

Aug. 19, 1947.

E. H. GROGAN

2,426,092

AUTOMATIC PHOTO PRINTER

Filed Feb. 26, 1945

4 Sheets-Sheet 1

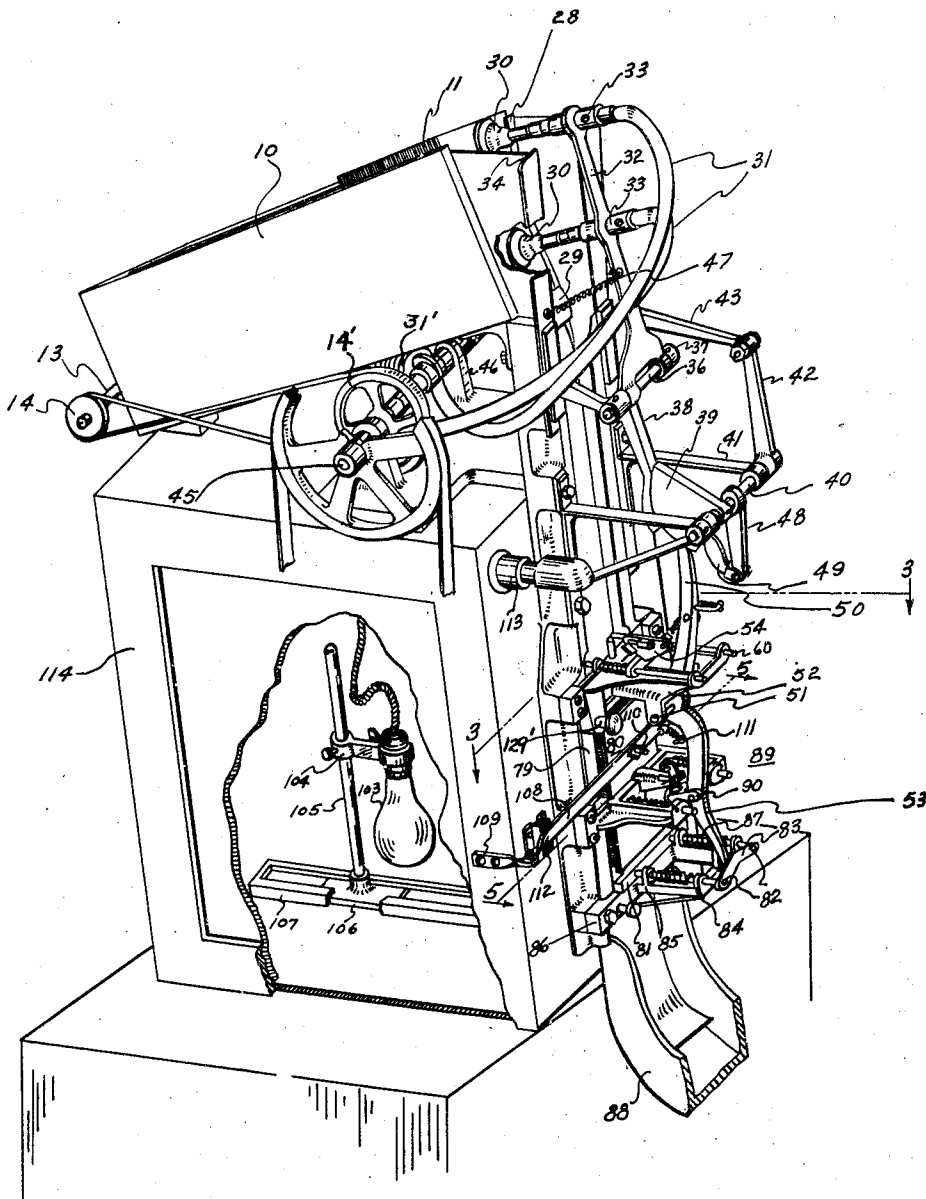


FIG. 1

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4 Sheets-Sheet 2

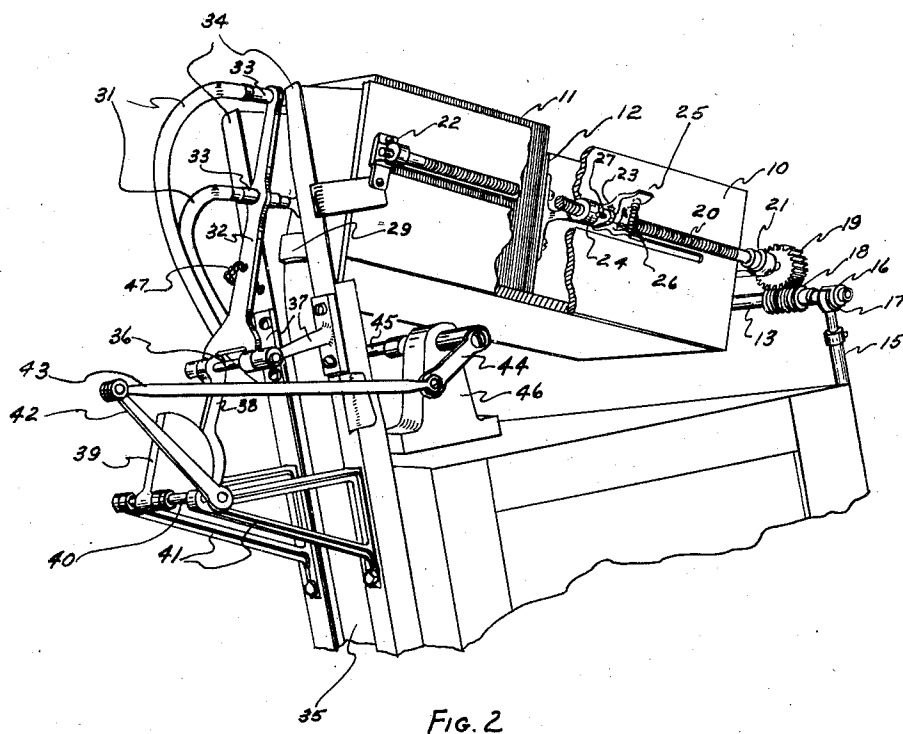


FIG. 2

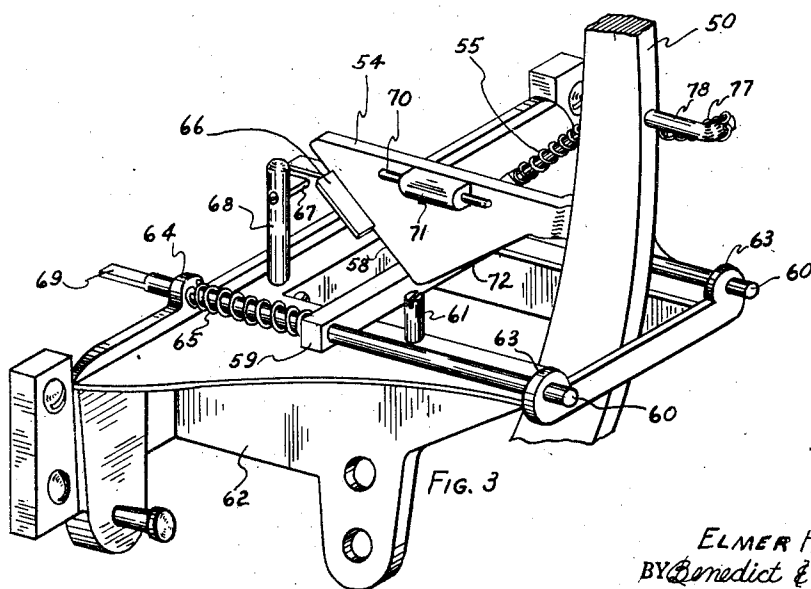


FIG. 3

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4 Sheets-Sheet 3

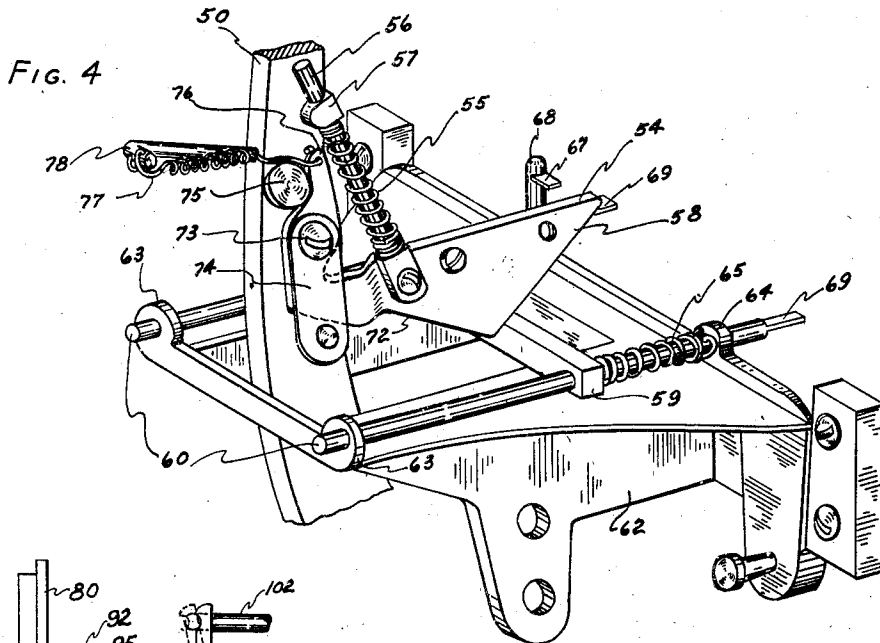
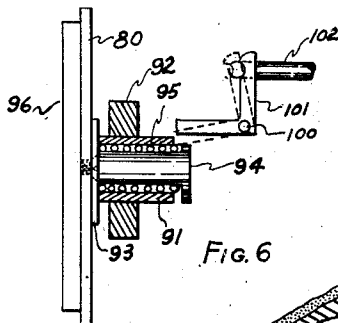
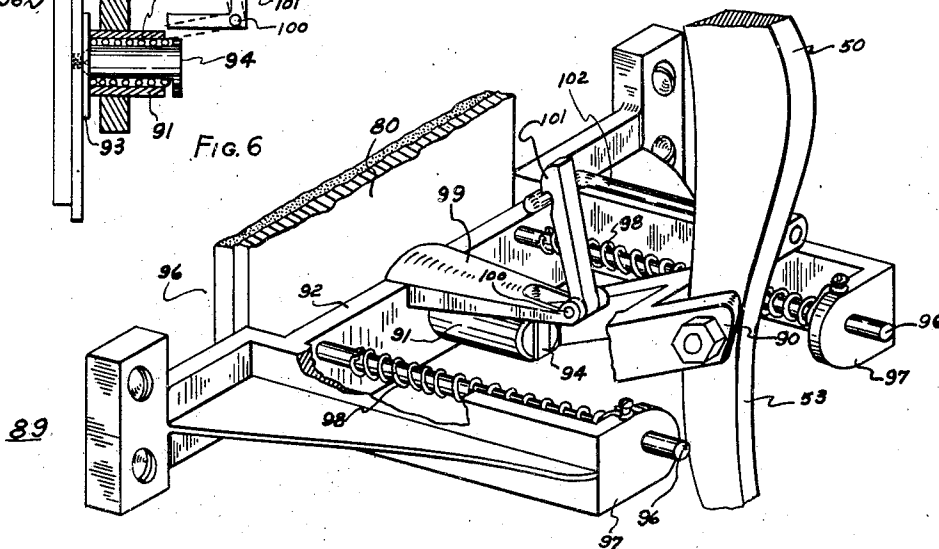


FIG. 5

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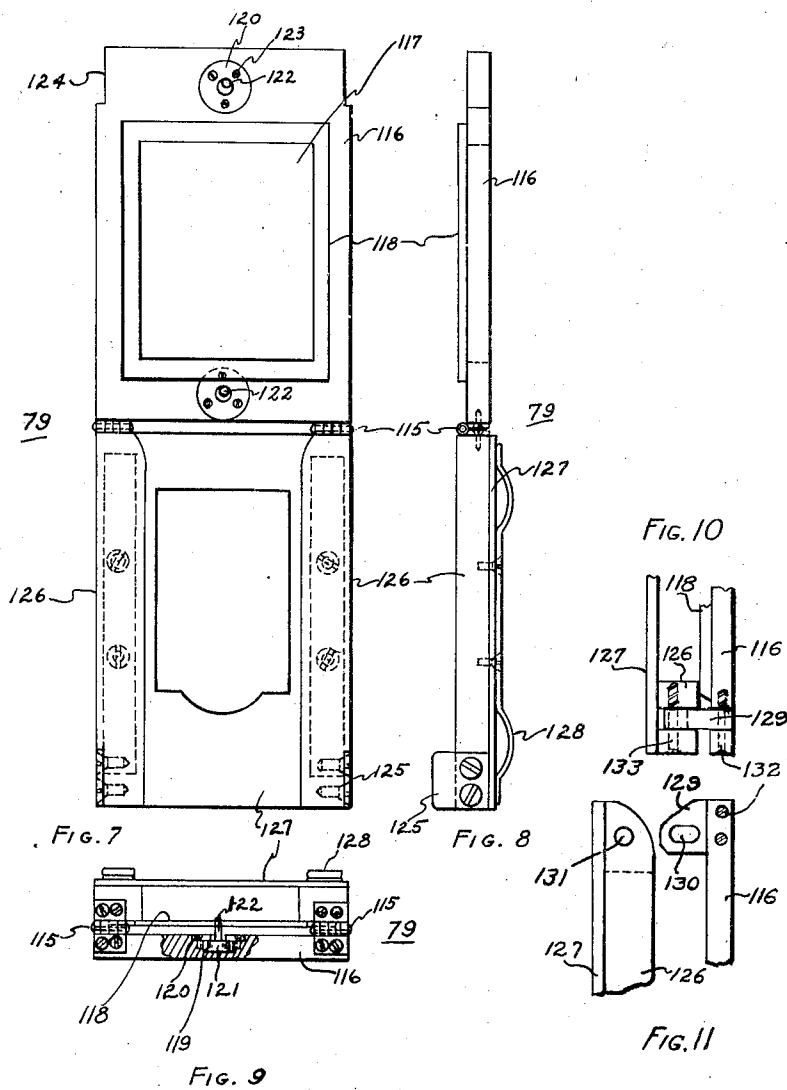
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,426,092

AUTOMATIC PHOTO PRINTER

Elmer H. Grogan, Danville, Ill.

Application February 26, 1945, Serial No. 579,719

1 Claim. (Cl. 95—73)

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This invention relates to an apparatus for printing photographs in large quantities from a single negative, group of negatives, or plate.

More especially, the machine is concerned with the steps of feeding and exposing a succession of sensitized cards which are then developed in a separate operation by conventional means. The machine is automatic and requires a minimum of attention. It is a feature of the improvements that the apparatus can be variously adjusted to effect the proper exposure of the sensitized card and to synchronize the various operations which must be performed in the course of the printing step, including feeding the card, exposing it, and releasing it from the machine. Numerous machines have been used for this purpose, but they are subject to disadvantages which have been eliminated or minimized by my present improved machine.

It is an object of my invention to provide a bulk supply of sensitized cards at a point from which these cards may be automatically picked up and supplied to an exposure or printing zone. It is a further object to synchronize the card pick-up with a timed release step whereby one card may be dropped into printing position an instant after the card immediately preceding it has been exposed and released from the printing zone, and to adjust these operations so that one follows the other in its proper timed sequence so that there is only one card at each position at any one time and yet each card passing through the printing zone is properly exposed.

The invention is illustrated and may be understood by reference to the accompanying drawings. Fig. 1 is a perspective view partly in section of the machine, the view being from the left end and front thereof.

Fig. 2 is a view in perspective partly in section of a part of the machine comprising the card magazine and pickup mechanism, and the parts by which these various elements are driven. It is taken from the right and front of the machine, i. e., the side opposite that shown in Fig. 1.

Fig. 3 is a detail in perspective of the stop and release mechanism by which the unexposed card which has been picked up from the bulk supply and dropped into the feed chute is dropped at an exactly timed instant into the printing zone. The viewing position is the same as Fig. 1.

Fig. 4 is a detail in perspective of the mechanism illustrated in Fig. 3 from the opposite side, i. e., the same angle as Fig. 2. It illustrates a safety feature which prevents breakage or other damage in the event the machine becomes clogged or out of adjustment.

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Fig. 5 is a detail in perspective of the mechanism for holding the blank card in position in the printing zone during the printing step and for releasing the card after it is exposed.

Fig. 6 is a detail of the stop and trigger mechanism by which the printing platten is held in position and released.

Figs. 7, 8, and 9 are views of the plate or negative holder. Fig. 7 is a view of the inside of the holder opened out. Fig. 8 is a view of the open holder from the side. Fig. 9 is an end view of the closed holder. Fig. 10 is an end view of a modified hinge and Fig. 11 is a side view of the parts.

Referring to Fig. 1, a container or magazine for holding a bulk supply of cards 11 is indicated at 10. It should be noted that this box is placed at an angle out of the perpendicular so that the cards 11 will tend to remain in a compact mass by their own weight. The cards are held in position and forced toward the front of the magazine by a follower 12. (See Fig. 2.) The follower is moved by means of an automatic mechanism illustrated in Fig. 2. This mechanism comprises a shaft 13 driven by pulley 14, which in turn may be driven by a belt passing around a pulley 14' on the main power shaft. Two pulleys may be provided, e. g., at 14, the second being of different diameter to change the speed of the follower to compensate for single or double weight sensitized cards. The shaft 13 may be supported on the main body of the frame by means of an adjustable support 15. The corresponding support at the opposite end of shaft 13 and brackets for supporting the magazine are not illustrated in interests of simplification. Shaft 13 is journaled in bearing 16, which is supported by bracket 17. When pulley 14 is driven, shaft 13 turns worm 18, driving pinion 19, thereby turning threaded shaft 20 which is journaled in brackets 21 and 22, which in turn are fastened to the frame of bulk supply box 10.

Supported on shaft 20 is a threaded member 23 which is attached to a bracket 24 which in turn passes through a slot in the side of box 10 and is attached to follower 12. Member 23 comprises threaded jaws, not illustrated, at the respective ends of wings 25 and 26 which are pivoted at 27. The wings are held apart by a spring under compression so that the threads on the jaws are kept in mesh with the threads on shaft 20. The jaws can be released by compressing wings 25 and 26 and the follower 12 may be shifted from one position to another along shaft 20. This permits the operator to refill the box by merely releasing the jaws of member 23 and sliding the entire assem-

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bly to the back of the box and then placing the cards in position in front of the follower. The operator can adjust the position of the follower to its proper place by moving it along shaft 20 until the bulk supply of cards has been pushed firmly against wings 28 and 29 at the forward end of the magazine and thus properly located to be fed in a manner hereinafter described. A wing corresponding to 28 is located on the other side of the box. These project just enough to prevent the cards from falling out of the box, especially when the pickup mechanism is operating.

The entire magazine is tilted backward so that the cards will be in proper position to be picked up by the mechanism about to be described. There is an additional advantage that the cards tend to stay packed even when the follower is released which is important with sensitized cards. When the foremost card is picked up by means of the suction pickup apparatus, it is bent slightly at the sides and bottom as it passes these projections 28 and 29 so that a positive pulling action must be exerted to remove it. Thus it is assured that only one card at a time can possibly be fed to the feeding chute. This is a marked advantage over other feeding devices using mechanical feeders. If anything happens to the pickup mechanism, no cards are fed. A condition can never exist in which more than one card is fed at one time.

The cards are picked up by means of suction cups 30, which are attached to vacuum lines 31. The suction cups are made of rubber or other resilient materials. The vacuum lines are rigidly secured in reciprocating arm 32. The position of the suction cups may be adjusted by sliding the lines forward or backward in the journal 33 passing through bracket 32. After the position has been properly adjusted, they may be held by means of set screws or other suitable means.

During operation, the suction cups 30 press against the foremost card in the box due to the forward motion of arm 32. At this moment, a valve 31' to which lines 31 are connected in a manner not illustrated, opens thereby reducing the pressure in vacuum lines 31. The source of vacuum is not shown. Vacuum sufficient to hold the foremost card firmly and to pull it out of the box as arm 32 moves away from box 10, is supplied. When the arm has traveled far enough to pull the card past wings 28 and lip 29, the vacuum valve closes and the pressure in line 31 is restored to atmospheric through a relief valve not shown. A cam on shaft 45 operates the valve 31'.

The card no longer being held by vacuum cups 30 is released and drops down the chute. In order to prevent the card from falling out of the chute, guide wings 34 are placed parallel to the feeding chute 35, which likewise is equipped with wings to guide the card during its downward fall into proper position for later operations to be performed upon it. Also, to assist in this operation and to be certain that the card falls into its proper position, the machine is preferably tilted slightly to one side or otherwise by setting the mechanism at an angle. As illustrated in the drawing, the machine is tilted to the left so that the card tends to slide along the left hand side of the chute. The chute 35 is otherwise substantially vertical except that it leans to the left. If there is any slope, it should be such that the card will rest along the back of chute 35 as it falls, for example by raising the

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front of the machine slightly or building it with a slight pitch toward the rear.

Reciprocating arm 32 is keyed to a shaft 36 which is journaled in a bracket 37 attached to the frame of the machine. Also keyed to shaft 36 is arm 38 which is shaped to conform to a cam 39. The cam in turn is keyed to a shaft 40 which is supported pivotally in brackets 41 attached to the frame of the machine. Shaft 40 is rocked back and forth by means of rocker arm 42 rigidly attached to shaft 40 and pivotally attached to link 43, which in turn is pivoted to bell crank 44 which is driven from the main power shaft 45, and as illustrated, is journaled in bracket 46 attached to the frame of the machine. When the bell crank 44 is revolving, it imparts a reciprocating motion through link 43 and arm 42 to cam 39, which in turn imparts a rocking motion to arm 38 and arm 32. Thus with each revolution of bell crank 44, the suction cups 30 move forward to pick up a card and then move backward into position to drop the card down the chute 35. It is in this manner that the cards are fed one at a time down the chute.

The pitch of the threads on shaft 20 and member 23 are such that the follower 12 is moved forward a distance equivalent to the thickness of one card during each revolution of shaft 45. The size of pulley 14 is chosen depending upon the thickness of the card used, or as before mentioned, a second pulley of different size may be placed on the shaft so that a quick change can be made merely by shifting the belt. This permits a change in the speed at which shaft 20 is rotated, and consequently the speed at which follower 12 moves along the supply box.

Spring 47 is attached to the frame and to arm 32 in order to pull it forward when the cam 39 is in position for the cards to be picked up.

The rocking motion imparted to shaft 40 likewise imparts a rocking motion to arm 48, which is keyed to shaft 40 and to link 49, which is pivoted to arm 48 and to lever 50 (not illustrated, but the pivot is behind cam 39 in Fig. 1). Levers 50 and 53 are parts of one continuous rocker arm which actuates the entire mechanism below the feeder. The arm is pivoted at point 51 to a bracket 52 attached to the frame of the machine. The part of the arm above the pivot is lever 50, and the part below the pivot is lever 53. The entire arm is rocked by moving shaft 40.

Lever 50 is given an arcuate shape, the extent of which is governed by its length so as to limit and determine the distance through which it travels. Since the lever operates all of the various parts of the printing mechanism except the feeding portion, the magnitude of the movement at any one point must be carefully determined in order that the proper effect may be obtained. As will appear below, the magnitude of motion of certain parts of the machine must be greater than others in order to synchronize the various actions.

Actuated by lever 50 is an assembly for stopping and dropping the cards fed from box 10, and is best illustrated in Figs. 3 and 4 which are taken along line 3—3.

Referring to Fig. 4, a member 54 roughly triangular in shape is pivotally attached to lever 50 so that it will move forward and backward with the rocking motion of the lever 50. For purposes of simplifying the drawing and reducing the numbers appearing thereon, the only part of this assembly which is numbered in Fig. 1 is the tri-

angular member 54. This will serve to orient the reader.

The triangular member 54 receives a downward thrust from spring 55 which is maintained under compression on guide 56 which slides freely through a hole in bracket 57 attached to lever 59. The other end of guide 56 is rigidly attached to triangular member 54. The action of the spring tends to thrust member 54 downward so that at one part of the stroke of lever 59, the forward face 52 of member 54 is firmly against the bar 59 pushing it forward toward the machine; and at another part of the stroke, face 72 of member 54 rests against the other side of bar 59 pulling it away from the body of the machine. The forward face 53 rests against bar 59 as lever 59 begins its forward movement. Bar 59 can be retracted no further than stop pin 61, which is set in bracket 62, which in turn is attached to the machine. Guide rods 60 attached to bar 59 are slidably associated with guide loops 63 and 64 in bracket 62. Thus, the rods may slide backward and forward by moving bar 59. Springs 65, one end of which rests against bar 59 and the other against guide loop 64, have a shock absorbing effect and tend to limit the extent of movement of the rods. The flattened ends 69 of these rods when they are in the forward position rest against the feed chute 35 (not shown in Figs. 3 and 4). In some instances, a recess is placed in the face of the feed chute 35 in order to more positively block the falling card.

As lever 59 moves forward, the leading face of member 54 rides up and over bar 59 (see Fig. 3). As the forward motion continues, member 66 which forms a lateral extension of face 53 for part of its length rides up and over arm 67 which is adjustably attached to pin 68 mounted on bracket 62. As the forward motion continues, face 53 rides free of bar 59 and the apex of the triangle crosses the bar to a position between it and the frame of the machine. An instant in advance of this, a card has been picked up, dropped down the chute, and rests against the flattened end 69 of guide rods 60. As the forward motion of lever 59 continues, the member 66 passes completely over arm 67 and the compression effect of spring 55 as well as gravity, causes member 54 to drop downward until arrested by adjustable pin 70 as it falls on arm 67. Pin 70 is held in position by means of bracket 71 and its position may be changed by sliding the pin 70 through bracket 71 in one direction or the other. As the arm 59 begins its backward motion, the pin 70 slides off of arm 67 permitting member 54 to drop downward and face 72 rests on the leading edge of bar 59; and because of the thrust of spring 55 against bar 59, the guide rods 60 are pulled sharply away from the chute 35 thus permitting the card to drop on down the chute. The bar comes up against stop 61 and face 72 rides up and over bar 59 until the apex of member 54 passes over the top. Face 53 then pushes the bar forward due to its shape and the downward thrust of spring 55. The mechanism is now in position to catch the next card that falls down the chute.

This mechanism may be adjusted so that the exact time for dropping the card into printing position can be determined and adjusted at will. The extension 66 has a fixed value. However, by making arm 67 with one flat face which can be turned at various angles from the horizontal, it becomes possible to vary the length of time that it takes for the extension 66 to ride over arm 67 by increasing or decreasing the amount of face

exposed to extension 66. Moreover, by moving the rod 70 forward or backward, it becomes possible to adjust the length of time that the member 70 will hold up member 54 by resting on member 67. Between these two adjustments, the exact timing can be accomplished with a greater degree of accuracy.

Referring to Fig. 4, member 54 is pivoted at point 73 to lever 59. One apex of the triangle is extended to form an offset arm which continues at an angle to form a vertical extension 76. A retaining plate 74 is placed over the pivot point and part of extension 76, holding member 54 in operative association with lever 59 as illustrated. A part of the arm 76 extends vertically beyond the pivot point against a stop or pin 75 on lever 59. The upwardly extending portion 76 is urged toward pin 75 by means of spring 77 attached to arm 76 which extends rearward from lever 59 and is bent at an angle and provided with a hole for attaching spring 77. If the mechanism becomes jammed in such a way that the forward motion of member 54 is unduly restricted, the mechanism just described serves as a safety feature. Sufficient force exerted on the forward part of 54 would cause the member 54 to pivot at point 73 thrusting the upper end of 76 forward, thus relieving the strain. Normally, this pivoting is prevented by the tension on spring 77.

Referring again to Fig. 1, when a card stopped by plunger rod 60 is released, it drops down the chute into an opening in the top of the plate holder 79, which is positioned in front of platten 80. As illustrated in Fig. 1, the platten is in the withdrawn position so that the card released by rods 60 drop into the plate holder. The platten is designed to fit into an opening in the plate holder, as will be described hereinafter so as to hold the card firmly against the negative plate or film while it is being exposed. The card is prevented from falling through the plate holder into chute 33 by means of a plunger bar 81, which passes under the platten and the plate holder to bar the outlet of the chute 35. This bar is actuated by a pair of plunger rods 82 which are attached to a plate 83. The outward movement of arm 53 thrusts it against the plate 83 and consequently plunger rods 82 and bar 81 move away from the frame of the machine so as to open the passage way in the feed chute and permit the card to drop through into chute 33. As the arm 53 swings back toward the machine, the bar 81 is urged forward into the passageway by means of contractile springs 87. The plunger rods pass through holes in appropriate bosses 84 and 85 on a casting 86, which is attached to the frame of the machine. This movement is synchronized with the movement of plunger rods 60 so that stop bar 81 is in place blocking the passageway at the time the card is released by the withdrawal of plunger rods 60. The card falls through the top of the plate holder 79 between the platten and the negative plate or film and comes to rest against bar 81. The platten 80 is then thrust forward in a manner which will be apparent from examination of Fig. 5.

The platten assembly is generally indicated at 89 on Fig. 1. A forked stud 90 is attached to lever 53. As the arm 53 moves inward toward the frame of the machine, the ears on the stud 90 are thrust against the end of barrel 91, which passes through casting 92, resting against a plate 93 attached to the back of platten 80 by any convenient means. Attached to the plate 93 is a core 94 which has a T at its outer extremity so

as to retain barrel 91 and serve as a support for spring 95, which normally thrusts barrel 91 away from plate 93 and which acts as a shock absorber when the platten is pushed into place. The thrust of member 90 against the barrel 91 urges it toward the platten and presses the platten 80 into the back opening in plate holder 79. The spring is sufficiently powerful to prevent the barrel moving entirely against the plate 93, unless something interferes with the entry of platten 80 into the plate holder. This is a safety feature intended to prevent damage to the machine in the event more than one card should be in the plate holder at one time, or some other contingency should arise which would result in damage to the machine if no provision were made for some part to yield slightly. On the face of platten 80 is a resilient pad 56 which may be of sponge rubber or the like. Its function is to press the sensitized card firmly against the negative without damaging either.

Guide rods 96 extending through appropriate openings in ears 97 of casting 92 and also passing through casting 92 are attached to the platten. When the platten is thrust into printing position in the back of the plate holder 79, springs 98 are extended. These springs are contractile and are intended to pull platten 80 sharply out of the plate holder when the platten is released, as will be described. These springs are sufficiently powerful to move the platten quickly into its retracted position as soon as the platten is released, this being done as soon as the card has been sufficiently exposed. The sharp movement tends to jar the card loose so that it will not stick in the plate holder. A slight hook may be put on the leading edge of bar 81 to give a slight stripping action to the card. This also tends to overcome or prevent sticking.

In order to release the platten, a bracket 99 is provided. This may be integral with casting 92. Pivoted to the outer end of the bracket at point 100, is trigger 101. As the arm 53 moves inward so that forked member 99 thrusts against the barrel 91 and pushes platten 80 into place, trigger 101 drops into the position indicated by the dotted lines in Fig. 6, thrusting against barrel 91 so as to hold the platten in position. As the arm 53 moves outward away from the machine, a trip arm 102 attached thereto engages trigger 101, pulling it into the position indicated by the solid lines in Fig. 6, so that the retaining end of the trigger no longer holds the platten in position. As soon as the trigger is tripped, springs 98 pull the platten sharply away from the position it has occupied while it is holding the card in printing position. At the same time, arm 53 continues its travel outward and pulls bar 81 from its position blocking the passageway permitting the printed card to drop into chute 83 and thence into an appropriate receptacle.

An appropriate source of light, which may be an electric light bulb 103 is held by an adjustable bracket 104 in the desired position in front of the negative. The bracket may be moved upon a ring stand 105 which is mounted on a base 106 which may be moved in a slide track 107 toward or away from the negative plate. By shifting the light backward or forward, or up and down, it becomes possible to vary the amount of light reaching the negative, and also to vary the amount of light reaching any one part of the negative. In addition, bulbs of varying sizes may be used to vary the exposure.

The machine may be driven from a single

source of power and is illustrated as a belt-driven apparatus in Fig. 1.

In order to effect exposure, a lever 108 may be pivotally mounted on a bracket 109, as indicated in Fig. 1. The lever 108 may contain a member 110 which may be a machine screw and hence may be adjusted. This member is intended to rest against platten 80 and the position of member 110 will determine, to some extent, the length of time of exposure, as will be described. A spring 111 is attached to the frame of the machine and to the end of the lever 108 at the opposite end from the pivot point, so that the arm 108 is always urged against the platten. Thus, as the platten 80 is moved into printing position in the back of plate-holder 79, lever 108 is urged to follow it by spring 111 and eventually causes contact to be made closing the switch 112, thus lighting the bulb 103. The wiring for the switch and the light are not illustrated, as these are within the skill of the art.

By varying the adjustment of member 110, it is possible to vary the length of time in which contact will be made in switch 112, and thus the exposure can be adjusted at this point as well as by moving the bulb and changing its capacity. A safe light 113 may be provided to assist in making adjustments on the machine when the printing is carried on in the dark. This light may also be included in the same circuit as the exposure bulb so that a positive indication is given that the exposure is being conducted in a proper manner.

An important feature of my invention lies in the plate holder which is illustrated in Figs. 7, 8, 9, 10, and 11, and is generally indicated at 79. This plate holder is designed to slide into the machine on an appropriate track in the casting forming the frame. To introduce it, the chute 83 illustrated in Fig. 1 is removed. The machine is set so that arm 53 has pulled bar 81 away from the card passageway and so that platten 80 is in the retracted position. The hinged plate holder with the plate or film held firmly in position is closed, as illustrated in Fig. 9, and is thrust upward in the trackway until it is in the proper position before an opening in the box 114 and with the opening in the back directly opposite the platten. It is retained in this position by set screws 129 which press it against springs 128 and thrust the plate holder against the frame of the machine to prevent its being moved. When in this position, the part of the plate holder against which the film is held is substantially flush with the card passageway so that a card falling down the passageway will drop behind the film in the opening provided in the top of the plate holder.

The plate holder is inserted with the hinged end uppermost and with frame 116 on the inside position fitting substantially flush with the card passageway. Opening 117 may be overlaid with a mask which provides a margin of proper shape and size on the printed card. The mask, now shown, fits over pins 122, the positions of which are adjusted until the mask is accurately placed. A transparent plate 118 is placed over the mask and the negative is placed on the plate. The plate holder is then closed and the members 125 rest upon the edges of the film and the glass plate holding them firmly in place. The position of the negative can be adjusted by holding the two halves of the plate holder slightly apart and moving the film as desired by reaching through the semicircular aperture in plate 127. When

the film is in proper position, the halves of the holder are clamped tightly together and will then hold the negative immovably in its proper position.

Ears 125 correspond with the notch or recess 124 and are preferably slightly sprung so that the two halves of the plate holder are held firmly together and in their proper relationship to each other. This avoids the necessity of special clamps.

It will be noted that frame 116 is slightly thinner than members 126 and is so hinged as to permit an even pressure on the glass plate and film when the two halves are closed. A modification of this permitting the use of glass of varying thickness is shown in Figs. 10 and 11. A hinge member 129 is held firmly in position in a notch in member 116 by means of screws 132. The part of the hinge to be associated with member 126 contains an elongated hole 130. This member fits into a notch in the end of member 126, which has a hole 131 extending through it and threaded on its inside portion to receive a machine screw 133. The machine screw serves as a bearing or pivot for member 129 so that member 126 may be pivoted. When the transparent plate 118 is placed between members 116 and 126, the halves closed, the inside surface of member 126 rests upon the surface of plate 118 pressing evenly over its length regardless of the thickness, since pivot pin 133 can slide back and forth for a small distance in hole 130. This prevents breakage of the plates due to minor variations in thickness.

Members 126 have a plate attached to the back of each so that it forms a frame. The plate contains an aperture having a semi-circular recess at one end, the main opening being to permit entrance of the platten and the recess being for the purpose of film adjustment above described. The two bars are of sufficient thickness to form a passageway for the cards falling down the chute 35. They should be of sufficient thickness that the card will not be impeded by any part of the plate holder. It is to these bars 126 that ears 125, flush with the sides, are attached. In the modification shown in Figs. 10 and 11, the hinged member is flush with the sides and ends so as to avoid any possible obstruction to the falling cards.

The upper end of members 126, that is the top end, is curved slightly so as to guide the falling card into the passageway between the film and the plate 127. The opening in 127 is slightly smaller than the card so that it cannot fall out or stick, and is sufficiently large to accommodate the entrance of the platten 80. A spring 128 is attached longitudinally to each of these bars and is bent as illustrated in Fig. 8. The set screws 129' thrust against the bowed part of these springs when the plate holder is placed in position in the machine.

An important feature of the plate holder is the device for holding the mask in position. This consists of a pin 122 attached to a head 121, the member being of a rivet-like shape. The head fits into a recess 119 in plate 116. The diameter of the recess is larger than head 121. A plate 120 fits over and closes the recess, being flush with the inside of member 116. It contains an opening substantially larger than the pin 122 so as to permit the pin being moved slightly, thus changing the position of the mask which is fitted on it and is held by a hole of a size corresponding to that of the pin 122. The plate 120 is held in place by screws 123 and presses firmly against

member 121 to prevent its moving, after the screws have been tightened.

Although I have described preferred embodiments of the machine, I do not intend to be limited to the exact structures illustrated.

I claim as my invention:

A machine for printing photographs in quantity which comprises a supply magazine for sensitized cards, a single power supply for said machine, driving means, a reciprocating arm associated with said driving means, vacuum cups associated with reciprocating arm to remove said cards one at a time from said bulk supply and drop them into a vertically disposed feed chute, said bulk supply magazine comprising a box open at the top and disposed at an angle downwardly away from said vacuum cups in order to permit easy pick up of the cards by the vacuum cups, said box also at an angle laterally in order to maintain one edge of the cards in alignment along the lower side of said box, said driving means operatively associated in timed relation with said vacuum means for actuating said vacuum means, a cam associated with said driving means to impart rocking motion to said arm, said driving means also actuating said cam in timed relation, said rocking arm fulcrumed at a point intermediate its length and operatively associated at its upper extremity with said driving means as above set forth, means actuated by the part of said lever arm above the fulcrum to stop and release said cards fed by said vacuum cups and associated parts at timed intervals, a printing zone, said card chute leading from said magazine to said printing zone, an exposure means and a card release means associated with said printing zone, a platten for holding a sensitized card in printing position in said printing zone, means for actuating said platten including said rocker arm and also including a member engageable with a plunger and a spring attached to said rocking arm to thrust said platten in place in said printing zone, a trip member including a spring to hold said platten in place for a predetermined time and a trigger attached to said rocking arm to release said platten after a predetermined time, means for sharply withdrawing said platten from said printing position upon such release by said trigger, means synchronized with said plunger and said release for switching on a light when said platten is in printing position and turning it off when said platten is out of printing position, and a card release means disposed directly below the printing zone to stop the fall of unexpected cards including means to release exposed cards from said zone.

ELMER H. GROGAN.

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