

July 28, 1931.

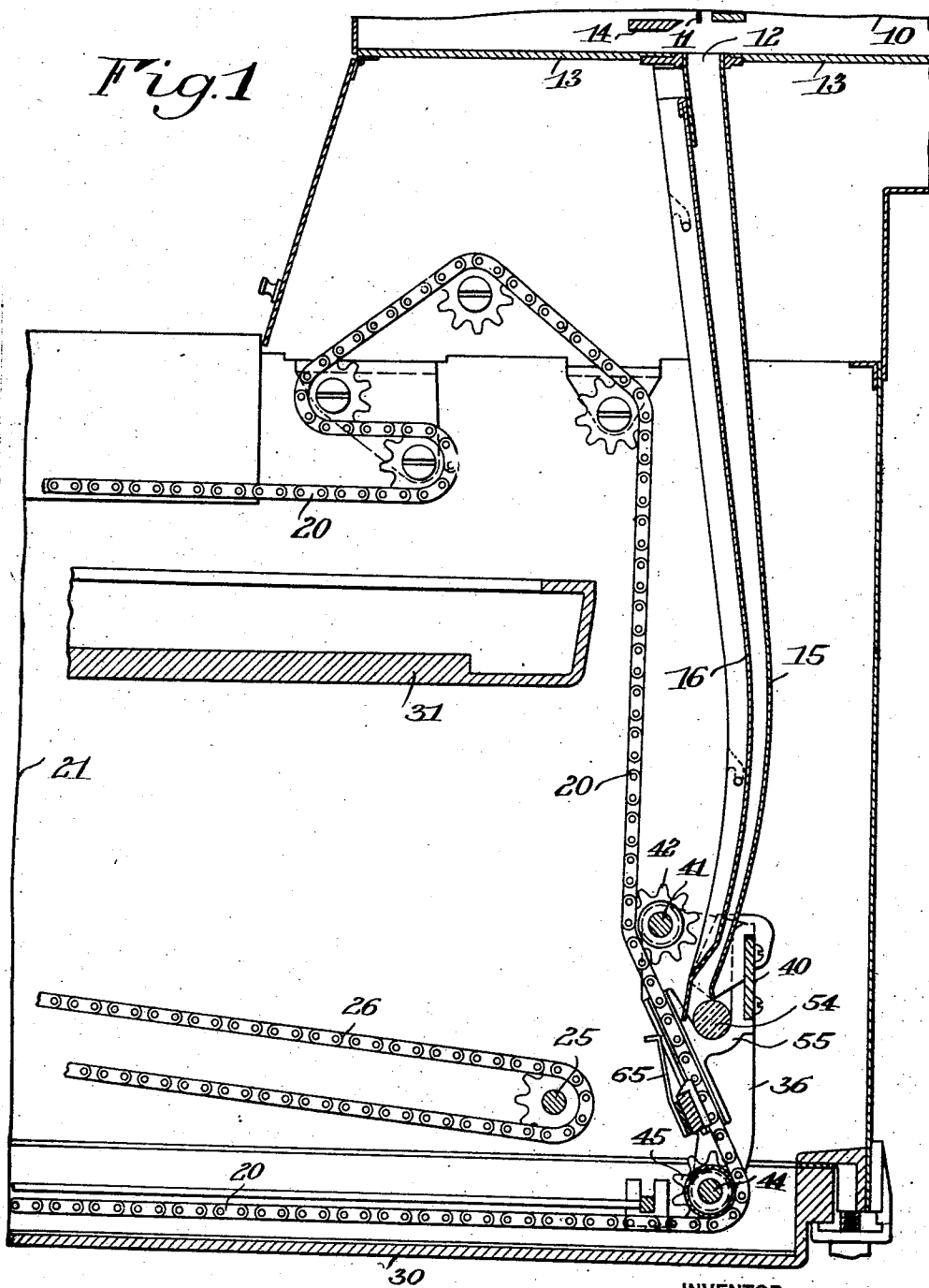
A. W. CAPS

1,815,967

PHOTOGRAPHIC APPARATUS

Filed March 16, 1929

3 Sheets-Sheet 1



INVENTOR
Arthur W. Caps
BY
Cumpton & Griffith
his ATTORNEYS

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A. W. CAPS

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Fig. 2

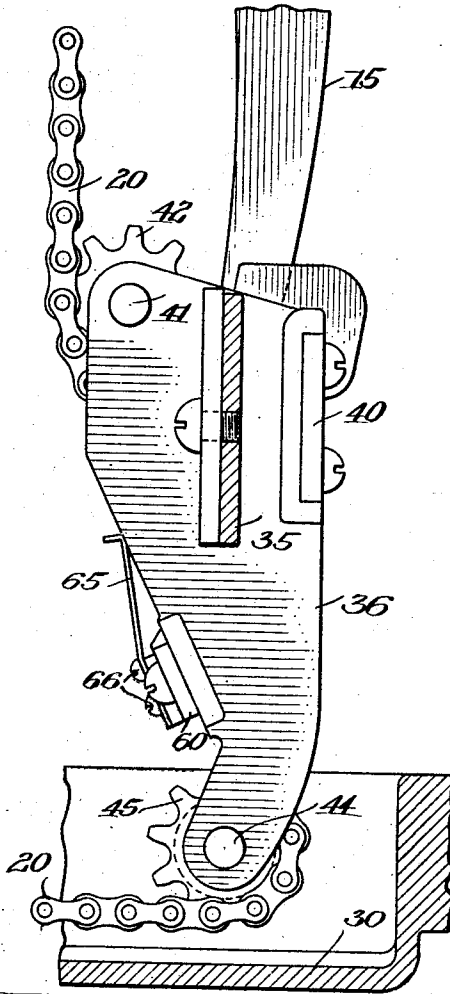


Fig. 3

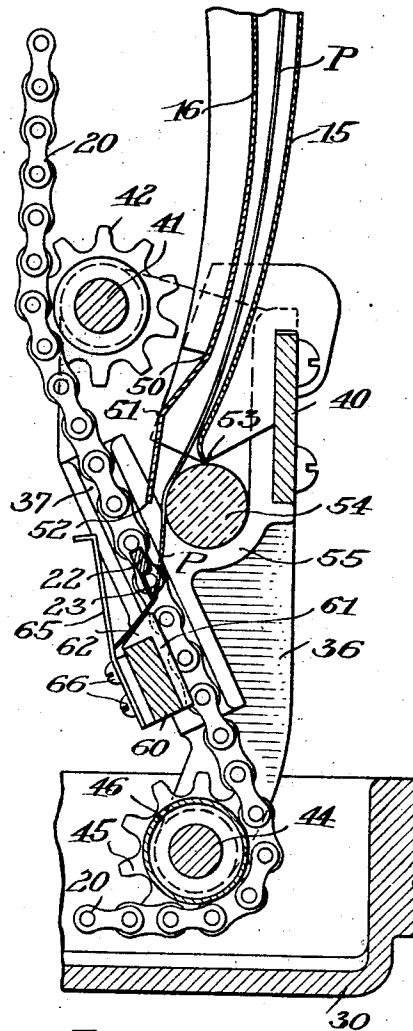


Fig. 4

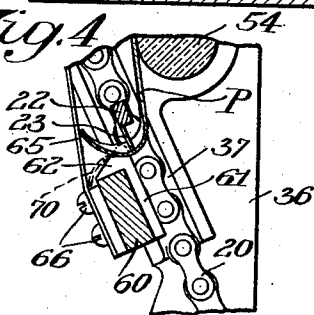
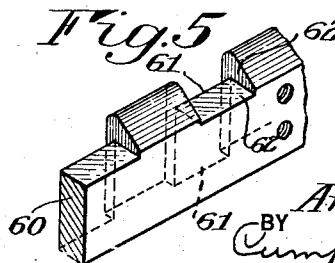


Fig. 5



INVENTOR
Arthur W. Caps
BY
Cumpston & Griffith
his ATTORNEYS

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Fig. 6

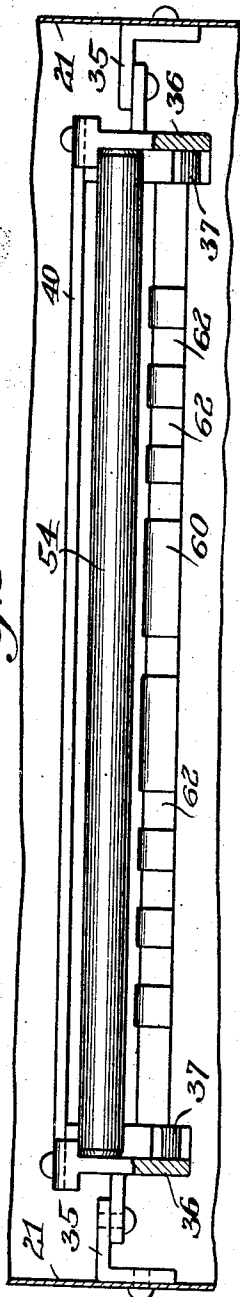
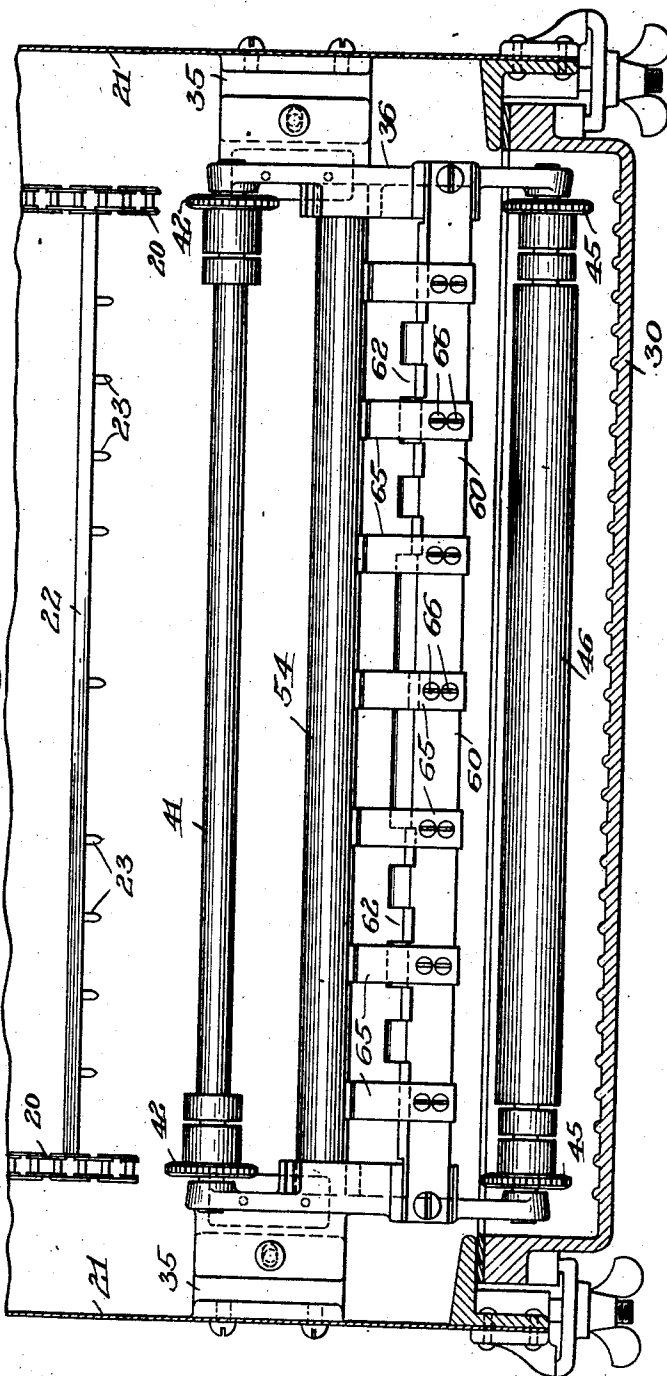


Fig. 7



INVENTOR
Arthur W. Caps
BY
Cumpston & Griffith
his ATTORNEYS

UNITED STATES PATENT OFFICE

ARTHUR W. CAPS, OF ROCHESTER, NEW YORK, ASSIGNOR TO PHOTOSTAT CORPORATION, OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF RHODE ISLAND

PHOTOGRAPHIC APPARATUS

Application filed March 16, 1929. Serial No. 347,649.

This invention relates to photographic apparatus of the general type known as "commercial cameras," in which successive portions of a roll of sensitized sheet material are brought into a focal plane, exposed, severed, picked up by conveying mechanism, and conveyed to one or more print treating baths, such as developing, washing, and fixing baths. The present invention deals particularly with the arrangement for holding the severed sheet material in position to be picked up by the conveying mechanism, and the principal object of the invention is to provide generally improved and more satisfactory holding devices so that the attachment of the severed prints to the conveying mechanism will be accomplished more smoothly and with greater certainty than by the use of previous constructions.

Another object of the invention is the provision of improved guiding means over which a print is drawn by the conveying mechanism, which guiding means is so designed and constructed that a print drawn thereover will not be marred or scratched as has sometimes been done in prior devices.

A further object is the provision of holding mechanism so designed that any liquid which accidentally falls or becomes spattered on the holding devices will drain off readily so that a print is not prematurely affected thereby.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a fragmentary vertical section through part of a commercial camera, illustrating the present invention applied thereto;

Fig. 2 is a side elevation of parts of the apparatus, with parts in section;

Fig. 3 is a vertical sectional view through the parts illustrated in Fig. 2;

Fig. 4 is a fragmentary view similar to a portion of Fig. 3, illustrating the convey-

ing mechanism and the print in a slightly different position;

Fig. 5 is a perspective view of a portion of a print supporting bar, illustrating details thereof;

Fig. 6 is a plan of part of the apparatus, with parts in section; and

Fig. 7 is a rear elevation of parts of the apparatus.

Similar reference numerals throughout the several views indicate the same parts.

There is illustrated in Fig. 1 a fragment of a commercial camera including a camera body having walls 10 enclosing a dark chamber in which the focal plane of the camera is located. Successive portions of a roll of sensitized sheet material are arranged to be held in this focal plane in position to be exposed, the lower edge 11 of a portion so held being illustrated in this figure. After the exposure is made, suitable feeding rolls (not shown) are rotated to feed the exposed portion downwardly, so that it passes through a slot 12 in a partition 13, and the severing knife 14 is then actuated to sever the exposed portion from the remainder of the strip. When thus severed, the exposed print drops downwardly by gravity within a chute having a front wall 15 and a rear wall 16 and is held in position to be picked up and removed by suitable conveying mechanism.

This conveying mechanism may include, for example, a pair of endless members such as the chains 20, one mounted at each side of the apparatus adjacent each side wall 21 of the casing which contains the print treating mechanism. One or more pin bars 22, illustrated in detail in Fig. 7, extend transversely of the apparatus, having their ends secured to the chains 20. Each pin bar has a plurality of impaling members such as the pins 23 which extend forwardly from the front edge of the bar 22, in the direction of travel of the bar, these pins 23 being preferably arranged substantially flush with one side of the bar 22, as shown for example in Figs. 3 and 4.

The conveying mechanism may be driven forwardly either continuously or intermit-

tently by suitable mechanism such as a motor (not shown) arranged to rotate a shaft 25 which drives a chain 26 which, in turn, rotates a pair of sprockets which are engaged with the conveyor chains 20. As the conveying mechanism is driven, the pins 23 on one of the pin bars 22 pierce the print held within the chute 15, 16, thus attaching the print to the conveying mechanism so that continued movement of the mechanism draws the print through a developing bath within a tray or container 30, and preferably through a washing bath (not shown). Later, the conveying mechanism deposits the print in a fixing bath of hypo or the like within a tray 31, and the pin bar from which the print was detached then returns to the mouth of the chute 15, 16 to pick up another print and to carry it through the same cycle.

It is particularly with the construction adjacent the mouth of the chute that the present invention deals. Heretofore, it has been thought necessary to support a print very close to the path of travel of the pin bar on both sides thereof. According to the present invention, however, improved print supporting means is provided so that the support of the print on one side of the path of travel of the pin bar need not be closely adjacent this path, but may be removed a considerable distance therefrom. This improved supporting means also has the advantage that the impaling of the print upon the pins 23 is accomplished with much more certainty and in a smoother and more satisfactory manner than has been possible by the use of previous constructions.

A preferred embodiment of this improved supporting means for the photographic print is as follows: Brackets 35 are secured to the side walls 21 of the casing, and these brackets support members or plates 36 of the form best shown in Figs. 2, 6 and 7. In each of these members 36 there is a guideway 37 inclined downwardly and forwardly, as illustrated in Figs. 1 and 3, this guideway serving to guide one of the chains 20 of the conveying mechanism. Thus the conveying mechanism is guided at this point so that it is properly aligned and must travel accurately along a predetermined path.

A cross bar 40 extends across from the right hand plate 36 to the left hand plate, thus connecting these plates and forming a firm and rigid structure. At the upper rear corner of each of the plates 36 there is journaled a shaft 41 which extends between these plates and is provided with sprockets 42 over which the chains run and on an extension at the bottom of each plate 36 is another shaft 44 having sprockets 45 over which the chains run, and having also a guiding roller 46 around which the print is drawn, as will be described hereafter. The chain travels in a straight path from the sprocket 42 to the

sprocket 45, and the guideway 37 is arranged in alignment with this straight path as is illustrated in Fig. 3.

The rear wall 16 of the paper chute is bent rearwardly at 50 and then bent forwardly at 51, finally terminating in a lower edge 52 which is near the path of travel of the conveying mechanism, as illustrated in Figs. 1 and 3. The front wall 15, however, terminates at an edge 53 some distance from the path of travel of the conveying mechanism, and just above a rod or bar 54 which will be described in greater detail below. This member 54 forms a downward extension of the front wall 15 of the chute, so that it may be considered in effect a part of the front wall. This rod is supported at its ends on flanges or ledges 55, suitably curved to receive it.

On the opposite side of the path of travel of the conveying mechanism from that on which the chute and the rod 54 are located, there is provided print supporting means in the form of a cross bar 60 secured at its end to the members 36. This cross bar has one face substantially parallel to and very closely adjacent the path of travel of the pin bars 22 of the conveying mechanism, as will be seen clearly by referring to Figs. 3 and 4. Recesses 61 are provided in this face of the bar, as shown especially in Figs. 3 and 5, one of these recesses being formed opposite each of the pins 23 on the pin bars 22. This provides additional clearance between the pins and the bar 60, so that in case one of the pins should become bent so as to project beyond the side of the pin bar 22, it would not catch upon the cross bar 60 during its travel.

The upper face of the cross bar 60 is arranged at an acute angle to the front face which is parallel to the path of travel of the conveying mechanism, so that this upper face is inclined or angularly disposed relative to the direction of travel of the conveying mechanism, as will be clearly apparent from Fig. 3. This upper face also has recesses 62 formed in it, these recesses likewise being opposite the pins 23 and intersecting the recesses 61 in the front face. Thus the upper edge of the bar 60 does not present a continuous smooth supporting edge, but provides what might be termed spaced supporting points intermediate the pins 23, so that a print in position to be picked up is supported by the upper edge of the bar 60 in between the pins 23 but is not supported by this bar at points directly opposite the pins.

Suitable stop means is provided at the rear edge of the cross bar 60 to contact with the edge of a print and to prevent it from sliding downwardly over the top of the bar 60. This stop means preferably comprises a plurality of fingers 65 fixed to the rear edge of the cross bar 60 by means such as screws 66, the fingers 65 being spaced from each other as shown in Fig. 7. The purpose of spacing the

fingers is to provide for easy drainage of any liquid which may fall upon the cross bar 60 or the fingers 65 or adjacent parts of the apparatus. During the operation of the machine, it may occasionally happen that fixing solution from the tray 31 may splash or spatter down on to these parts, or liquid which has collected upon the pin bars 22 may drop onto these parts, or moisture may condense thereon. It is apparent that if a continuous stop member were used in place of the spaced fingers 65, liquid would then collect between this stop member and the bars 60, and would find no ready outlet. By using spaced fingers, however, as the stop means, the spaces between the fingers provide a plurality of openings through which liquid may easily drain, so that it does not accumulate at this point.

It will be noted from Figs. 3 and 4 that the stop members 65 are arranged at an acute angle to the top face of the cross bar 60, so that a substantially V-shaped space is formed between the bar and the stop member. Thus when the edge of a print is placed in this space, the stop members 65 will not only support the edge of the print to prevent it from sliding downwardly over the bar 60, but will also tend to prevent upward displacement of the edge of the print in a direction perpendicular to the surface of the print. This action of resisting displacement of the edge of the print is beneficial in securing a cantilever action in the print, as will be brought out in greater detail hereafter, in the description of the operation of the device.

Referring now again to the guiding rod or bar 54, this rod is preferably of nonmetallic material, such, for example, as glass or bakelite, and may conveniently be made of circular cross section. It has been found in practice that the developing and fixing baths vaporize somewhat, and the vapors tend to condense upon other parts of the apparatus. The vapors which condense upon metal are apt to form metallic salts of the various chemicals, which may form crystals. If such crystals are present upon a part of the apparatus over which the print slides, the print is apt to be scratched, particularly if crystals are present where the print makes a bend so that it is pressed against them. A deposit of crystals on the lower edge of the front wall of the chute, at the mouth thereof, is accordingly very undesirable, since the print is drawn over and pressed against this lower edge of the chute when it is being removed from the chute by the conveying mechanism. Furthermore, the emulsion side of the print is forwardly so that it would be scratched by any crystals which were present here.

It is for this reason that the member 54 is made of nonmetallic material, since the chemical vapors condensing on such material do not form hard crystals which would scratch the print, but simply form moisture

thereon. Thus the member 54 forms a guiding means over which the emulsion side of the print is drawn by the conveying means, without danger of scratching the print. Furthermore, if the member 54 is made circular or of any other cross section in which its lowest point is removed from the point at which the print contacts with the member, then the moisture which condenses on this member will run to the lowest point as rapidly as it is formed, so that no harmful amount of liquid is in a position to contact with the print. Making the rod 54 of glass has been found to give excellent results, though bakelite or other nonmetallic materials would also be satisfactory.

In operation, the exposed print after being fed downwardly partially into the chute is severed by the knife 14 as above described, so that it falls by gravity within the chute. The lower end of the print issues from the mouth of the chute in the space between the edge 52 of the rear wall and the rod 54 at the front wall, and enters the V-shaped space between the top face of the bar 60 and the stop members 65, coming to rest with the lower edge of the print substantially at the vertex of this V-shaped space. Thus the print extends across the path of travel of the conveying mechanism.

As the conveying mechanism is actuated, the pin bars 22 travel downwardly and the impaling members or pins 23 thereon come into contact with the upper or rear side of the print. Fig. 3 illustrates a print P just as the pins have come into contact with it and slightly displaced it. It will be observed that the bar 60 supports the print on one side of the path of travel of the conveying mechanism, and very closely adjacent the path of the pins, while the rod 54 supports the print on the opposite side of the path of travel, and may be placed at a considerable distance from this path.

It will be remembered that the upper edge of the supporting bar 60 is recessed or cut away at points directly opposite the pins 23, so that the print P is supported at a plurality of spaced points intermediate the pins. Accordingly, continued downward movement of the pin bar 22 tends not only to bend the print in a longitudinal direction, but also tends to deform it transversely or in the direction of the length of the pin bar, so that it becomes cupped or depressed around each pin 23. This is illustrated in full lines in Fig. 4. It is found in practice that the pins will pierce the paper very easily when it is cupped in this manner, since the ridges between the cups act somewhat as corrugations and tend to stiffen the paper so that it offers sufficient resistance to enable the pins to pierce it.

During the downward travel of the pin bars, there is a tendency, of course, for the

end of the print beyond the pin bars to pivot around the upper edge of the supporting bar 60, so that the extreme lower edge of the print would fly upwardly. Such a tendency is resisted, however, by the stop members 65, since they are at an acute angle to the print and tend to prevent the edge of the print from moving upwardly perpendicular to the surface thereof. Thus the extreme edge of the print is restrained and held for a time in the vertex of the V-shaped space between the bars 60 and the stop members 65, and the restraint of this edge of the print adds stiffness to the print by causing it to act on the cantilever principle, thus assisting in providing sufficient resistance so that the pins may pierce the print easily. The dotted lines 70 in Fig. 4 illustrate the edge of the print restrained in this manner by the stop members 65. Upon continued movement of the pin bar, of course, the lower edge of the print will finally spring up to the full line position shown in Fig. 4, but nevertheless it is held down for a time and thus assists the piercing action.

When the pins have pierced the print which thus becomes impaled upon the conveying mechanism, continued movement of the mechanism draws the main body of the print out of the chute, so that the print slides over the guiding rod 54 which, because of its nonmetallic construction, acts as a smooth guide without crystals which might scratch the print. The enlargement near the mouth of the chute, at the point 51, allows sufficient space so that the print is not forced to bend sharply over the rod 54, and thus a smooth withdrawing action is secured. The prints are then drawn around the roller 46 and into the developing bath in the tray 30, from which they may be conveyed through a washing bath and deposited in the fixing bath within the tray 31.

It is found in practice that an arrangement constructed in accordance with the present invention gives extremely good results, prints being picked up easily and with certainty by the conveying mechanism, and scratches on the prints being avoided. Even prints of extremely short length may be picked up satisfactorily by the conveying mechanism when they are supported by the improved supporting devices herein disclosed.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive idea may be carried out in a number of ways. This application is therefore not to be limited to the precise details shown, but is intended to cover all variations and modifications thereof falling within the spirit of the invention or the scope of the appended claims.

I claim as my invention:

1. In a photographic apparatus, the com-

bination with print conveying mechanism, of devices for holding a print in a generally transverse direction relative to the path of travel of said conveying mechanism, said devices including means for supporting said print at a plurality of spaced points on one side of the path of travel of the conveying mechanism, so that said print may curve transversely between the spaced supporting points.

2. In a photographic apparatus, the combination with print conveying mechanism including a plurality of impaling members movable along a predetermined path of travel, of devices for supporting a print in a generally transverse direction relative to the path of travel of said conveying mechanism in position to be pierced by said impaling members, said devices including means for supporting a print at spaced point intermediate said impaling members on one side of the paths of travel thereof, so that said print may curve transversely between the spaced supporting points when said impaling members come into contact therewith.

3. In a photographic apparatus, the combination with print conveying mechanism including a movable bar and a plurality of impaling members mounted in fixed position on and projecting forwardly from said bar, of devices for holding a print in position to be pierced by said impaling members, said devices including means for supporting a print at a plurality of spaced points intermediate said impaling members and closely adjacent the path of travel of said bar.

4. In a photographic apparatus, the combination with print conveying mechanism movable along a predetermined path of travel, of devices for holding a print in position to be picked up by said conveying mechanism, said devices including means for supporting a print at spaced point on one side of the path of travel of said conveying mechanism, so that said print may curve transversely between the spaced supporting points, and means for supporting said print on the other side of the path of travel of the conveying mechanism.

5. In a photographic apparatus, the combination with print conveying mechanism including an impaling member movable along a predetermined path of travel, of devices for holding a print in position to be pierced near one edge thereof by said impaling member, said devices including means for supporting said print in a position extending across said path of travel, and means substantially resisting displacement of said edge of said print, so that the portion of said print between said edge and the path of travel of said impaling device may act as a cantilever.

6. In a photographic apparatus, the combination with print conveying mechanism including a bar movable along a predetermined

path of travel and a plurality of impaling members mounted on said bar, of devices for holding print across the path of travel of said bar in position to be pierced near one edge by said impaling members, said devices including means for supporting said print between said edge and the path of travel of said bar, and a member substantially in contact with said edge of the print and extending backwardly at an acute angle thereto to resist displacement of said edge, so that the portion of said print between said edge and the path of travel of said bar may act as a cantilever.

7. In a photographic apparatus, the combination with print conveying mechanism including impaling members movable along a predetermined path of travel, of devices for holding a print across the path of travel of said impaling members in position to be pierced near one edge thereby, said devices including members forming a substantially V-shaped space adapted to receive said edge of the print and to resist displacement of the edge thereof.

8. In a photographic apparatus, the combination with print conveying mechanism movable along a predetermined path of travel, of devices for holding a print in position to be picked up by said conveying mechanism, said devices including a plurality of spaced stop members having openings between them so that liquid may easily drain therefrom.

9. In a photographic apparatus, the combination with print conveying mechanism movable along a predetermined path, of devices for holding a print in position to be picked up by said conveying mechanism, said devices including a member adjacent the path of travel of said conveying mechanism and having a downwardly sloping face for supporting a print, and stop means adjacent the lower edge of said downwardly sloping face to limit the downward motion of a print over said face, said stop means having a plurality of openings to permit easy drainage of liquid falling upon said sloping face.

10. In a photographic apparatus, the combination with print conveying mechanism including a movable bar and a plurality of impaling members mounted thereon, of devices for holding a print in position to be pierced by said impaling members, said devices including a bar having one face closely adjacent the path of travel of said first mentioned bar and another face at an angle thereto for supporting said print, both of said faces having recesses at points opposite the paths of travel of said impaling members.

11. In a photographic apparatus, the combination with print conveying mechanism movable along a predetermined path, of devices for holding a print in position to be picked up and conveyed by said mechanism,

said devices including means for supporting a print on one side of the path of travel of the conveying mechanism, a nonmetallic guide member for supporting said print on the opposite side of said path of travel, and a pair of notches in which said guide member is received for rapid removal therefrom so that said member may be easily cleaned and replaced.

12. In a photographic apparatus, the combination with print conveying mechanism, including a movable bar and a plurality of impaling members mounted thereon, of devices for holding a print in position to be pierced by said impaling members near one edge of the print so that said print will be drawn along by said mechanism, said devices including means for supporting said print at spaced points along that side of the path of travel of said bar toward said edge of the print, and a nonmetallic guide member for supporting said print on the opposite side of the path of travel of said bar, said print being drawn over said guide member by said conveying mechanism after becoming impaled thereon.

13. In a photographic apparatus, the combination with print conveying mechanism, of devices for holding a print in position to be picked up by said conveying mechanism, and a stationary nonmetallic guiding member over which said print is drawn when it is picked up and moved by said conveying mechanism, said guiding member having a low point out of contact with a print being drawn over said guiding member, so that liquid condensing upon said member may drain to said low point and may be out of contact with a print.

14. In a photographic apparatus, the combination with print conveying mechanism including a bar movable along a predetermined path of travel and a plurality of impaling members spaced from each other and mounted on said bar, of devices for holding a print transversely across the path of travel of said bar in position to be pierced by said impaling members, said devices including a supporting member having a print supporting face at a substantial angle to the direction of travel of said bar so that a print extending transversely across the path of travel of said bar may contact with and be supported by said face, said supporting face having recesses of substantial width arranged opposite said impaling members so that said print may curve transversely into said recesses when said impaling members come into contact with said print.

ARTHUR W. CAPS.