circumferential grooves 62 which are engaged by the arms 63, 64, 65 of the blocking member designated with reference numeral 31 in FIG. 1. These arms are arranged on a shaft 35 which is supported with little friction. This embodiment offers the possibility to make the blocking member 31 work also in the immediate neighbourhood of the transport rollers, allowing also for the possibility of passing the arms of the blocking element 31 through the space between the rollers formed by the circumferential grooves 62. Provided that the circumferential grooves are deep enough, there will be sufficient room for movement of the arms of the blocking members, in order to move them in front of the slot between the rollers or to remove them therefrom.

FIG. 4 shows that both ends of the rollers 27, 28 are driven by belts 66, 67.

When operating the described apparatus, the positive sheet of paper designated with 38 is first inserted into the entry slot 4, where it is kept upright by the guide walls 8, 9, its lower edge abutting the blocking member 31. Then the original and the negative sheet of paper are inserted into the entry slot 3 corresponding to the arrows 39, 40 and in such a manner that the layer of the negative sheet faces downwardly and the image on the original faces upwardly. These sheets are guided through the channel 41, underneath the developing device and on to the inserting spot between the cylinder 10 and the belt 12 guided over the roller 13. After the apparatus has been switched-on, the belt 12 and the cylinder 10 effect the further transport. With this arrangement the exposure may be effected manually or automatically, the duration of exposure being controlled by an exposure clock, the position of which is for instance shown at 42. After the

exposure has been carried out and the belt **12** has been deviated around the rollers **13**, **16**, the original and the negative sheet of paper moving in tangential direction relative to the contact point between the original and the cylinder **10** on to the pair of separating rollers **25**, **26**. The negative sheet of paper is guided on the roller **25** through the slot between the two rollers, while the leading edge of the original hits the periphery of the roller **26**, and as the feed of the sheets is continued, is pushed back, upset and by further adherence of the leading edge of the original to the rough surface of the roller **26**, is lifted and transported out of the exit opening **6** along the guide wall **44** in the direction of the arrow **43** depositing itself automatically on the top part of the apparatus.

The negative sheet of paper which is moved by the roller **25**, runs with its leading edge up against the blocking member **32** and thus at the same time adjusts the blocking member **31** by rotating the shaft **35**. Thus, the positive sheet of paper is released, and it either drops or is transported between the rollers **27**, **28** and advanced between the guide elments **21**, **22** into the channel between the guide elements **29** or **21** and **20** respectively, in accordance with the feed of the negative paper. Both sheets are passing the developing bath and arrive at the pressure roller pair **23**, **24** simultaneously, between which the adhering liquid still is pressed off, said rollers transporting the sheets out of the apparatus through the exit slot at the operating side.

FIGS. 5 and 6 schematically show a modified apparatus, wherein parts have been omitted having no concern with the invention, as for instance the driving motor, ventilating equipment and the like, and drive transmitting devices between the driven parts and their bearings, or a special structure therefor, respectively.

The apparatus shown in FIGS. 5 and 6 comprises a housing part **68**, which contains an exposure device **69** and a developing device **70**. The exposure device **69** consists of a rotatable exposure drum with a light source arranged within it, the effective operating range of which being adjustable by means of a shutter, not shown, the light source being screened towards the lower side of the drum. Within the range of its periphery where the light source may become effective, an endless belt **71** is looped around the drum being guided over three rolls **72**, **73**, **74**. The rolls **72**—**74** are driven in the direction indicated by the arrow. The drive of the drum may be effected by frictional engagement between the belt and the drum.

The developing device **70** consists of a liquid container **82** and guiding elements **79**, **80**, **81** defining guide paths for the positive sheet of paper and the negative sheet of paper leading through the liquid to a pressure roller pair **75**, **76**.

At the front side of the desk-like apparatus, an entry slot is disposed, formed by the guide surfaces **77**, **78**. The guide surfaces **77**, **78** extend to the exposure device, i.e. to the portion between the roll **72** and the exposure drum. The guide surfaces are curved in such a way that the original when passing the guide is fed between the belt **71** and the drum. Particularly the bottom guide surface **77** is bent at the side facing exposure device **69** in such a way that it terminates about in the mid-zone before the conical slot formed by the band **71** looped around the roll **72** and the exposure drum.

Within the lower part of the housing **68**, a box **83** is provided which contains a pile **84** of negative sheets of paper. The negative sheets of paper are arranged in such a manner that their layers are facing downwardly. The end of the box facing the guiding surface **77** is open and is provided with a transport device, adapted to always transport one sheet only out of the box. This transport device may also be arranged on the outside of the box or in a recess of the wall of the box, respectively. It is possible to place the negative sheets of paper simply into guiding devices arranged at the bottom of the housing.

The transport device comprises three rollers **85**, **86**, and **87**, which are driven in the direction of the arrows shown in the drawing, that means they all are driven in the same sense of direction. The transport device serves to withdraw the top sheet from the pile **84**. The top sheet is pushed to a slot between the rollers **85**, **86** by the roller **87**. The width of this slot corresponds to the thickness of a sheet of paper. If the slot is free, the top sheet may pass through the slot. It is then advanced by a rotating roller **86** having for instance a smooth surface consisting of steel. The bottom roller **85** preferably is equipped with a rubber surface and prevents by its sense of rotation that the sheets below the top sheet enter the slot between the rollers **85**, **86**.

The roller **87** is preferably journalled so that a height adjustment is possible and either rests on the top sheet of the pile **84** with its own weight or is pressed to this sheet by resilient means, for instance a spring. The drive of the roller **87** may be effected in dependence upon the drive of the roller **86**, in which case the guiding slot for the height adjustment of the roller **87** suitably extends concentrically to the roller **86**.

Preferably, the pile **84** is disposed on a table or a plate, respectively, which is pressed upwardly by means of springs, so that the top sheet will always be positioned properly with regard to the transport device consisting of the rollers **85**—**87**.

The slot between the rollers **85**, **86** may be blocked by means of a blocking bracket **88**. The blocking bracket is arranged on a double-armed lever **89** which is pivotable around a fulcrum **90** between the guide path defined by the guiding surface **77** and the transport device. The end not carrying the blocking bracket **88** extends into the guide path for the original and forms a stop element therein. The arrangement is such that, when hit by a sheet this stop is pivoted in such a way that the blocking bracket **88** is moved out of the slot between the rollers **85**, **86**.

The rollers **85**, **86** may for instance be provided with ring grooves on their peripheries, in which the blocking bracket is moving. Preferably, several blocking brackets and ring grooves are spaced over the length of the rollers.

A guiding surface **91** leading to a pair of separating rollers **92**, **93**, serves to pass on the original and the negative sheet of paper leaving the exposure device. These separating rollers are driven in the same sense of direction in such a manner that the lower separating roller advances the negative sheet of paper running over the guiding surface **91** in its feeding direction, while the top roller **92** pushes the upper original back from the slot between the separating rollers **92**, **93**. The width of the slot corresponds to the thickness of the negative sheet of paper.

The mantle of the separating roller **92** preferably has a rough surface, so that the leading edge of the original guided to the roller **92** will adhere to the roller and be lifted off in the direction of rotation of the roller **92**, i.e. upwardly. The original continuously being advanced by the drive of the exposure device, moves into an exit guide leading to the upper part of the housing.

The negative sheet of paper, however, is transported into the guide path between the guiding elements **80**, **81** with its layer facing upwardly.

In this guide path, a stop element **95** is arranged which is formed by one arm of a double-armed lever, the other arm of which carrying a blocking bracket **96**, adapted to block the slot of a transport roller pair **97**, **98**. The double-armed lever **95** is pivotable around a fulcrum **99**. The double-armed lever may for instance consist of two brackets extending on both sdies of the roller pair **97**, **98** and carrying the blocking bracket **96** above the roller pair, or several parallel lever arms are provided, spaced over the length of the roller **97**, **98**, said lever arms for instance extending through and moving in peripheral grooves of the roller **97**.

The arrangement of the stop elements **95** is such that the double-armed levers, as a result of an abutment of a negative sheet of paper when entering the developing

device 70, are fulcrumed in such sense of direction that the blocking bracket 96 releases the slot between the transport roller pair 97, 98, so that a positive sheet of paper transported into this slot is advanced into the guide path formed by the guide elements 79, 80.

In the embodiment shown, the positive sheets of paper are kept in a vertical position on a pile 100, the layers facing towards the left-hand side of the drawing. For instance, an abutment 101 aligned with a transport device and an abutment 102 and a pressure plate 103 are provided, the pressure plate being biased by spring means in order to keep the pile always contacting the abutment 101. In the embodiment shown, the abutment is arranged in a vertical plane. The invention includes also embodiments, in which the abutment is arranged obliquely.

The transport device associated with this abutment consists of a pair of rollers 104, 105, which are driven in the same sense of direction, having a slot between them which corresponds to the thickness of a positive sheet of paper. The roller 104 being arranged on that side of a sheet being fed that faces the pile preferably has a surface consisting of rubber or a similar material and rotates in such a direction that it tends to push the arriving sheets back to the pile, while the roller 105 is preferably equipped with a smooth surface and effects a feed of an entering sheet away from the pile and into the transport roller pair 97, 98. An additional transport roller 106 ensures the feed of the sheet lying close to the abutment 101 to the transport roller pair 104, 105. The roller 106 is driven in a direction indicated by the arrow.

The pressure roller pair 75, 76 is arranged at the end of the guide path extending through the developing device 70, said pressure roller pair 75, 76 pressing the sheets leaving the developing device together in order to transfer the image. In rear of the pressure roller pair 75, 76, there is a guide surface 107, which guides the layer carriers adhering to one another into a drying device 108. This drying device 108 consists of a rotating heating cylinder 109, the cylinder wall of which for instance consisting of copper. In this heating cylinder, heating elements are arranged. The sheets are guided around this heating drum by an endless belt 110, which is trained over driven rolls 111, 112, 113. The rotating direction of the rolls 111—113 is indicated by the arrows. As in case of the rolls 72—74 of the exposure device one of the rolls 111—113 is also supported displaceably on resilient means, in order to provide the proper tension of the band.

The sheets leaving the drying device 108 are transported to a transport roller pair 114, 115, a slot of the thickness of the negative sheet of paper being formed between the rollers. The rollers 114, 115 are driven in a direction, shown by the arrows The direction of rotation of the lower roller 115 is such that its peripheral surface facing the slot will transport the negative sheet of paper entering the slot in its existing feed direction through the slot between the rollers and into an insert slot 116 of a container 117. In this container, the negative sheet of paper is deposited. When leaving the drying device 108 the leading edge of the positive sheet of paper lying on top arrives at the roller 114 rotating in a direction opposed to the feed direction and is pushed back. As a result of a temporary adherence of the leading edge of the positive sheet of paper to the periphery of this roller, the positive sheet of paper is lifted from the negative sheet of paper and is transported over the roller 114 onto a table 118 on the upper side of the container where it is deposited.

According to the illustration of FIG. 6, which shows a detail of the device according to FIG. 5, the invention includes an embodiment by means of which a separation of the positive and negative sheets of paper sticking together and leaving the drying device 108 is facilitated. A further roller pair 121, 122 is arranged between the drying device 108 and the separating roller pair 114, 115, the rollers of the roller pair 121, 122 being driven in a direction indicated by the arrows. It will be seen that the rollers have differently sized diameters. The roller 121 has a larger diameter than the roller 122. When both rollers are driven with the same number of revolutions, the circumferential speed of the roller 121 is higher. The rollers 121, 122 for instance have a mantle consisting of ground rubber. The slot between the rollers 121, 122 is a little smaller than the combined thickness of the negative and positive sheets of paper. The rollers, therefore, act on the sheets of paper with a slight pressure so that frictional forces are transmitted on the sheets. The frictional forces are directed in the feeding direction, but the force imparted to the negative sheet of paper by the roller 121 is higher than that imparted to the positive sheet of paper by the roller 122. These forces become effective as relative forces between the sheets and bring about a separation of the sheets sticking together so that the lifting of the positive sheet of paper by the roller 114 is facilitated.

The difference between the circumferential speeds of the rollers 121 and 122 is relatively small. With respect to their revolutions, the diameters of the rollers are dimensioned to be such that the smooth passage of the sheets is by no means impaired by the separating device 108. In a special embodiment, the space between the drying device 108 and the roller pair 121 and 122 may in addition correspond substantially to the length of a sheet. A corresponding effect may be obtained by the use of two rollers with equal diameters driven at different rotational speeds.

In the shown example of embodiment, the rollers of the transport devices 85, 86, 87, 104, 105, 106 are continuously driven. It is also possible to provide individual drives for these transport devices and to switch them on temporarily only in dependence upon an actuation of the stops extending into the feed guide for the original and into the feed guide of the negative sheet of paper the developing device. It is furthermore possible to actuate also the transport device 104—106 for the positive sheet of paper in dependence upon a stop in the feed guide for the original, via a time control.

When all the rolls are continuously driven, all rotating parts are driven from the same driving device, for instance a motor, via corresponding drive transmitting devices such as gears, pulleys, chains and the like.

The device works as follows: an original is inserted into the apparatus in the direction of the arrow 119. In doing so, the stop formed by the double-armed lever 89 is actuated, so that the slot between the transport rollers 85, 86 is released. The transport roller 87 pushes the uppermost negative sheet of paper into the slot between the transport roller 85, 86, and any more sheets possibly adhering to the underside of this sheet being pushed back by the roller 85 rotating in a corresponding direction. The uppermost sheet runs through the roller slot and is moved-on by the roller 86 to the end of the guiding surface 77 terminating approximately in the mid-zone of the slot between the roller 72 and the exposure drum. At the right-hand side of this guiding surface, the negative sheet of paper is sliding towards the exposure device and comes into contact with the original inserted on the left-hand side of the guiding surface 77. Thus the original and the negative sheet of paper are transported together into and through the exposure device, and guided through it by means of the driven belt 71. This way, an exposure takes place in the known manner.

The original and negative sheet of paper sticking together when leaving the exposure device 69, are separated at the transport roller pair 92, 93 in the described manner. The original being transported upwardly and out of the apparatus, in the direction of the arrow 120.

The negative sheet of paper running through the pair of separating rollers 92, 93 actuates the stop 95 and hereby admits introduction of a positive sheet of paper into the

transport roller pair **97**, **98**. Up to this moment, this sheet of positive paper has been kept ready on the blocking bracket **96** by the transport device consisting of the roller group **104—106**, of which the rollers **105**, **106** having running contact on the side of the positive sheet of paper with a slight pressure only. Excess sheets of positive paper having been taken from the pile **100**, are prevented from running through the slot between the rollers **104**, **105** by the roller **104**. After pivoting the blocking bracket **96**, a positive sheet of paper is running through the developing device together with the negative sheet of paper. Both sheets are guided to meet each other in the pressure roller pair **75**, **76**, dried in the described manner, separated and deposited in different places, the positive sheet of paper with the finished copy lying free on a table.

Suitably, the container **117** and table **118** are designed integral with the housing **68** in both parts of the apparatus. Furthermore the invention includes also a covering of the heating device **108** by means of a housing wall.

FIG. 7 shows a special embodiment of the separating device according to the invention at an exposure device. The apparatus shown in FIG. 7 is an exposure device of the continuous type, in which a reflex exposure takes place. The exposure device is equipped with a transparent plate **123** the upper side of which suitably shows a convex form within the range of the transport device **124**. The transport device substantially consists of a rotating transport belt **125**, which is driven and guided for instance by two rollers **126**, **127** extending over the total width of the device. The rollers **126**, **127** are supported in the side walls of the upper part of the housing **128**. Preferably, the rollers are arranged in a vertically displaceable manner and are resiliently pressed against the transparent plate **123**.

In the embodiment shown, the roller **127** is driven by means of a belt or chain drive **129** from a driving motor **130**, suitably via a variable reduction gear. The roller **126** may either rotate freely or may be connected with the roller **127** via a belt or chain drive **131**.

Underneath the transparent plate **123** within the lower part of the apparatus, the exposure lamps **132** are arranged which, by means of conduits **133** are connected to a power source **134**. Furthermore, a potentiometer **135** for adjusting the time of exposure is suitably arranged in such a manner that it is easily accessible from the outside of the apparatus. The exposure may also be regulated by adjusting the speed of the transport belt **125**.

The apparatus has an insert slot **136**, through which the positive sheet of paper and the negative sheet of paper are inserted lying one on the other. The apparatus also includes an exit slot **137** for the original and another exit slot **138** for the exposed negative sheet of paper.

At the end of the transparent plate **123**, i.e. at the end of the exposure device proper, the guide path for the sheets is provided with a slight upward slope. Above this sloping portion **140**, a roller **141** is arranged which for instance extends over the whole width of the guide path for the sheets. It is, however, also possible to provide circumferential grooves on the roller or to arrange several rollers side-by-side; the roller **141** is journalled in the side walls of the housing. It is driven by a motor **130** over a reduction gear by means of a belt or chain drive **142**. This drive is derived from another shaft than that driving the rollers **126**, **127**, because the roller **141** is rotating at a different speed.

The transport belt **125** is driven in the direction of the arrow **143**, so that the lower strand of the belt is moving in a direction from the inserting slot **136** to the roller **141**. The drive direction of the roller **141** is indicated by the arrow **144**, from which it will be seen that the circumferential surface of the roller facing the guide path **139** moves in a direction which is opposed to the transport direction of the lower strand of the belt **125**.

The roller has a slightly roughened surface. It is also possible to provide the rubber mantled roller with flutes extending substantially parallel to the axis of the roller enabling the leading edge of the sheet to be urged into a flute thus facilitating that the leading edge of the sheet is lifted and guided upwardly. It is of advantage to provide different angles for the flanks of the flutes so that the leading flank in relation to the rotating direction of this roller is relatively flat, while the opposite flank of a flute extends substantially radially or practically radially.

In order to enable a proper adjustment of the space between the roller surface and the transport guide **139**, the roller **141** is journalled to be adjustable in height as indicated by the arrow **145**. The bearing may for instance be provided with adjusting screws. It is, however, preferred, in order to achieve a parallel position of the roller, that the adjusting screws on both sides of the roller are actuated by one and the same element.

Furthermore, the roller **141** is driven with a circumferential speed which by far exceeds the speed of the transport belt **125**.

The function of the device is as follows: The width of the slot between the portion **140** of the guide path **139** and the circumference of the roller **141** is exactly adjusted to the thickness of the thickness of the negative sheet of paper **148** which is transported over the guide path **139** to a developing device, in the direction of the arrow **146**. Thereupon the original **147** and the negative sheet of paper **148** lying one on the other are placed into the insert slot **136** and fed between the transport belt **125** and the transparent plate **123**, the original **147** contacting with its rear side the transport belt **125**, while the negative sheet of paper **148** is contacting the transparent plate **123** with its light sensitive layer facing upwardly towards the original. The exposure takes place during the passage. The sheets **147**, **148** are then transported by the transport belt to the roller **141**.

Provided that the leading edges of the two sheets are mating exactly, the top sheet, i.e. the original **147**, abuts the roller **141**. As this roller rotates in a direction opposed to the advancing direction, the original if the advance is continued will be pushed back in a way shown in dotted lines **149**. As a result of the inherent tension of the original, the front edge of the original adheres to the surface of the roller **141** and is thus taken along by the roller until it reaches the range adjacent the top of the roller **141**. Here the original **147** may straighten again. It moves simultaneously driven by the roller **141** occupying a position indicated at **150** to the exit slot. The negative sheet of paper **148**, however, travels underneath the roller **141** over the guide path **139** to the exit slot **138** or to an additional transport device, respectively, and through a developing device.

It is possible to adjust the slot between the circumference of the roller **141** and the portion **140** of the guide path to be a little larger than the thickness of the negative sheet of paper **148**. If such an adjustment is effected, the circumference of the roller may slightly be roughened. It is pointed out that the adjustment of the rollers may be achieved with utmost accuracy, because the negative sheets of paper **148** passing underneath the roller have a defined thickness.

When adjusting the slot it must, however, be considered that the width of it should always be less than the thickness of the original and the negative sheet of paper together.

If, for instance, the bottom sheet, i.e. the negative sheet of paper **148**, by chance is slightly in advance, this does not change the effect. If, contrary to this, the original **147** happens to be slightly in advance, the front edge of the original will at first get under the roller **141**. However, as soon as the negative sheet of paper enters the slot between the roller **141** and the guide path **139**, the original is pressed against the surface of the roller, so that the leading edge of the original is transported back and guided upwardly along the periphery of the roller,

while the negative sheet of paper travels on along the path 139 to the exit slot.

What I claim is:

1. An apparatus for making copies comprising a housing, an exposure device within said housing, means transporting an original and negative and positive sheets of paper through said housing, means exposing said original and negative sheet of paper to said exposure device, separating means separating said original and exposed negative after exposure thereof by said exposure device, a developing device within said housing, a first guide path between said separating device and said developing device guiding said exposed negative paper into said developing device, means introducing a positive sheet of paper into said housing, a second guide path between said means and said developing device guiding said positive paper into said developing device, a blocking element positionable in one of said guide paths, a releasable stop element positionable in the other guide path, said stop element and the blocking element being constructed as a pivotally mounted double-armed lever and arranged with respect to the guide paths in such a manner that the blocking and stop elements are kept in the operative position by their own weight, said blocking and stop elements being mounted whereby engagement of the leading edge of a sheet of paper with said stop element simultaneously displaces said stop and blocking elements from their associated guide paths thereby synchronizing the movement of said positive and negative papers into said developing device, said blocking and stop elements upon being pivoted into their operative positions passing a dead center whereby they are maintained in stable equilibrium by their own weight in the inoperative as well as in the operative position, means selectively moving said blocking and stop elements into the operative position, said means comprising a pair of transport rollers in the path of one of said sheets of paper, said rollers being resiliently pressed together and moving in relation to one another on entry of a sheet therebetween, contact arms operatively connected to said transport rollers, said contacts controlling a circuit of an actuating magnet effecting a movement of the blocking and stop elements and a pair of pressure rollers receiving said positive and negative papers therebetween upon leaving said developing device.

2. An apparatus for making copies comprising a housing, an exposure device within said housing, means transporting an original and negative and positive sheets of paper through said housing, means exposing said original and negative sheet of paper to said exposure device, separating means separating said original and exposed negative after exposure thereof by said exposure device, a developing device within said housing, a first guide path between said separating device and said developing device guiding said exposed negative paper into said developing device, means introducing a positive sheet of paper into said housing, a second guide path between said means and said developing device guiding said positive paper into said developing device, a blocking element positionable in one of said guide paths, a releasable stop element positionable in the other guide path, said stop element and the blocking element being constructed as a pivotally mounted double-armed level and arranged with respect to the guide paths in such a manner that the blocking and stop elements are kept in the operative position by their own weight, said blocking and stop elements being mounted whereby engagement of the leading edge of a sheet of paper with said stop element simultaneously displaces said stop and blocking elements from their associated guide paths thereby synchronizing the movement of said positive and negative papers into said developing device, said blocking and stop elements upon being pivoted into their complete operative and inoperative positions passing a dead center position so that they are kept in a stable equilibrium by their own weight in the inoperative position as well as in the operative position, an abutment contact arranged on one of said elements, said contact and a time delay switch being arranged in the circuit of an actuating magnet operatively associated with said elements such that the elements are simultaneously pivoted out of the guide paths solely by abutment of a sheet with said stop element so that the circuit is closed and the magnet responds in accordance with the time delay in order to return the elements into their operative position wherein the contact in the circuit is opened, de-energizing the locking magnet, and a pair of pressure rollers receiving said positive and negative papers therebetween upon leaving said developing device.

3. An apparatus for making copies comprising a housing, an exposure device within said housing, means transporting an original and negative and positive sheets of paper through said housing, means exposing said original and negative sheet of paper to said exposure device, separating means separating said original and exposed negative after exposure thereof by said exposure device, a developing device within said housing, a first guide path between said separating device and said developing device guiding said exposed negative paper into said developing device, means introducing a positive sheet of paper into said housing, a second guide path between said means and said developing device guiding said positive paper into said developing device, a blocking element positionable in one of said guide paths, a releasable stop element positionable in the other guide path, said blocking and stop elements being mounted upon a common movable support whereby engagement of the leading edge of a sheet of paper with said stop element simultaneously displaces said stop and blocking elements from their associated guide paths thereby synchronizing the movement of said positive and negative papers into said developing device, said guide path in which the blocking element is associated sloping downwardly, the portion of said blocking element blocking the associated guide path sloping downwardly and away from the direction of movement of said blocking element when moving to the inoperative position and a pair of pressure rollers receiving said positive and negative papers therebetween upon leaving said developing device.

4. An apparatus for making copies comprising a housing, an exposure device within said housing, means transporting an original and negative and positive sheets of paper through said housing, means exposing said original and negative sheet of paper to said exposure device, separating means separating said original and exposed negative after exposure thereof by said exposure device, a developing device within said housing, a first guide path between said separating device and said developing device guiding said exposed negative paper into said developing device, means introducing a positive sheet of paper into said housing, a second guide path between said means and said developing device guiding said positive paper into said developing device, a blocking element positionable in one of said guide paths, a releasable stop element positionable in the other guide path, said blocking and stop elements being mounted upon a common movable support whereby engagement of the leading edge of a sheet of paper with said stop element simultaneously displaces said stop and blocking elements from their associated guide paths thereby synchronizing the movement of said positive and negative papers into said developing device, a magazine for a pile of negative sheets of paper defined within said housing adjacent a slot defined therein for the insertion of an original, said magazine having an exit slot adjacent the first mentioned slot, defined by a pair of rollers rotating in a like direction, said rollers being spaced apart a distance whereby said exit slot is only slightly greater in thickness than the thickness of a single sheet, a rotating transport roller engaging a sheet within said magazine feeding a sheet toward said exit slot, and biasing means acting on said pile of sheets of paper biasing said pile toward said trans-

port roller, and means rotating said rollers, and a pair of pressure rollers receiving said positive and negative papers therebetween upon leaving said developing device.

5. An apparatus as in claim 4 wherein said means introducing a positive sheet of paper comprises a magazine for a pile of positive sheets of paper mounted on said housing, said magazine having an exit slot opening into said second guide path defined by a pair of rollers rotating in a like direction, said rollers being spaced apart a distance whereby said slot is only slightly greater in thickness than the thickness of a single sheet, a rotating transport roller engaging a sheet within said magazine feeding a sheet toward said slot, and biasing means acting on said pile of sheets of paper biasing said pile toward said transport roller, and means rotating said rollers.

6. An apparatus according to claim 5 wherein the magazine for said negative sheets of paper is substantially horizontally disposed and the magazine for said positive sheets of paper is substantially vertically disposed.

7. An apparatus as in claim 4 wherein a second blocking element is arranged in said slot defined in said housing for the insertion of an original and operatively associated with the slot defined by the rollers of said negative sheets of paper magazine whereby a negative paper may be fed through said roller slot only upon insertion of an original into said housing.

8. Apparatus for the manufacture of copies including a housing having walls, at least one treatment station within the housing, first introducing means defined in one wall of the housing for the introduction of a first sheet of paper, first guide means between the introduction means and the treatment station for feeding the introduced sheet of paper to the treatment station, second guide means within the housing extending from a pile holder arrangement for second sheets of paper to the treatment station, means for transporting the first and second sheets of paper to the treatment station through the housing, a blocking element pivotally mounted in the first guide means, a disengageable stopping element pivotally mounted in the second guide means, the blocking and stop elements being arranged on a common pivot so that the engagement of the leading edge of said second sheet of paper at the stopping element simultaneously displaces the blocking and stop elements from out of their associated guide means so that the movement of the two sheets of paper into the treament station is synchronized, the pile holder arrangement being located at the beginning of the second guide means and comprising a first and a second roller supported within the housing and driven in the same sense and arranged at a location in the second guide means beside the stop element and maintaining a distance corresponding to the thickness of the sheet of paper transported through the second guide means, wherein the gap formed by the distance communicates with the second guide means, a third roller arranged beside the rollers of the roller pair moving the sheet of paper out from between the first and second rollers, the circumferential portion of the third roller facing the gap rotating in the direction of the stopping element, said third roller being arranged at that side of the adjacent roller remote from the stopping element and being driven in the same sense of rotation, a pile of sheets of paper having one sheet of paper lying adjacent to the third roller, a supporting plate for the pile of sheets of paper at that side of the pile opposite from the third roller movable in the direction toward the third roller, biasing means arranged beneath the supporting plate and pressing the same in the direction towards the third roller so that the sheet of paper lying adjacent to the third roller is transported by this roller into the gap between the first and second rollers and is pushed through this gap against the stopping element and is maintained thereto, with the third roller and the adjacent roller rotating on the sheet of paper while the other roller of the roller pair consisting of the first and second rollers prevents the entry of additional sheets of paper into the gap between this roller pair, wherein after the pivotal release of the stopping element owing to the actuation of the blocking element the driving forces of the third roller and the adjacent roller of the roller pair become effective to transport the sheet of paper through the second guide means into the treatment device, while the other roller of the roller pair prevents the simultaneous passage of further sheets of paper, third guide means and ejector means within a wall of the housing, said third guide means extending between the exit of the treatment station and the ejector means transporting both the sheets of paper out of the treatment station.

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