

June 29, 1948.

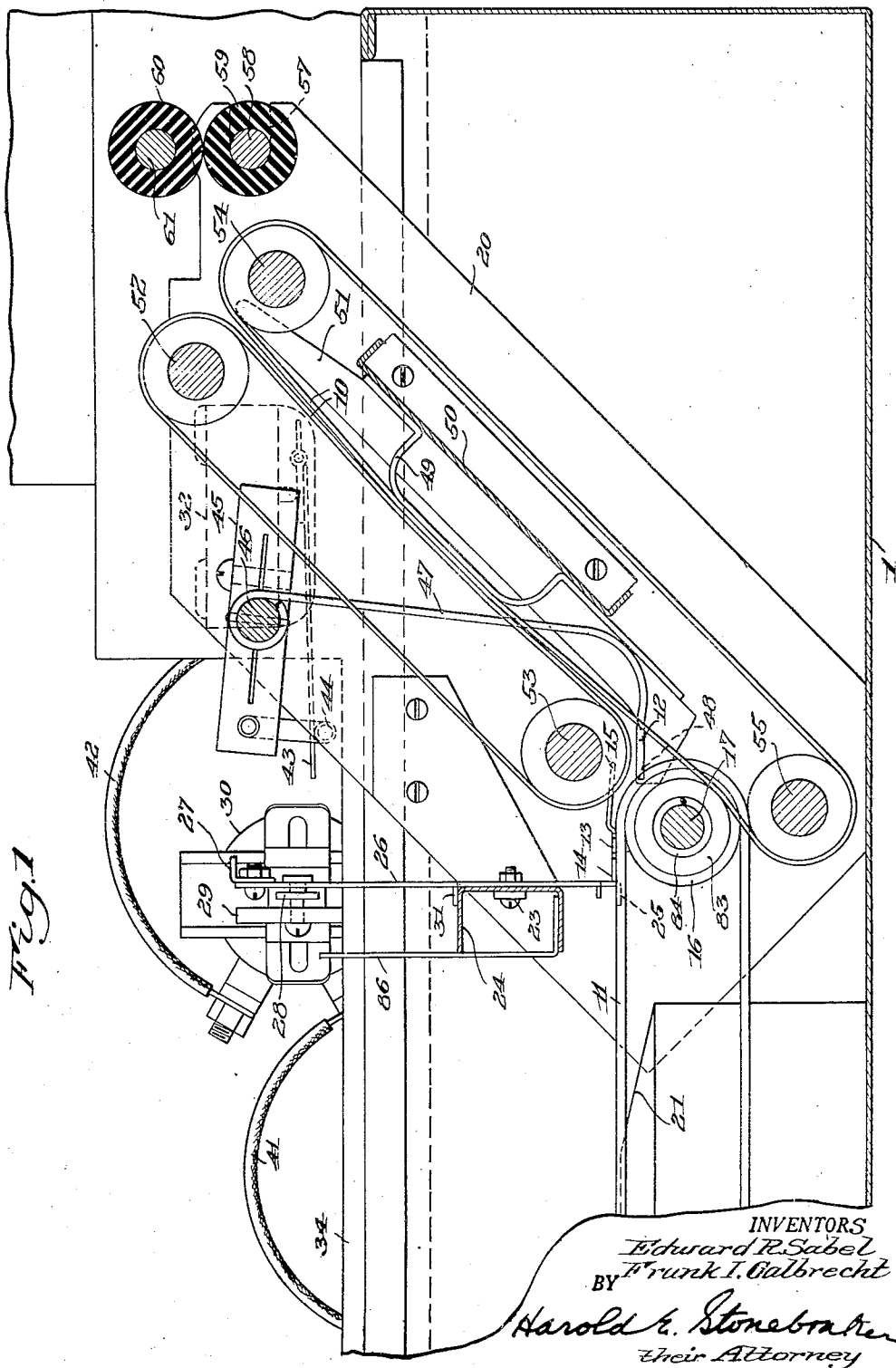
E. R. SABEL ET AL

2,444,170

PHOTOGRAPHIC PRINT CONVEYING MECHANISM

Filed May 31, 1947

5 Sheets-Sheet 1



June 29, 1948.

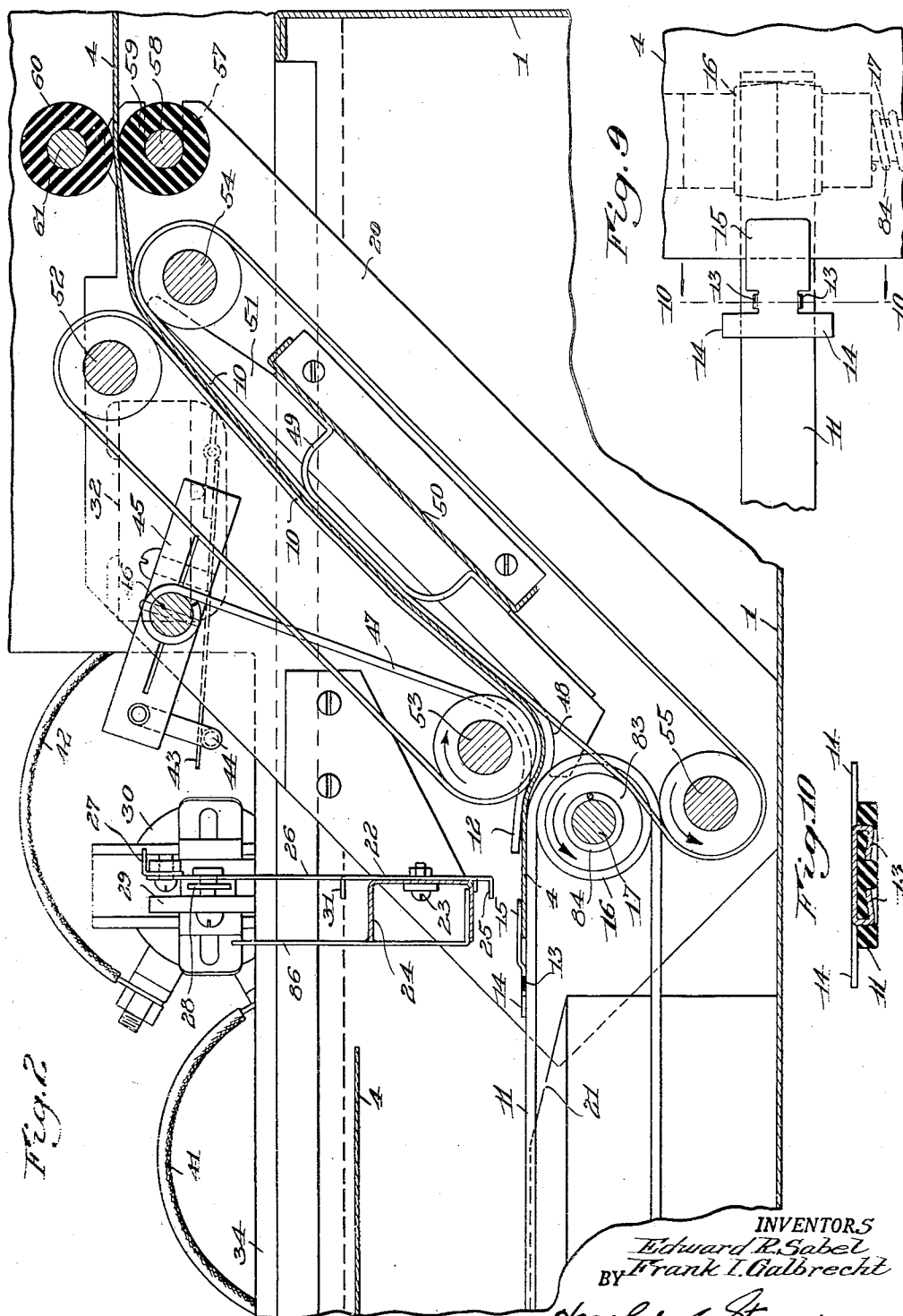
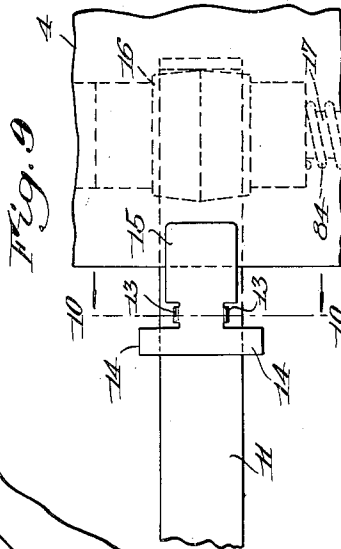
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PHOTOGRAPHIC PRINT CONVEYING MECHANISM

Filed May 31, 1947

5 Sheets-Sheet 2



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PHOTOGRAPHIC PRINT CONVEYING MECHANISM

Filed May 31, 1947

5 Sheets-Sheet 3

Fig. 3

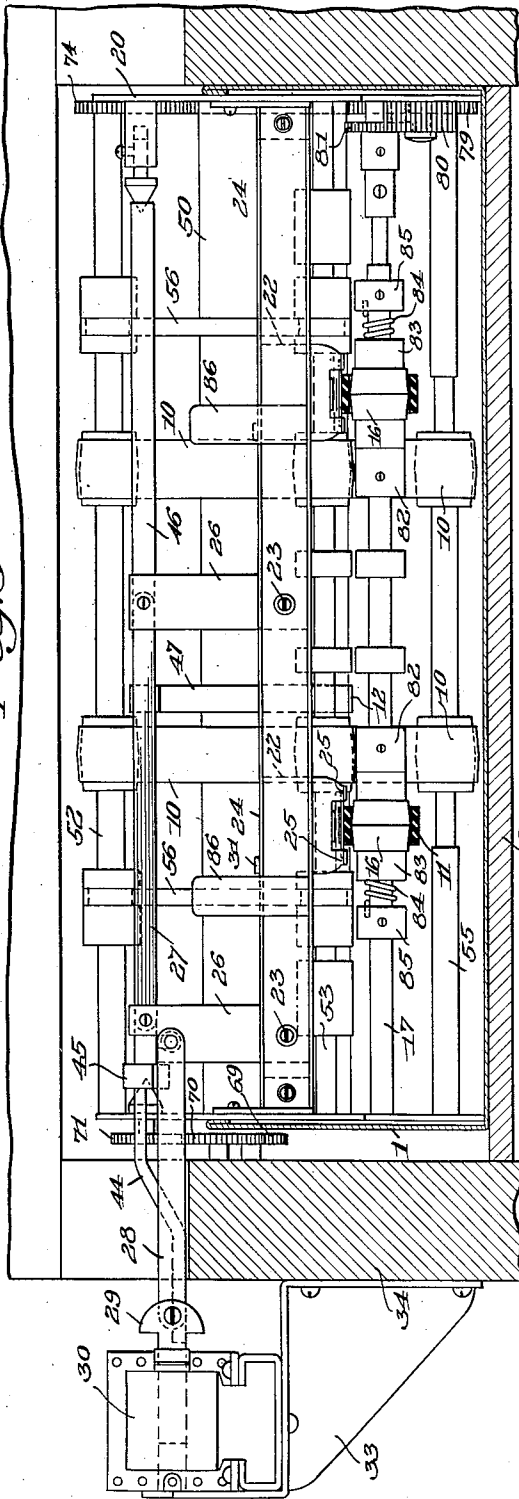
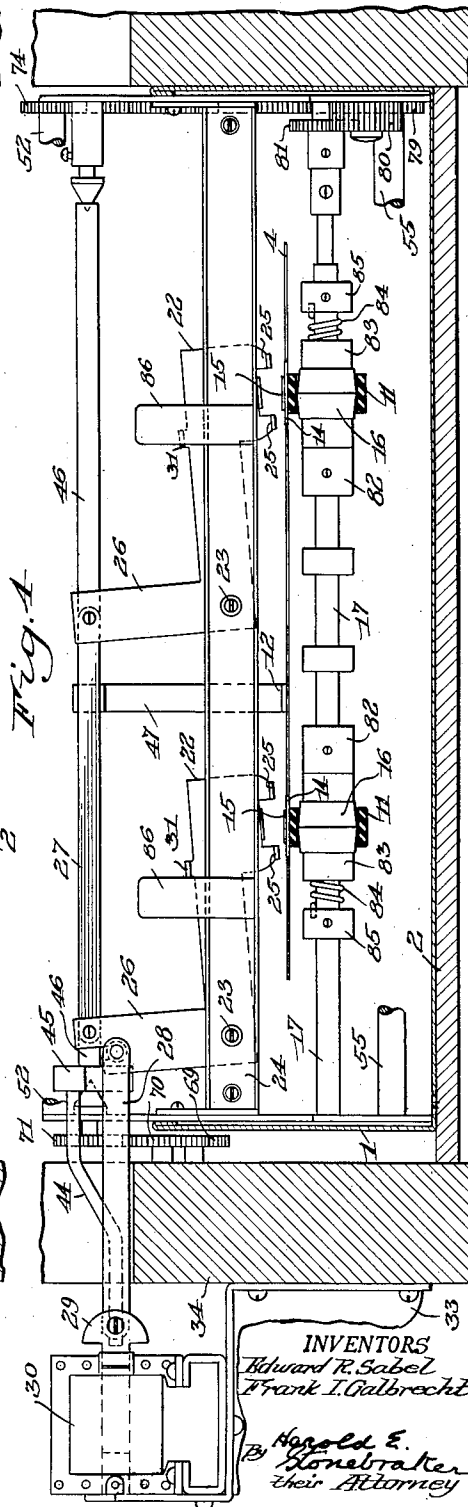


Fig. 4



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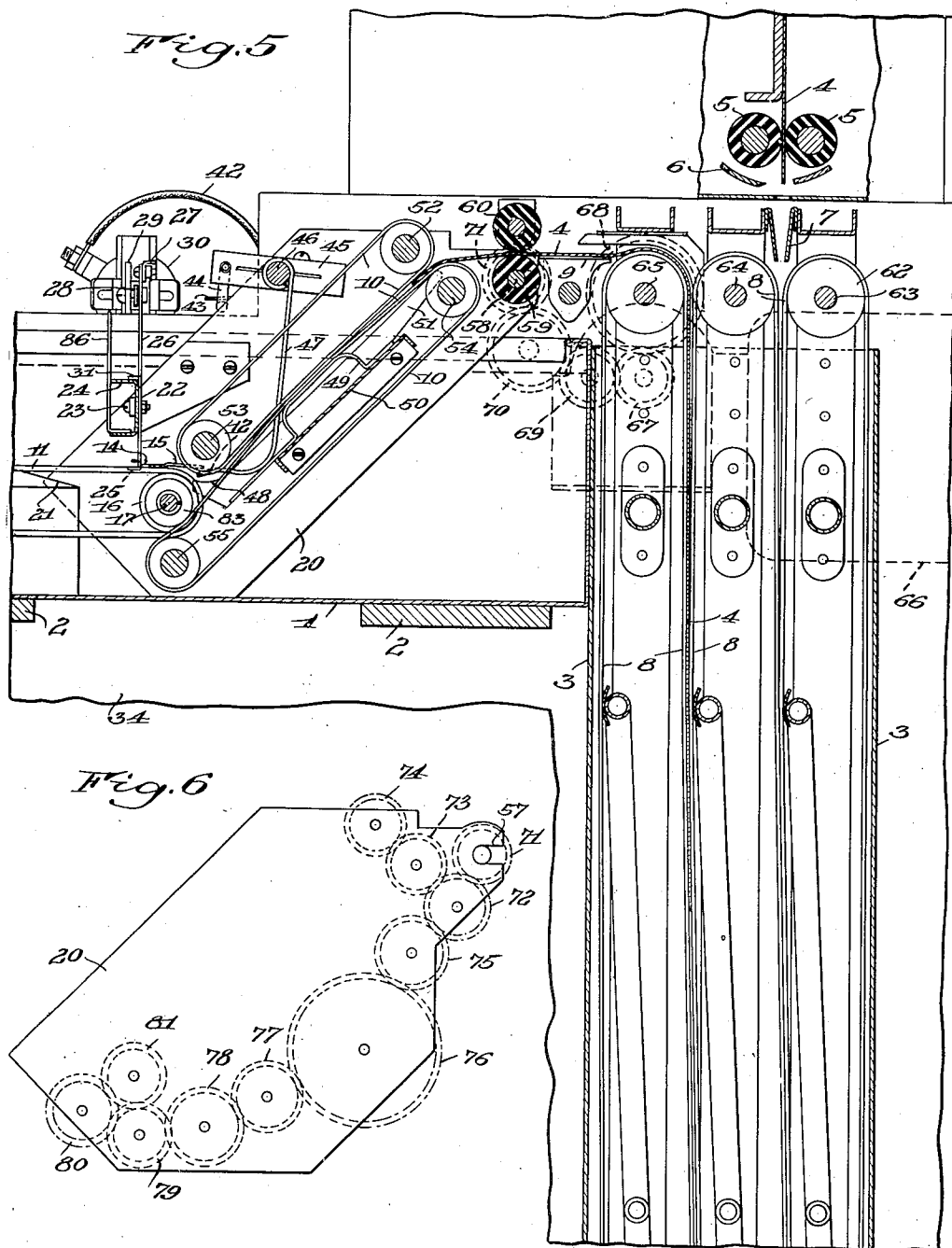
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PHOTOGRAPHIC PRINT CONVEYING MECHANISM

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5 Sheets-Sheet 4



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PHOTOGRAPHIC PRINT CONVEYING MECHANISM

Filed May 31, 1947

5 Sheets-Sheet 5

Fig. 7

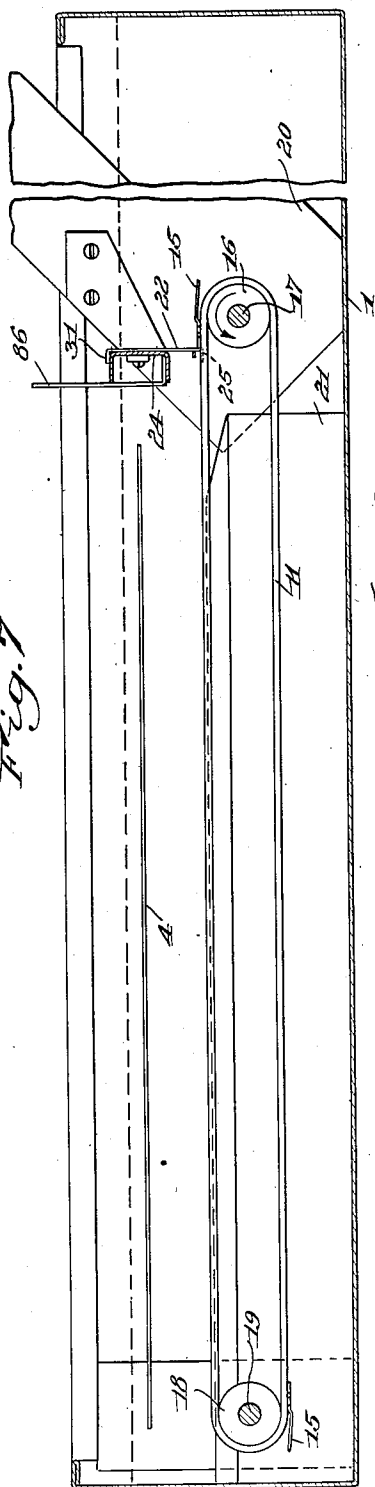
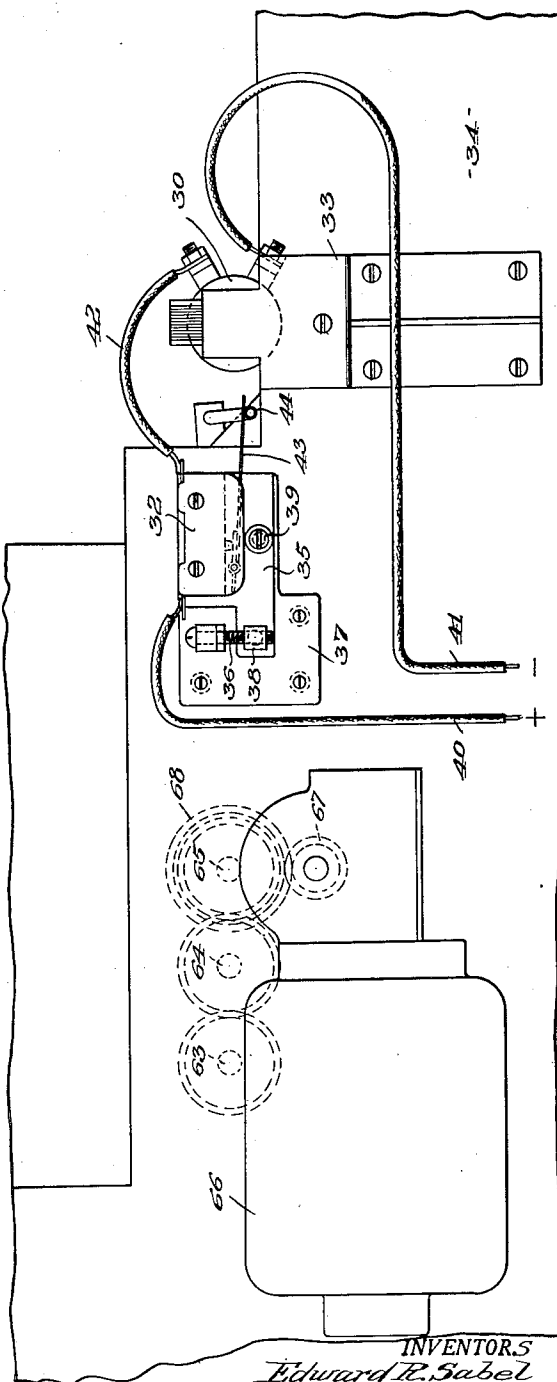


Fig. 8



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UNITED STATES PATENT OFFICE

2,444,170

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Application May 31, 1947, Serial No. 751,592

12 Claims. (Cl. 95—89)

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This invention relates to a photographic print conveying mechanism and has for its purpose to afford a practical and efficient automatic mechanism for rapidly carrying sheets or prints from a developer tank through a continuously operating feeding mechanism into a hypo-containing or fixing tank where the prints are released in a horizontal position below the liquid level in the tank.

Heretofore, the usual practice for transferring prints from a developing tank into a fixing tank has required a manual operation to depress the prints in the fixing liquid for thorough and intimate contact by pushing them from the top of the liquid downwardly, and it is a more particular purpose of the invention to afford mechanism for conveying the prints in horizontal position into the body of the fixing liquid beneath the surface thereof, and automatically releasing a print when it is entirely within the liquid, whereupon it floats to the surface to a position just under the print immediately thereabove, whereby each print is brought into thorough contact at all portions with the fixing liquid, and when a sufficient supply of prints is collected in the fixing tank, they can be easily removed by the operator for washing.

Another object of the invention is to afford a construction that permits of a completely automatic operation whereby prints can be fed from a developer tank continuously and successively into a fixing tank, and intermittently fed and released as required in the hypo solution when in a horizontal position in the fixing tank.

A further purpose of the invention is to afford a conveying mechanism within a fixing tank that is automatically and intermittently operated to grip a print as the latter enters the fixing tank, then to convey the print until it assumes a completely horizontal position within the tank, and finally to release the print to permit its floating upwardly in the hypo solution underneath the mass of prints above.

An additional object of the invention is to afford a construction of the general character mentioned in which the feeding mechanism continuously operates to deliver prints from the developer tank to the fixing tank, and the conveying mechanism within the fixing tank is idle except when a print enters the fixing tank, whereupon the print automatically effects a complete cycle of movement of the conveying mechanism which grips the print, conveys it to horizontal position within the fixing solution, and then releases the print.

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Another purpose of the invention is to afford a simple and efficient form of print-conveying and gripping means, including gripping devices that automatically engage and release a print at predetermined points, while movement of the gripping devices and conveyor is governed by electrical means under the control of the print itself as it travels through the machine.

Still an additional object is to afford an arrangement of fixing tank, feeding means for effecting movement of prints from the developer tank into the fixing tank, conveyor belts within the fixing tank, drive means for the feeding means and conveyor belts, and instrumentalities operated by the print as it travels into the fixing tank for effecting movement of the conveyor belts through a cycle, following which the conveyor belts remain idle until another print enters the fixing tank, thus enabling continuous and fast processing of prints from a photocopy machine or the like without requiring attention from the operator for the fixing operation other than to remove a mass of prints occasionally from the fixing tank when the latter has been filled to capacity.

To these and other ends, the invention consists in the construction and arrangement of parts that will appear clearly from the following description when read in conjunction with the accompanying drawings, the novel features being pointed out in the claims following the specification.

In the drawings:

Fig. 1 is a vertical sectional view of a machine, partially broken away, showing a preferred embodiment of the invention and illustrating the conveyor belts in idle position previously to the entrance of a print;

Fig. 2 is a sectional view similar to Fig. 1, with parts omitted, and showing the position of a conveyor belt and gripping device after a print has engaged and moved the control member, causing the conveyor belt to be released and the gripping device to engage the forward edge of the print and carry it along on the conveyor belts;

Fig. 3 is a transverse vertical sectional view with the conveyor belts held in idle position;

Fig. 4 is a similar view showing the position of the parts after the stop devices have been elevated to release the conveyor belts and sheet-gripping devices;

Fig. 5 is a vertical sectional view looking from right to left of Fig. 3 and showing the relation of the mechanism to the feeding means and developer tank of a photocopy machine;

Fig. 6 is a detail sectional view looking from right to left of Fig. 4 and illustrating the drive to the feeding rolls and conveyor belts within the fixing tank;

Fig. 7 is a sectional view through the fixing tank showing the relation of the conveyor belts and gripping devices, and the position of a print after its release from the conveyor belts;

Fig. 8 is a view in end elevation of the machine looking from left to right of Fig. 3;

Fig. 9 is an enlarged detail view in elevation of a portion of one of the conveyor belts and one of the sheet-gripping devices carried thereby, and

Fig. 10 is an enlarged detail sectional view on line 10-10 of Fig. 9 looking in the direction indicated.

Referring more particularly to the drawings in which like reference numerals refer to the same parts throughout the several views, 1 designates a photographic fixing tank for containing a hypo solution, suitably mounted on supports 2 in adjacent relationship to a developer tank 3, see Fig. 5, from which prints are fed after developing to the fixing tank 1. 4 designates a print positioned in the focal plane of a photocopy camera for instance, to be fed downwardly, after exposure, by feed rolls 5 and cut off by the knife 6, whereupon the print is fed through a chute 7 and engaged by the feeding belts 8 which conduct the print downwardly into the developer tank, and thence upwardly over a bridge 9, to a point between the belts 10 which carry the print downwardly into the fixing tank and the liquid therein.

The belts 10 of the feeding mechanism are operated continuously by drive mechanism that will be described presently, and as prints are received from the developer tank, they are fed downwardly between the belts 10 into the fixing tank, whence they emerge onto conveyor belts 11 in a manner that will now be explained. The feeding belts 10 are spaced from each other, and the conveyor belts 11 are likewise spaced from each other, the feeding belts 10 being preferably constructed of woven plastic or other suitable material while the conveyor belts 11 are preferably constructed of rubber so as to effect the proper cooperation with the print-gripping devices to be described later.

It will be observed that the upper feeding belt 10 extends downwardly a less distance than the lower feeding belt 10, and when a sheet or print reaches the lower end of the upper feeding belt, it is deflected and guided by suitable means outwardly away from the lower feeding belt and around the lower end of the upper belt 10 toward the conveyor belts 11, the forward edge of the print in the meantime having engaged and lifted a shoe 12 of a control member located between the feeding belts 10 and in the path of the print as it is fed therethrough. The conveyor belts 11 are normally stationary, and when the shoe 12 is elevated by the print, it acts to release the conveyor belts 11 for movement and the conveyor belts thereupon grip the forward edge of the print by mechanism that will presently be described.

In order to grip a print, each conveyor belt is provided with two gripping devices arranged at points of the belt, as illustrated in Figs. 7, 9 and 10, each gripping device comprising a metal plate overlying the outer surface of the belt and including flanges 13 that extend through the body of the belt and are bent against the under surface thereof to hold the gripping device securely

on the belt, while 14 designate opposite stop portions in the form of extensions projecting laterally beyond the edges of the belt and affording means whereby the belt is held against movement between successive cycles. 15 designates the gripping portion of the plate in the nature of a tongue lying against the belt to engage a print when disposed in parallelism therewith, as in Fig. 2, and occupying a position spaced from the adjacent part of the belt when the latter travels and is flexed around its supporting pulley, as illustrated in Fig. 1. Thus in the idle position of the conveyor belts, when the stop portions 14 are held by the stop devices to be described presently, the gripping portions or tongues 15 lie in a horizontal plane while the adjacent part of the conveyor belt extends around its supporting pulley and affords a recess or space between the belt and the gripping portion 15 into which the forward edge of the advancing print moves as it leaves the feeding belts.

As a print is fed downwardly into the fixing tank and travels around the lower end of the upper belt 10, it moves in between the tongue 15 of the gripping device and the adjacent surface of the belt, and the movement of the parts is so timed that just as the print occupies this position, the conveyor belts are released and start to move forwardly at the same speed as the advancing print, and such forward movement causes the gripping portions 15 to engage the forward edge of the print in the manner shown in Fig. 2. This takes place immediately after the conveyor belts have started to move and as soon as the conveyor belts and gripping portions 15 have assumed parallel relative positions, the gripping devices thus acting to hold the print on the conveyor belts and to carry it along with the conveyor belts through the liquid in the fixing tank until the entire print occupies a horizontal position in the tank, as illustrated in Fig. 7. When the gripping devices which hold the print reach the outer end of the tank, the gripping portions move away from the conveyor belts as the belts travel around their supporting pulleys at the outer end of the tank, thus releasing the print which is then free to float upwardly in a horizontal position through the liquid to the surface or until it engages a print or prints already resting at the surface of the body of liquid.

The conveyor belts travel around pulleys 16 mounted on a driven shaft 17 at the inner end of the tank, see Fig. 7, and around pulleys 18 at the outer end of the liquid tank, said pulleys 18 being mounted on the shaft 19. The belts and gripping devices are shown in the normal position of rest as at the beginning of a cycle in Figs. 7 and 1, where it will be observed that the gripping portions 15 are separated from the belts as the latter are flexed around the adjacent pulleys 16, thus affording a space between the gripping portions 15 and the belts into which the forward edge of the print or sheet passes as it is fed by belts 10 onto the conveyor belts.

By the time a print reaches the position just described between the gripping portions 15 and the conveyor belts, the latter start to travel forwardly at the same speed as the print after having been released by the movement of the print or sheet, and thereupon the gripping devices assume the position illustrated in Fig. 2 and carry the print along until it reaches the outer end of the tank, where it is released as the belts travel around the pulleys 18 and the gripping portions

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are separated from the adjacent surface of the belt.

The prints are carried through the liquid and fixing tank by two or more conveyor belts 11 which are spaced from each other, the sheet being supported between the belts by the tracks or vertical walls 21 mounted on the bottom of the tank, and when a print is released from the conveyor belts, it floats upwardly through the liquid to the surface thereof or to a point in contact with the print immediately thereabove, and this operation is repeated whenever a print is conducted by the feeding mechanism from the developer tank into the fixing tank, no attention on the part of the operator being required other than to remove a stack of prints from the fixing tank when a sufficient number have accumulated after a period of time. The conveyor belts are normally idle with the gripping devices in the position illustrated in Figs. 1 and 7, there being two gripping devices spaced from each other at opposite points of each belt, and the feeding belts are retained in idle position after completion of a cycle by stop devices, the construction and operation of which will now be described in detail.

The stop devices comprise a pair of stop plates 22, see Fig. 4, pivotally mounted at 23 on the cross-bar 24, supported at its ends on side walls 20 of a supporting frame mounted in the tank 1, and each stop plate 22 includes bifurcated portions 25 that straddle a belt 11 in the manner shown in Fig. 3 in front of the stop portions 16 of the gripping devices on the belt, so that when the stop plates 22 are in their lowered positions, as shown in Fig. 3, the bifurcated portions 25 lie in the path of the stop portions 16 and prevent movement of the belts. At the predetermined point in the movement of the print into the fixing tank, the stop plates 22 are lifted to the position shown in Fig. 4 to release the belts, and to effect this, each stop plate includes an upstanding arm 26 that is pivotally connected by an arm 27, while 28 indicates a link connecting the outer arm 26 to a plunger 29 of a solenoid 30. 31 designates lugs carried by the upper end of the stop plates 22 and adapted to engage the upper edge of the cross-bar 24 and limit downward movement of the stop plates.

The solenoid 30 is controlled by a micro-switch of conventional construction indicated at 32. The solenoid 30 is supported on a bracket 33 mounted upon the frame 34 of the machine and the micro-switch 32 is mounted on a plate 35 that is pivotally supported on a plate 37, which is attached to the frame of the machine, the position of the micro-switch being adjustable by means of the adjusting screw 36 mounted on the fixed plate 37 and adjustably connected to an ear 38 on the pivoted switch supporting plate 35 which is pivoted to the plate 37 at 39 whereby the micro-switch can be set to exactly the proper position for actuating the stop devices at the critical instant when the print or sheet reaches the position between the gripping devices and the belts.

40 and 41 designate conductors leading to the solenoid and micro-switch respectively, while 42 designates a conductor leading from the solenoid to the switch, and 43 designates the movable arm of the micro-switch 32, that is actuated to close the circuit and operate the solenoid. The micro-switch and arm 43 are delicate, so as to be controlled by a paper print, and to effect this, the switch arm 43 is engaged and operated by a rock arm 44, see Figs. 3, 4 and 8, mounted on a block 45 fixed to a rock shaft 46 which is mounted at

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its ends in bearings carried by the walls 20, and carries a control member or rod 47 that extends downwardly between adjacent feeding belts and terminates in the aforementioned shoe 12, see Figs. 1 and 2, which normally occupies a lowered position as illustrated in Fig. 1 in the path of the print or sheet as it is fed downwardly into the fixing tank, the shoe 12 and control member being elevated by the sheet and assuming the position illustrated in Fig. 2 as the print is fed thereunder and onto the conveyor belts.

The lower feeding belts 10 extend to the bottom of the fixing tank, as shown in Figs. 1 and 5, whereas the upper feeding belts terminate at a point slightly under the top lap of the conveyor belts 11, and 48 designate deflecting guide walls adjacent to and between the belts for guiding the paper under and around the lower ends of the upper belts 10 and thence onto the conveyor belts 11, see Fig. 2, while 49 designate belt-engaging abutments secured to a cross-support 50 secured to the side plates 20, the abutments 49 being located for engagement under the central portions of the meeting laps of the belts 10 to effect stretching of the belts at this point and consequent tight engagement with the sheet or print as it passes therethrough, so as to hold the wet paper web or sheet sufficiently taut so that its forward edge will engage and lift the shoe 12 of the control member, to effect the necessary operation of the parts already described as the sheet travels from the feeding mechanism onto the conveyor belts.

Between the feeding belts 10 are arranged spaced vertical walls 51 also fastened to the cross-support 50 and to which the guide walls 48 are fastened, and which support the portions of the print beyond the feeding belts, while 56 designates retaining belts acting to hold the print down against said walls 51, see Fig. 3.

The upper feeding belts 10 are mounted on pulleys carried by the shafts 52 and 53 respectively, while the lower feeding belts are mounted on pulleys carried by shafts 54 and 55 respectively, the entire assembly of feeding belts, pulleys and shafts 52, 53, 54, 55 and 17, and the stop devices, control member and rock shaft 46 being supported on the aforementioned side plates 20 supported within the tank and slotted at 57, see Figs. 2 and 6, to engage a shaft 58 on which is mounted a feed roller 59 engaging the roller 60 mounted on shaft 61, the print being fed by rollers 59 and 60 from the aforementioned bridge 9, see Fig. 5, to the feeding mechanism which carries the print downwardly into the fixing tank.

The feeding belts 8 in the developer tank travel around pulleys 62 on shafts 63, 64 and 65 respectively, and the several pulley shafts are driven from the motor 66, see Figs. 5 and 7, which operates pinion 67 on a shaft which drives shaft 68, from which the shafts 64 and 63 are driven. To operate the aforementioned feeding and conveyor belts, the pinion 67 engages and drives pinion 69 which engages gear 70, while the latter engages pinion 71 on shaft 59, and pinion 71 engages and drives pinion 72, geared to pinion 73 on shaft 54, see Fig. 5, pinion 73 in turn engaging gear 74 on shaft 52, thus driving the shafts 52 and 54. Pinion 72 also drives an idler pinion 75 which engages idler gear 76, the latter engaging idler pinion 77 that engages pinion 78 which drives pinion 79 on shaft 55, on which pulleys for the lower feeding belts 10 are mounted. Pinion 73 engages an idler gear 80 which in turn

drives the gear 81 mounted on the shaft 17 that carries the pulleys 16 around which the conveyor belts 11 travel.

Since the conveyor belts travel only intermittently when a print is fed to the fixing tank, whereas the shaft 17 on which the pulleys 16 are mounted is traveling continuously, it is necessary to provide means for permitting the pulleys to ride freely on the shaft while the conveyor belts are held by the stop devices, and to engage the pulleys with the shaft 17 for moving the pulleys when the conveyor belts are released, and to accomplish this, the pulleys 16 are freely rotatable on shaft 17 and engage against collars 82 fixed on the shaft, see Fig. 4, the pulleys 16 being held frictionally against said collars by means of friction collars or clutch elements 83 actuated by springs 84 located between the friction clutch elements 83 and collars 85 fixed on the shaft. With this construction, when the conveyor belts are held by the stop devices 22, as shown in Fig. 3, the pulleys 16 remain stationary on the shaft 17 which slips within the pulleys, and when the conveyor belts are released, the pressure of the friction clutches 83 acting under the springs 84 is sufficient to cause the pulleys 16 to rotate with the shaft 17 and to move the conveyor belts through one cycle, or half the total length of the conveyor belt, until the stop portions of the opposite gripping device on each belt is engaged by the stop devices, it being understood that the stop plates are released and drop back into locking position after a print or sheet has passed beyond the shoe 12, permitting the control member to resume its normal position and release the switch arm to open the solenoid circuit. 86 designate vertical arms or uprights attached to the cross-support 24, acting to prevent prints, as they float upwardly in the liquid, from moving back over the stop plates and feeding belts.

With this construction, it is possible to process prints at a very fast rate as they come from a photocopy machine for instance, and to carry prints continuously and automatically from a developer tank to a fixing tank without attention on the part of the operator, the prints being fed successively into the liquid of the fixing tank in a horizontal plane and released at a point substantially below the level of the liquid, from which position each print floats upwardly until it strikes the print above, and when the body of liquid above the conveyor belts is substantially filled with prints, the operator can remove them for washing. This necessitates only occasional effort on the part of the operator and eliminates the necessity for a hand operation in feeding prints into the fixing tank or of manipulating the prints while in the fixing tank by paddling or otherwise to insure proper immersing, since the mechanism effects complete and thorough contact of every portion of a print with the fixing liquid, due to the fact that the print enters below the surface of the body of fixing liquid and when released, floats slowly upwardly toward the surface of the liquid.

While the invention has been described in connection with a preferred embodiment, it is not restricted to the details herein disclosed, and this application is intended to cover such modifications or changes as may come within the scope of the following claims.

We claim:

1. The combination with intermittently moving conveyor belts and driving means for the

conveyor belts, of sheet-gripping devices carried by the conveyor belts, each gripping device being fixed at one end to a belt and including a gripping portion which lies parallel to and against the belt when the adjacent portion of the belt is straight and spaced from the belt when said adjacent portion is curved away from the gripping portion, and feeding means comprising opposed belts coacting to conduct a sheet positioned therebetween to a position with its forward edge between the conveyor belts and said gripping portions when the belts are stationary, the gripping portions being automatically moved into contact with the belts to grip the sheet after the belts start to move and away from the belts at a predetermined point to release the sheet, said sheet-gripping and releasing operations being effected as the belts assume a curved position upon traveling around pulleys to thereby grip and release the sheets successively.

2. The combination with intermittently moving conveyor belts and driving means for the conveyor belts, of sheet-gripping devices carried by the conveyor belts, each gripping device being fixed at one end to a belt and including a gripping portion which lies parallel to and against the belt when the adjacent portion of the belt is straight and spaced from the belt when said adjacent portion is curved away from the gripping portion, feeding means comprising opposed belts coacting to conduct a sheet positioned therebetween to a position with its forward edge between the conveyor belts and said gripping portions when the belts are stationary, and instrumentalities controlled by the fed sheet and acting to release and permit movement of the conveyor belts and thus effect said relative movement between the belts and said gripping portions, the gripping devices being automatically moved in relation to the belts at a predetermined point to release the sheet.

3. The combination with intermittently moving conveyor belts and driving means for the conveyor belts, of sheet-gripping devices carried by the conveyor belts, each gripping device being fixed at one end to a belt and including a gripping portion movable relatively toward and from the belt, feeding means for conducting a sheet to a position with its forward edge between the conveyor belts and said gripping portions, stop devices engaging the gripping devices on the belts and acting to hold the belts against movement, and instrumentalities controlled by the fed sheet acting to move the stop devices to release the belts and to thereby permit said relative movement between the conveyor belts and gripping portions to grip the sheet, the gripping portions being automatically moved in relation to the belts to release the sheet at a predetermined point.

4. The combination with intermittently moving conveyor belts and driving means for the conveyor belts, of sheet-gripping devices carried by the conveyor belts, each gripping device being fixed at one end to a belt and including a gripping portion movable relatively toward and from the belt, feeding means for conducting a sheet to a position with its forward edge between the conveyor belts and said gripping portions, friction clutches between the driving means and the conveyor belts, stop devices engageable with the sheet-gripping devices, and instrumentalities controlled by the fed sheet acting to move said stop devices to release the conveyor belts and to thereby permit said relative movement between

the conveyor belts and said gripping portions to grip the sheet, the gripping portions being automatically moved in relation to the belts at a predetermined point to release the sheet.

5. The combination with intermittently moving conveyor belts, inner and outer pulleys around which said belts travel, and driving means for said pulleys, of sheet-gripping devices carried by the belts, each gripping device being fastened at one end to its belt and having a gripping portion free from the belt and separable therefrom when the belt travels around a pulley, stop devices engaging the gripping devices and acting to hold the belts in position with gripping devices at the inner pulleys and their gripping portions spaced from the belts to permit positioning the forward edge of a sheet between the belts and said gripping portions, feeding means for conducting a sheet to a position with its forward edge between the belts and said gripping portions, and instrumentalities controlled by the fed sheet and acting to move said stop devices to release the conveyor belts for movement, the sheet being gripped and carried by the conveyor belts and automatically released when the gripping devices reach the outer pulleys and the adjacent belt portions travel around said pulleys and move away from said gripping portions.

6. The combination with intermittently moving conveyor belts, inner and outer pulleys around which said belts travel, and driving means for said pulleys, of sheet-gripping devices carried by the belts, each gripping device being fastened at one end to its belt and having a gripping portion free from the belt and separable therefrom when the belt travels around a pulley, friction clutches between said driving means and said pulleys, stop devices engaging the gripping devices and acting to hold the belts with gripping devices at the inner pulleys and their gripping portions spaced from the belts to permit positioning the forward edge of a sheet between the belts and said gripping portions, feeding means for conducting a sheet to a position with its forward edge between the belts and said gripping portions, and instrumentalities controlled by the fed sheet and acting to move said stop devices to release the conveyor belts for movement, the sheet being gripped and carried by the conveyor belts and automatically released when the gripping devices reach the outer pulleys and the adjacent belt portions travel around said pulleys and move away from the gripping portions.

7. The combination with conveyor belts, inner and outer pulleys around which said belts travel, driving means for said pulleys, and friction clutches between said driving means and pulleys, of sheet-gripping devices carried by the conveyor belts, each gripping device including a plate fastened at one end to the belt, stop portions extending laterally beyond the edges of the belt, and a gripping portion overlying and separable from the belt when the latter is flexed away from the gripping portion, stop devices engaging said stop portions and holding the belts in position with gripping devices at the inner pulleys and their gripping portions separated from the belts to permit positioning the forward edge of a sheet between the belts and said gripping portions, feeding means for conducting a sheet to a position with its forward edge between the belts and said gripping portions, and instrumentalities controlled by the fed sheet and acting to move said stop devices and release the belts to permit their movement to grip and convey the

sheet, the sheet being automatically released when the gripping devices reach the outer pulleys and the adjacent portions of the belts travel around said outer pulleys and move away from said gripping portions and the gripping devices being engaged by said stop devices to stop movement of the belts after release of the sheet.

8. The combination with a photographic fixing tank and conveyor belts located beneath the level of liquid in the tank and intermittently operating to conduct a sheet horizontally in said tank below the liquid level therein, of feeding means comprising opposed belts extending above the level of liquid in the tank and coacting to conduct a sheet positioned therebetween downwardly into said tank and onto said conveyor belts, each conveyor belt traveling around inner and outer pulleys and having a pair of gripping devices attached thereto at opposite points on the belt, drive means for the pulleys, friction clutches between said drive means and the pulleys, each gripping device being fastened at one end to the belt and having stop portions extending laterally beyond the edges of the belt and a gripping portion overlying and separable from the belt when the latter is flexed around a pulley, stop devices engaging said stop portions and holding the belts in position with gripping devices at the inner pulleys and their gripping portions separated from the belts to permit positioning the forward edge of a sheet between the belts and said gripping portions, and instrumentalities controlled by a fed sheet acting to move said stop devices and release the conveyor belts to grip and carry the sheet, the sheet being automatically released when the gripping portions reach the outer pulleys and the stop devices being automatically re-engaged with said stop portions.

9. The combination with a photographic fixing tank and conveyor belts located beneath the level of liquid in the tank and intermittently operating to conduct a sheet horizontally in said tank below the liquid level therein, of feeding means comprising opposed belts extending above the level of liquid in the tank and coacting to conduct a sheet positioned therebetween downwardly into said tank and onto said conveyor belts, each conveyor belt traveling around inner and outer pulleys and having a pair of gripping devices attached thereto at opposite points on the belt, driving means for the pulleys, friction clutches between said drive means and the pulleys, each gripping device being fastened at one end to the belt and having stop portions extending laterally beyond the edges of the belt and a gripping portion overlying and separable from the belt when the latter is flexed around a pulley, stop devices engaging said stop portions and holding the belts in position with gripping devices at the inner pulleys and their gripping portions separated from the belts to permit positioning the forward edge of a sheet between the belts and said gripping portions, a solenoid plunger connected to said stop devices, a micro-switch controlling said solenoid, a rock arm engaging said micro-switch, a rock shaft on which said arm is mounted, and a control member mounted on said rock shaft and including a shoe lying in the path of a sheet as it is fed to the conveyor belts.

10. The combination with a photographic fixing tank and conveyor belts located beneath the level of liquid in the tank and intermittently operating to conduct a sheet horizontally in said tank below the liquid level therein, of feeding

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means comprising opposed belts extending above the level of liquid in the tank and coacting to conduct a sheet positioned therebetween downwardly into said tank and onto said conveyor belts, inner and outer pulleys for the conveyor belts, drive means for the pulleys, gripping devices on the conveyor belts including gripping portions separable from the belts when the belts travel around the pulleys and flex away from said gripping portions, movable stop devices engageable with the belts, a solenoid connected to said stop devices, a micro-switch controlling said solenoid, a rock arm engaging said micro-switch, a rock shaft on which said arm is mounted, and a control member mounted on the rock shaft and including a shoe lying in the path of a sheet as it is fed to the conveyor belts.

11. The combination with a photographic fixing tank and conveyor belts located beneath the level of liquid in the tank and intermittently operating to conduct a sheet horizontally in said tank below the liquid level therein, of feeding means comprising opposed belts extending above the level of liquid in the tank and coacting to conduct a sheet positioned therebetween downwardly into said tank and onto said conveyor belts, each of said conveyor belts traveling around inner and outer pulleys and having a pair of gripping devices attached thereto at opposite points of the belt, drive means for said pulleys, friction clutches between the drive means and pulleys, each gripping device being fastened at one end to its belt and having stop portions extending laterally beyond the edges of the belt and a gripping portion overlying and separable from the belt when the latter is flexed around a pulley, stop devices comprising pivotally mounted plates having bifurcated portions which straddle the belt and engage said stop portions, a solenoid plunger connected to said stop devices, a micro-switch controlling said solenoid, a rock arm engaging said micro-switch, a rock shaft on which said rock arm is mounted, and a control member mounted on said rock shaft and including a shoe lying in the path of a sheet as it is fed to the conveyor belts.

12. The combination with a photographic fixing tank and conveyor belts located beneath the

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level of liquid in the tank and intermittently operating to conduct a sheet horizontally in said tank below the liquid level therein, of feeding means comprising opposed belts extending above the level of liquid in the tank and coacting to conduct a sheet positioned therebetween downwardly into said tank and onto said conveyor belts, inner and outer pulleys for the conveyor belts and drive means for said pulleys, friction clutches between said drive means and pulleys, sheet-gripping devices on the conveyor belts including gripping portions movable relatively away from the belts, stop devices engageable with the belts, a solenoid connected to said stop devices, a micro-switch controlling said solenoid, and a control member operatively connected to the micro-switch and including a shoe lying in the path of a sheet as it is fed to the conveyor belts acting to release the belts to carry the sheet through the tank, said gripping portions being automatically engaged with and disengaged from the sheet at the beginning and end of each cycle as they leave the inner pulleys and reach the outer pulleys respectively.

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