

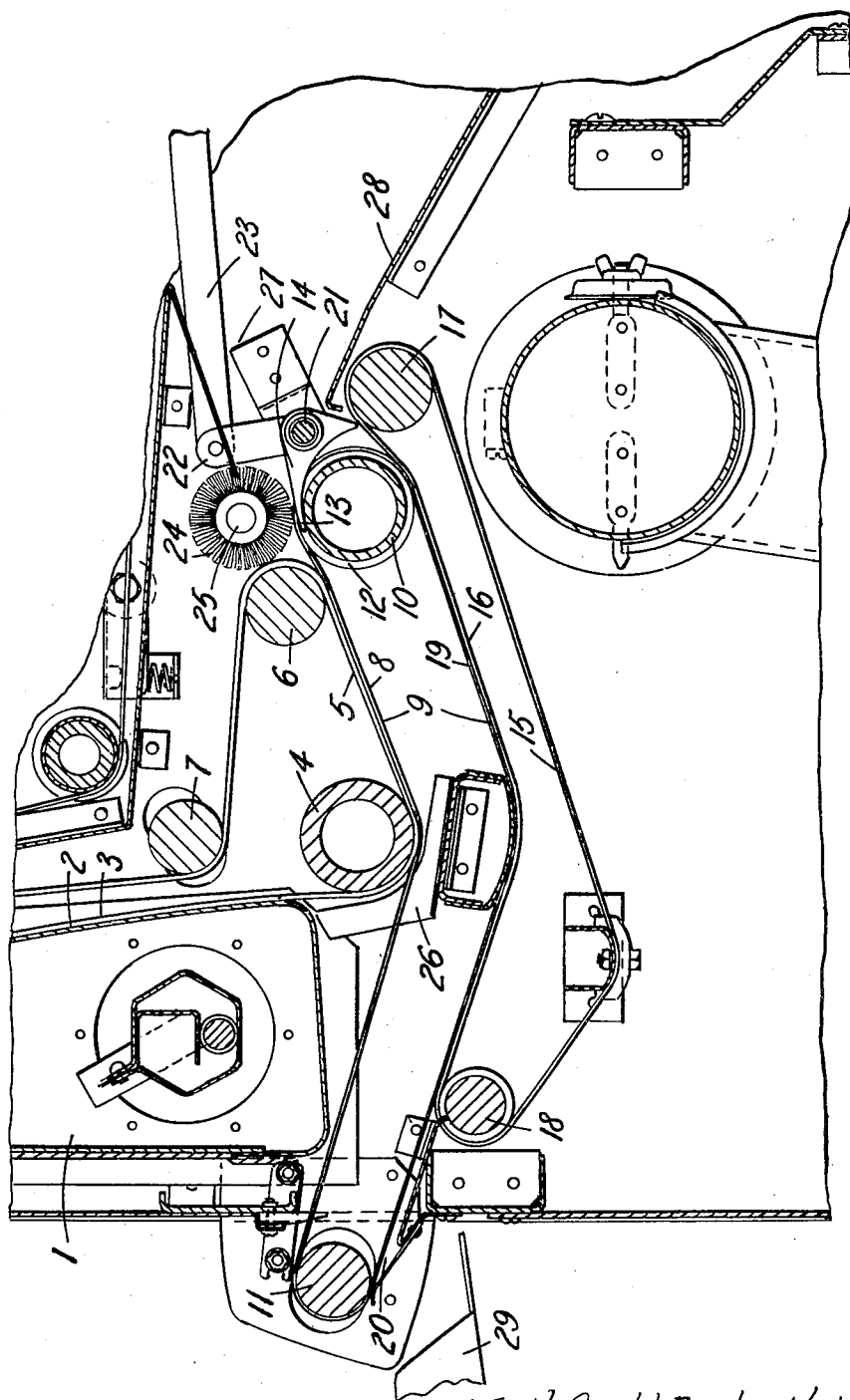
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PHOTO-COPYING AND LIKE REPRODUCTION MACHINES

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PHOTO-COPYING AND LIKE REPRODUCTION MACHINES

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This invention relates to sheet delivery means for diazotype and like photocopying machines of the kind in which copies of originals are produced on light sensitive materials (e.g. diazotype materials).

A diazotype photocopying machine may comprise three sections, an exposure section in which an original to be copied is exposed to a source of actinic radiation in contact with a light sensitive diazotype material, a separating section in which the original is separated from the exposed diazotype material and delivered outside the machine while the said diazotype material is moved through a developing section prior to delivery of the finished print outside the machine. Alternatively there may be only an exposure section and a developing section, the original and the exposed material being delivered together from the exposure section and the separation being effected by hand.

The term "developing" is used herein broadly to mean any process by which an exposed material is treated to produce a permanent visible image.

The invention is principally concerned with the delivery of the sheets from a developing section but is also applicable to delivery at other stages (e.g. from an exposure section or apparatus).

In photocopying machines, it is known to provide for the delivery of the finished print from the developing section either at the front of the machine or at the rear thereof, such front or rear delivery being under the control of the machine operator.

Such known front or rear delivery devices are satisfactory up to a point but sometimes misfeeding does occur particularly when printing with certain types of material with the result that in practice difficulties quite frequently arise.

In machines of the kind referred to the light sensitive material is traversed through the machine or the various sections of the machine by means of conveyor systems comprising moving endless belts or bands.

It is an objective of the present invention to provide in a diazotype or like photocopying machine, a delivery device which is positive in action and simple to install and operate, and which will deliver the finished, or unfinished, prints at one or other of two delivery stations, as desired by the operator. The stations will usually be at the front and rear of the machine.

In its broad form the invention provides, in a diazotype or like photocopying machine, sheet delivery means comprising two sheet conveyor systems arranged to convey the sheets in succession and sheet diverting means between the two conveyor systems and adjustable from a position in which they permit or guide the sheets to pass direct from the first conveyor to one delivery station, to a position in which they permit or guide the sheets to pass from the first conveyor to the second conveyor which then carries the sheets to a different delivery station.

More specifically the invention provides a front or rear delivery device for the developing section of a diazotype or like photocopying machine, comprising two conveyor systems comprising an upper belt conveyor unit, an intermediate belt conveyor unit and a lower belt conveyor unit, movable pick off or diverting fingers adjustable into

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either of two positions and brush rollers, said pick off fingers and brush rollers being associated with the intermediate conveyor unit, and being so arranged that with the pick off fingers in one position the material delivered by the upper conveyor unit is delivered by the brush rollers to the front of the machine while with the pick off fingers in their other position the material delivered by the upper conveyor unit is guided thereby to the lower conveyor unit which then delivers the material to the rear of the machine.

The pick off fingers and brush rollers are preferably so disposed and arranged that when the said pick off fingers are in position for rear delivery their leading ends of points are shrouded by the brush rollers so that positive and unimpeded transfer of the material from the upper to the lower conveyor unit is assured.

The three conveyor units are preferably so arranged that the lower run of the upper unit and the upper run of the intermediate unit are in contact with each other to provide a feed path for the material towards the front of the machine while the lower run of the intermediate unit and the upper run of the lower unit are also into contact with each other to provide a feed path for the material towards the rear of the machine.

The pick off fingers associated with the intermediate conveyor unit may be so shaped and disposed and the arrangement may be such that in one position the leading ends or points of the fingers enter into slots provided for the purpose in a roller carrying the conveyor belts of the unit so that they are then disposed below the level of the said belts while in their other position they stand proud of, or above the level of the said belts.

The pick off fingers may be pivoted and their movement may be under the control of the machine operator via link and lever mechanism and for instance a push pull knob provided for convenient actuation by the operator.

The brush rollers are preferably disposed in pairs across the width of the machine, the outer peripheries of the brushes being in contact with the upper run of the intermediate conveyor unit belts at a position where the said belts take around a roller. The brush rollers are preferably driven at a peripheral speed in excess of the linear speed of the conveyor unit belts.

If desired a sealing belt for the developing tank may constitute part of the upper conveyor unit.

The invention will be further described with reference to the accompanying drawing which shows, by way of example, and in section, a part of the developing section of a specific construction of diazotype copying apparatus.

In the drawing the developing tank of the developing section of the machine is indicated by the reference numeral 1.

The developing tank 1 is disposed at the rear of the machine and has a perforated wall 2 facing the front of the machine through which ammonia vapour produced in the tank has access to the material to be developed.

An endless sealing belt 3 which traverses exposed diazotype material over the perforated wall 2 of the developing tank 1 (and which prevents ammonia vapour escaping from the tank 1 into the surrounding atmosphere) passes around a roller (not shown) at the top of the tank 1 and around a roller 4 at the bottom thereof, the rollers being so disposed as to hold the belt in sealing relationship with the perforated wall 2 of the tank 1.

Where the sealing belt 3 takes around the lower roller 4 it is carried forwardly at 5 to pass around a further roller 6 disposed towards the front of the machine and then back to a tensioning roller 7 before passing to the upper roller. The section 5 of the sealing belt 3 therefore extends forwardly from a position adjacent to the rear of the machine to a position adjacent to the front

thereof, the said section 5 of the belt which moves from rear to front, comprises, with the upper run 8 of the intermediate conveyor unit indicated at 9, one of the two conveyor systems.

The intermediate conveyor unit 9 which is disposed immediately below the section 5 of the sealing belt 3 comprises a plurality of narrow endless belts passing around a front roller 10 and a rear roller 11.

The front roller 10 is disposed just in advance of the front roller 6 of the sealing belt 3 (i.e. nearer the front of the machine).

A part of the upper run 8 of each of the belts is in contact with the section 5 of the sealing belt 3, the remaining portion of belt extending beneath the lower surface of the developing tank 1 to take around a roller 11 disposed at the rear of the machine.

The front roller 10 of the intermediate unit is slotted as shown at 12 between the individual belts of the unit to provide a plurality of spaced slots across the said roller 10. The slots 12 are provided to house the points 13 of pick off fingers 14 in one of their two positions as will be hereafter described.

The lower conveyor unit 15 also comprises a plurality of narrow endless belts 16 passing around front and rear rollers 17 and 18 respectively, the front roller 17 being disposed in advance of the front roller 13 of the intermediate conveyor unit 9.

The upper run 16 of the belts of the lower conveyor unit 15 forms with the lower run 19 of the belts 8 of the intermediate conveyor unit 9 the second conveyor system.

The rear roller 18 of the lower conveyor unit 15 is disposed adjacent to the rear feed delivery aperture 20 of the machine.

Disposed in front of the front roller 10 of the intermediate conveyor unit 9 is a shaft 21 carrying the pick off fingers 14, such shaft being adapted to be rotated into either of two positions by means of link and lever mechanism 22, 23 and a hand operated push-pull knob (not shown) disposed on the front of the machine casing and attached to link 23.

The pick off fingers 14 are fast with the shaft 21 so that by actuation of the push-pull knob they are moved into either of the two positions, one in which, as shown, the points 13 of the fingers 14 are disposed in the slots 12 provided in roller 10 as aforesaid and the other in which the points 13 of the fingers 14 stand proud of, i.e. above the level of the belts 8 of the conveyor unit 9.

Brush rollers 24 are mounted on a shaft 25 the longitudinal axis of which is above and parallel with the longitudinal axis of the front roller 10 of the intermediate conveyor unit 9, the brushes being in contact with and, when operating, brushing forwardly the surface of the upper run 8 of the belts thereof and also brushing downwardly the sealing belt 3 where it passes around roller 6.

The brush rollers 24 are disposed in pairs across the width of the machine each pick off finger 14 being disposed between a pair of the brush rollers.

In operation and with the device set for front delivery the points 13 of the pick off fingers 14 are disposed in the slots 12 in the roller 10. The exposed light sensitive material is traversed over the perforated surface 2 of the developing tank 1 by means of the endless sealing belt 3, and is directed by suitable guide members shown at 26 into the nip formed between the forwardly extending

section 5 of the sealing belt 3 and the upper run 8 of the intermediate conveyor unit 9.

As the developed print reaches the front part of the conveyor system it is acted upon by the brush rollers 24 which take the print to the front feed aperture 27 and deposit it on a tray 28 provided for the purpose at the front of the machine.

To provide for rear delivery of the print the push-pull knob at the front of the machine is actuated to rotate shaft 21 thereby to raise the points 13 of pick off fingers 14 from their slots 12 into their raised position.

In this position the points 13 of the fingers extend above the level of the upper run 8 of the intermediate conveyor belts 9 and are shrouded by the brush rollers 24 which now guide the print below fingers 14 so that as it is delivered from the perforated surface 2 of the developing tank 1 it is directed around the front roller 10 to the intermediate conveyor unit 9 into the nip formed between the lower run 19 of the belts thereof and the upper run 16 of the belts of the lower conveyor unit 15. This conveyor system carries the print rearwardly and delivers it through the rear delivery aperture 20 on to a tray 29 provided for the purpose at the rear of the machine.

I claim:

1. In a photo copying machine, sheet delivery means comprising a belt conveyor system which includes an intermediate belt conveyor having a plurality of endless belts and means including at least one support roller which constrain the belts to follow an endless path in which they pass around the support roller with opposed laps moving towards and away from the roller respectively, and two outer belt conveyors running respectively against the two laps aforesaid and in combination with the said system at least one sheet diverting guide finger and means for supporting the finger for movement between two positions, said finger having two guide surfaces which converge together to a tip which, in one of the said two positions lies within the compass of said endless path and in the other position lies outside said compass, one of said guide surfaces being arcuate about the roller and the other guide surface, when the guide finger is in the other position, forming a fixed continuation in a direction away from the roller of the surface of the lap aforesaid which moves towards the roller.

2. Sheet delivery means as claimed in claim 1 in combination with a plurality of brush rollers engageable with the surface of said intermediate conveyor at the roller aforesaid and rotatable to brush against sheets travelling over said surface in the direction of movement thereof, the tip aforesaid being arranged to lie between a pair of adjacent brush rollers when the guide finger is in the said other position.

3. Sheet delivery means as claimed in claim 2 in which the brush rollers are positioned also to brush the surface of that outer conveyor which runs against the lap which moves towards the support roller.

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