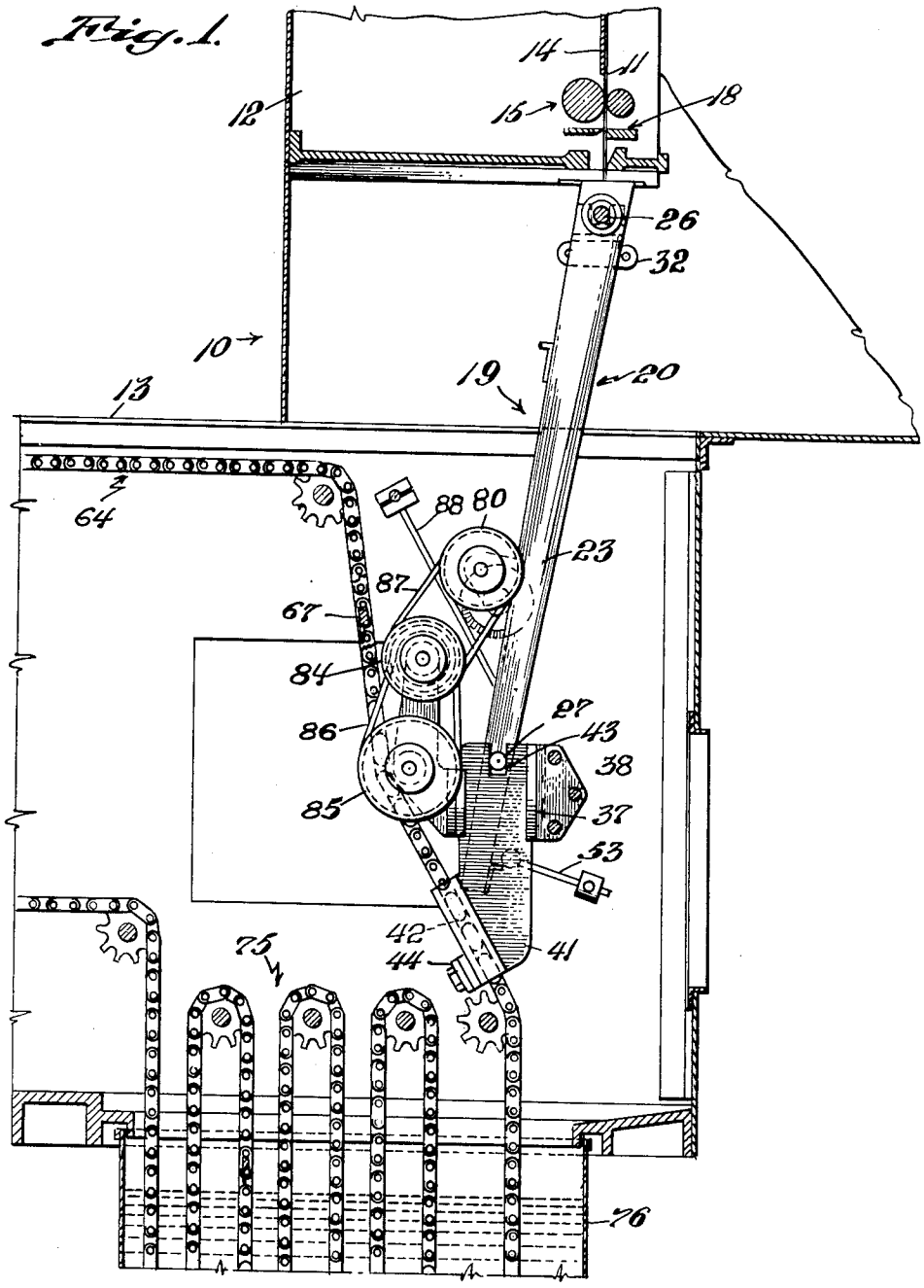
Oct. 18, 1955 A. W. CAPS 2,721,078

PRINT FEEDING AND CONVEYING APPARATUS

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Fig. 1.



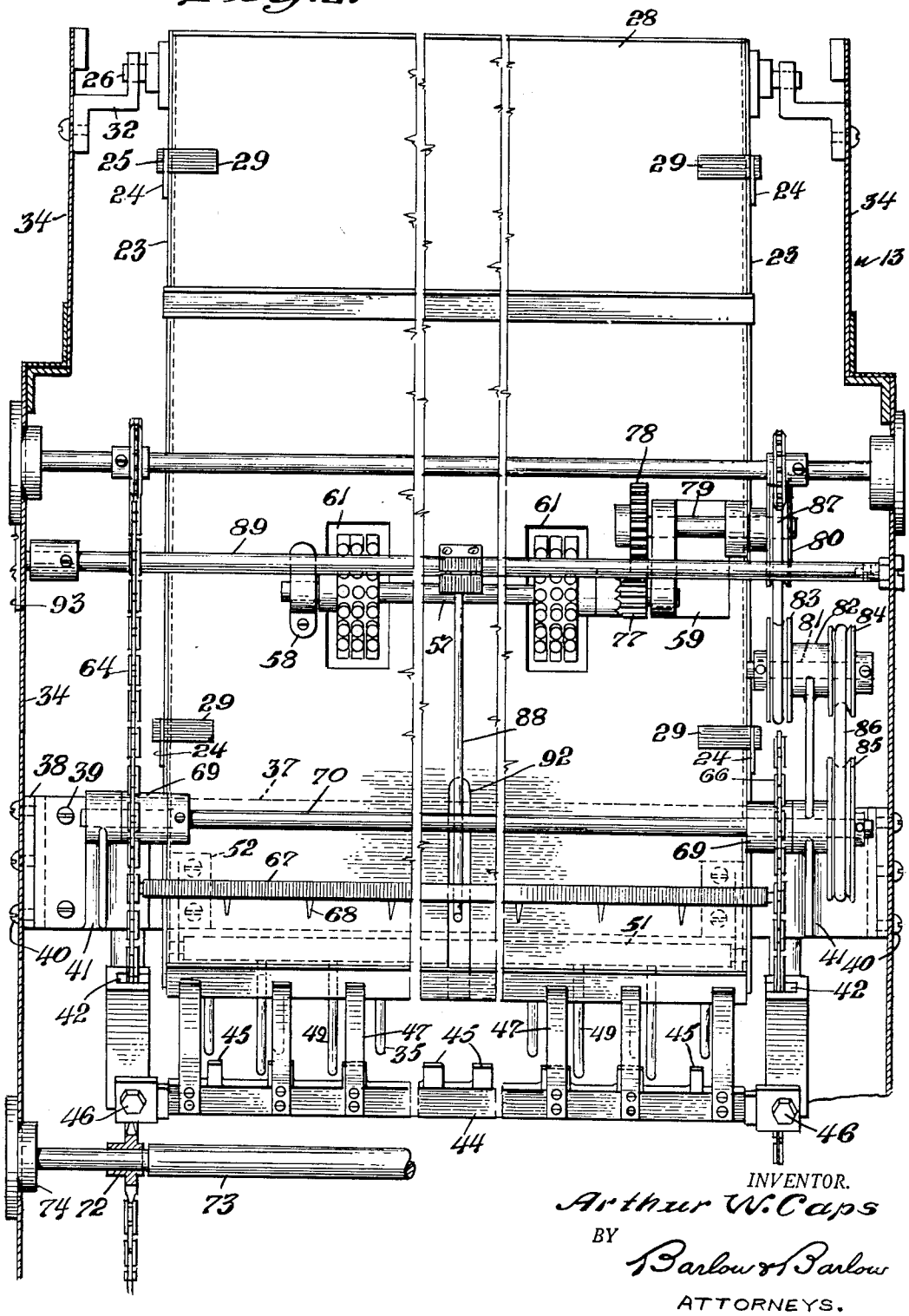
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Fig. 2.



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Fig. 3.

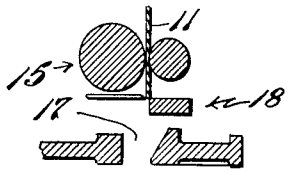


Fig. 5.

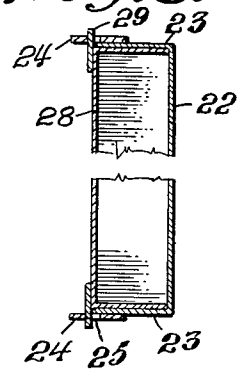


Fig. 4.

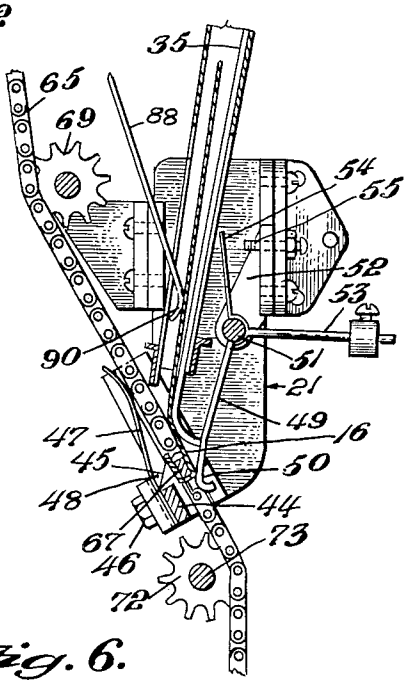
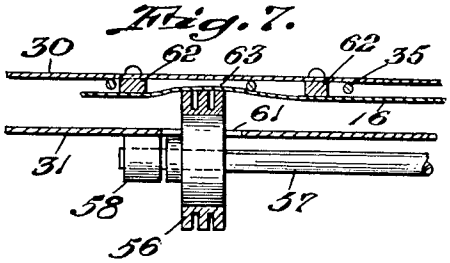


Fig. 6.

Fig. 7.



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PRINT FEEDING AND CONVEYING APPARATUS

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Application August 11, 1951, Serial No. 241,466

9 Claims. (Cl. 271—8)

This invention is for improvements in a photographic apparatus.

In known cameras for copying letters, documents, and the like, the print after exposure is fed to be deposited into a pick-up chute and moves therein by gravity to the bottom thereof against a stop and is then picked up by a conveyor which advances the print through the treating baths for developing and fixing. In some instances, the print is made of paper stock which will curl and engage the walls of the chute and so block itself against movement to a proper location to be picked up by the said conveyor.

An object of the invention is to provide a pick-up chute so constructed as to positively cause the print to move into the predetermined location to be picked up by the conveyor.

Another object of the invention is to provide a pick-up chute so constructed that a minimum contact will be had between the sensitive surface of the print and a print feeding means.

Another object of the invention is to provide means for feeding a print within the pick-up chute which will have a pushing action on the print.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a sectional view of a fragmental portion of a camera embodying my invention, looking at the pick-up chute from the side;

Figure 2 is a front elevational view of the pick-up chute shown in Figure 1, showing the enclosing casing in section;

Figure 3 is a central sectional view of the pick-up chute and related structure shown in Figure 1 on an enlarged scale;

Figure 4 is a view similar to that of Figure 3 of the lower portion thereof but showing certain elements thereof in a different position;

Figure 5 is a sectional view taken substantially along line 5—5 of Figure 3;

Figure 6 is a lateral cross sectional view of the paper stop of the chute of Figure 3; and

Figure 7 is a sectional view taken substantially along line 7—7 of Figure 3.

Referring to the drawings for a more detailed description of the invention, and particularly to Figure 1, **10** designates generally a well-known type of commercial camera employed for copying letters, documents, and the like, only so much of which is shown as is necessary for an understanding of the invention. A roll supply (not shown) of sensitized film or paper **11** is housed within a compartment **12** which is located above the casing **13** containing the paper print developing and treating part of the camera. The paper **11** is passed over a focal plane guide **14** so as to be at a proper location to be exposed to the action of light passing through lens (not shown)

of the camera. The advancing marginal edge of the paper is held between a pair of feed rollers **15** which are mechanically rotated in timed relation with other moving elements of the camera to draw an exposed section or stretch of paper **11** constituting a print **16** (see Fig. 3) from the support **14** to be passed through an opening **17** in the bottom wall of compartment **12**, thence to be deposited in a pick-up chute which is located in the casing **13**. The print **16** is severed below the feed rollers from the supply by means of knives designated generally **18** which are positioned in the compartment **12** at a location beneath the rollers **15**.

The pick-up chute **19** into which the severed print **16** has been deposited is positioned to extend from adjacent the said opening **17**, on a steep incline to the horizontal downward and comprises an upper portion **20** and a base portion designated generally **21**. The portion **20** is preferably made of a channel section **22** having side walls **23** (see Fig. 5) which taper to be of less width toward the lower edge of the chute. Each side is provided with spaced tabs **24** projecting beyond the free edge of the wall **23** and having a slotted opening **25** therein in the upper edge thereof (see Figures 2, 3, and 5). Each side wall **23** is further provided with an outwardly extending pin **26** at the upper edge thereof and a pin **27** adjacent the lower edge thereof. A similar channel section **28** (see Figures 3 and 5) is received within the section **22** in a reverse position relative to the section **22** and is provided with spaced fingers **29** which are received in the slots **25** to detachably secure the two sections **22**, **28** together providing downwardly converging front and rear walls **30**, **31**. This upper portion **20** is suspended in position by means of brackets **32** secured to the side walls **34** of the casing **13** (see Figure 2) each having a slotted opening **33** (see Figure 3). The pins **26** are received in the openings **33** and the chute depends therefrom.

The print **16** is deposited into the chute with the sensitized side thereof facing the front wall **30** and to prevent marring this sensitized surface spaced wires **35** are secured to the inner side of the front wall **30** so as to provide a minimum of contacting surface for the print to engage. These wires have a highly polished smooth surface and extend below the lower end portion of the wall **30** to additionally provide guiding fingers **36** to direct the print into proper location.

The base **21** comprises a lateral beam **37** (see Figures 2 and 3) which is supported at its end portions by angle brackets **38** attached to the beam **37** by means of screws **39**, the bracket **38** being secured to the wall **34** by means of screws **40**. The beam **37** supports a pair of brackets **41** which are similar to each other and each is provided with a guide groove **42** for a chain and a recess **43** at its upper edge (see Figure 1). The pins **27** are received in the recesses **43** to support the lower end of said chute in proper inclined position. The brackets **41** are right and left hand and are positioned to have the grooves **42** therein face each other. A paper stop bar **44** having a plurality of upwardly extending spaced projections **45** (see Figures 2, 4, and 6) is attached to the brackets **41** as by means of bolts **46** and extends between the said brackets to be in line beneath the lower opened end of the upper part of the chute **20**. A plurality of resilient fingers **47** are secured in spaced relation to the bar **44** and extend upwardly therefrom and provide with the projections **45** a recess **48** (see Figs. 3 and 4) which is in line with the opening in the chute to receive the advancing marginal edge of a print **16**. The curved portion **36** of the wires **35** extend to adjacent the said recess **48** and tend to direct the print between the said projection **45** and the resilient fingers **47**. Additional guides for the print are provided and these comprise a plurality of fin-

gers 49 having curved free ends 50 adapted to be moved into the space between the said projection 45. These fingers 49 are secured to a rock shaft 51 to depend therefrom in the path of a moving print. The rock shaft 51 is journalled at its ends in bearing supports 52 which are attached to the beam 37 and has a weighted arm 53 positioned to rock the shaft 51 in a clockwise direction to move the curved end 50 thereof in the said space between the projections 45. The shaft 51 is further provided with an arm 54 (Fig. 4) which extends upwardly from the shaft 51 and moves into engagement with an adjustable stop 55 projecting from the beam 37 when the fingers 49 are at the proper print guiding location. The stop 55 provides for adjusting the position of the fingers 49.

The print 16 is fed forward from the feed rollers 15 through the said opening 17 and into the chute 19 and is then severed by means of the knives 18, as previously pointed out. Normally a print drops through the action of gravity to the bottom of the said chute 19 to engage with one or the others of the guiding fingers 36, 49 to be directed thereby between the projection 45 and the said resilient fingers 47. In some instances the advancing marginal edge of the print will curl and engage the walls 30, 31 and block its dropping to the bottom of the chute.

In order to insure that a print 16 deposited into the chute will move to the bottom thereof, a plurality of rotatable brushes 56 are provided for engaging the print to move or push the same to the lower end of the chute. These brushes are positioned at a location to insure contact with any size print which may be deposited into the chute and are attached to a shaft 57 which is journalled in bearings 58 and 59 (see Figure 2) which are carried by the rear wall 28 of the chute. In the present instance, these brushes comprise wheels having a plurality of spaced resilient fingers 60 extending radially from the axis of the wheel and may be conveniently made of a rubber material. The peripheral marginal edge of these brushes 56 passes through openings 61 in this rear wall 28 to extend into engagement with a print 16 so as to exert a light brushing or pushing action thereon in a direction tending to move the said print 16 to the bottom of the chute to be guided between the projection 45 and resilient fingers 47. This pushing action is further augmented by means of shoes 62 (best seen in Figure 7). These shoes are attached to the inner side of the wall 30 to be at a location one on each side of the brushes 56 and are of a thickness to extend slightly beyond a plane in the path of movement of the brushes 56 so as to cause the brushes to engage the stretch 63 of the print spanning the shoes 62 and place a slight tension on the print.

The print 16 is picked out from between the said projections 45 and fingers 47 by means of an endless chain conveyor designated generally 64 comprising a stretch of endless chain 65 positioned to extend along a side wall 34 of the casing 13 and another similar stretch 66 positioned to extend along the opposite side wall 34. These two endless stretches of chain carry between them in spaced relation a plurality of bars 67 (see Figures 2, 3, and 4) which are armed with pins 68 projecting from one edge thereof. A pair of idler sprocket wheels 69 are mounted on an idler shaft 70 which is journalled in bearings 71 affixed to the brackets 41 (see Figure 3). These sprockets 69 are engaged by the said stretches 65, 66 and are at a position to be in line with the upper edge of the guide grooves 42. A similar pair of sprockets 72 are fixed to a shaft 73 (see Figures 2 and 3) to be at a position below and in line with the guide grooves 42. The shaft 73 is journalled for free rotation in bearings 74 fixed to the said walls 34 of the casing 13. The stretches of the chains pass through these grooves 32 which are angularly disposed with regard to the path of movement of the print 16 and carry the pin bar 67 at such a position that the pins 68 pierce the marginal edge of the print to impale the same thereon (see Figures 3 and 4). Further movement of the chains in the same direction will draw the print 16 out of the chute 19, the fingers 49 being moved out of the path of the print by contact therewith, the said fingers 49 when free of the print being returned to guiding position by the weight arm 53, as previously described. The chains pass over a plurality of sprockets designated generally 75 (see Fig. 1) to be guided thereby to carry the print through the developing bath contained in a tank 76 and thence to the other print treating baths (not shown).

The brushes 56 are positively rotated and to this end a pinion gear 77 (see Fig. 2) is fixed to the shaft 57 to rotate therewith and is engaged by a gear 78 attached to one end of a jack shaft 79 which is journalled in bearing support 59 and carries a grooved pulley 80 at the other end thereof. A second jack shaft 81 is journalled in a bearing 82 which is provided for by an extension on the bracket 41 and carries grooved pulleys 83, 84. Motion is transmitted from the shaft 70 to the shaft 81 by means of a grooved pulley 85 secured to the shaft and connected to the pulley 84 by means of the usual endless belt 86. A similar endless belt 87 connects the pulleys 80 and 83 so as to drive the shaft 79 and the gear 78 connected thereto. The shaft 70 is free of the chute portion 20 and by removing the belt connection 87, the section 28 may be easily removed to make the inner side of the chute accessible.

In order to indicate the presence or absence of a print 16 within the chute, an arm 88 (Figs. 2 and 3) is attached to a rock shaft 89 journalled in suitable bearings. This arm has a curved lower free end portion 90 (see Figures 2, 3, and 4) which is spring loaded to be moved across the path of a print 16 through aligned openings 91, 92 in the said front and rear walls 30, 31, respectively. When a print 16 is within the chute, as shown in Figure 3, the arm 88 will be moved clockwise in an outwardly direction, as shown in full lines in Figure 3, and when the chute is free of a print the arm 88 will move inwardly to span the space between the said walls 30, 31, as shown in dot and dash line in Figure 3. The shaft 89 is operatively connected to an indicator designated generally 93 which is affixed to a side wall 34. The indicator may be of any suitable construction having some indicating means, for example a lamp, and is placed in the electric circuit of the machine to be operable through the movement of the arm 88 to open and close the circuit of the said lamp. When a print is within the chute, the lamp will be lighted and indicates the presence of such paper print within the chute. When free of said print, the arm 18 will return to initial position to actuate the indicating device 93 to open the lamp circuit. With a print contained within the chute the machine will still normally operate to process the print, but prior to the time of actuating the feed rollers to deposit another exposed print into the chute, the ineterlocking of the electrical circuits will be such as to de-energize the feed rollers 15 so that no additional print may be deposited into the chute until conditions have again been righted by the removal of the said print from the chute.

The operation of the machine will be apparent from the above, the mechanism being operable to be continuous to deposit an exposed print into the pick-up chute and to transfer the said print thereafter by the conveyor to the various baths provided.

It will be apparent that I have disclosed a construction of pick-up chute whereby means are provided to positively move and guide the print to the proper location to be picked up by the conveyor of the apparatus.

I claim:

1. In a photographic print conveying apparatus, a chute having front and rear walls extending in a general vertical direction and between which an undeveloped print is moved edgewise with the sensitized side of the print facing the said rear wall, said chute having a stop at the lower end portion thereof for engaging the lower edge of the

print, and a rotatably mounted member projecting through the said front wall for engaging the other side of the print for moving said print against said stop, said rear wall having an abutment thereon at each side of said rotatable member and against which said print engages in moving through said chute, said abutment extending toward and slightly inwardly of the peripheral edge of said rotatable member whereby to assure contact of said rotatable member with said print.

2. In a photographic print conveying apparatus as set forth in claim 1 wherein said rotatably mounted member comprises a circular brush.

3. In a photographic print conveying apparatus as set forth in claim 1 wherein said rotatably mounted member has radially projecting rubbery fingers for engaging the said print.

4. In a photographic print conveying apparatus as set forth in claim 1 wherein said chute is provided with guides against which the print engages to be guided thereby against said stop.

5. In a photographic print conveying apparatus, a chute having front and rear walls extending in a general vertical direction and between which an undeveloped print is moved edgewise with the sensitized side of the print facing the said rear wall, a plurality of spaced abutments on said rear wall and against which said print engages, a conveyor movable across the lower end of said walls and adapted to engage the advancing edge of a print and move said print from said chute, a rotatably mounted member projecting through said front wall at a position to be between said abutments for engaging the other side of the print for moving said print at a position to be engaged by said conveyor, and means including said conveyor for rotating said rotatably mounted member, said abutments extending toward and slightly inwardly of the peripheral edge of said rotatably mounted member to assure engagement thereof with said print.

6. In a photographic print conveying apparatus, a chute having front and rear walls extending in a general vertical direction and between which an undeveloped print is moved edgewise with the sensitized side of the print facing the said rear wall, a stop extending across the lower edge of said walls and spaced therefrom for engaging the advancing edge of a print, a conveyor movable across said chute in the space between the lower end of said walls and the said stop and adapted to engage and move a print lodged against said stop out from between said walls, said rear wall having an abutment thereon at each side of said rotatable member and against which said print engages in moving through said chute, said abutment extending toward and slightly inwardly of the peripheral edge of said rotatable member whereby to assure contact of said rotatable member with said print, and a rockable guide finger extending to said stop and in the path of movement of said conveyor for guiding a print to said stop as moved between said walls, said guide

finger being swingable in the direction of travel of said conveyor and swung out of said path by contact by said print as moved from between said walls.

7. In a photographic print conveying apparatus, a chute having front and rear walls extending in a general vertical direction and between which an undeveloped print is moved edgewise, a stop extending across the lower edge of said walls and spaced therefrom for engaging the advancing edge of a print, a conveyor having a pin bar thereon movable in the space between the lower end of said walls and the said stop for engaging a print lodged on said stop, and a rockable guide weighted for swinging movement towards said stop to be in the path of the advancing edge of a print fed between said walls to engage said advancing edge to guide the same to said stop, said guide being swingable in the path of said pin bar and engageable thereby to be moved out of said path by said pin bar.

8. In a photographic print conveying apparatus, a chute having front and rear walls extending in a general vertical direction and between which an undeveloped print is moved edgewise with the sensitized side of the print facing the said rear wall, a stop extending across the lower edge of said walls for engaging the advancing edge of a print, a plurality of spaced shoes on said rear wall and against which said print engages, and a rotatably mounted member carried by said front wall and projecting therethrough a distance to overlap said shoes to engage the span of the print extending between said shoes for moving said print onto said stop.

9. In a photographic print conveying apparatus, a chute having a front and rear walls extending in a general vertical direction and between which an undeveloped print is moved edgewise with the sensitized side of the print facing said rear wall, a conveyor movable across the lower edge of said walls for engaging the advancing edge of a print for moving the same from between said walls, a shaft journalled on the said front wall, a brush mounted on said shaft for rotation therewith and projecting through said front wall into engagement with a print for moving the same in position to be engaged by said conveyor, and a drive for said shaft including a sprocket rotated by said conveyor.

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