Jan. 20, 1959 C. E. YOUNG BERG 2,869,447

PHOTOGRAPHIC PRINTING MACHINE

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Fig. 1.

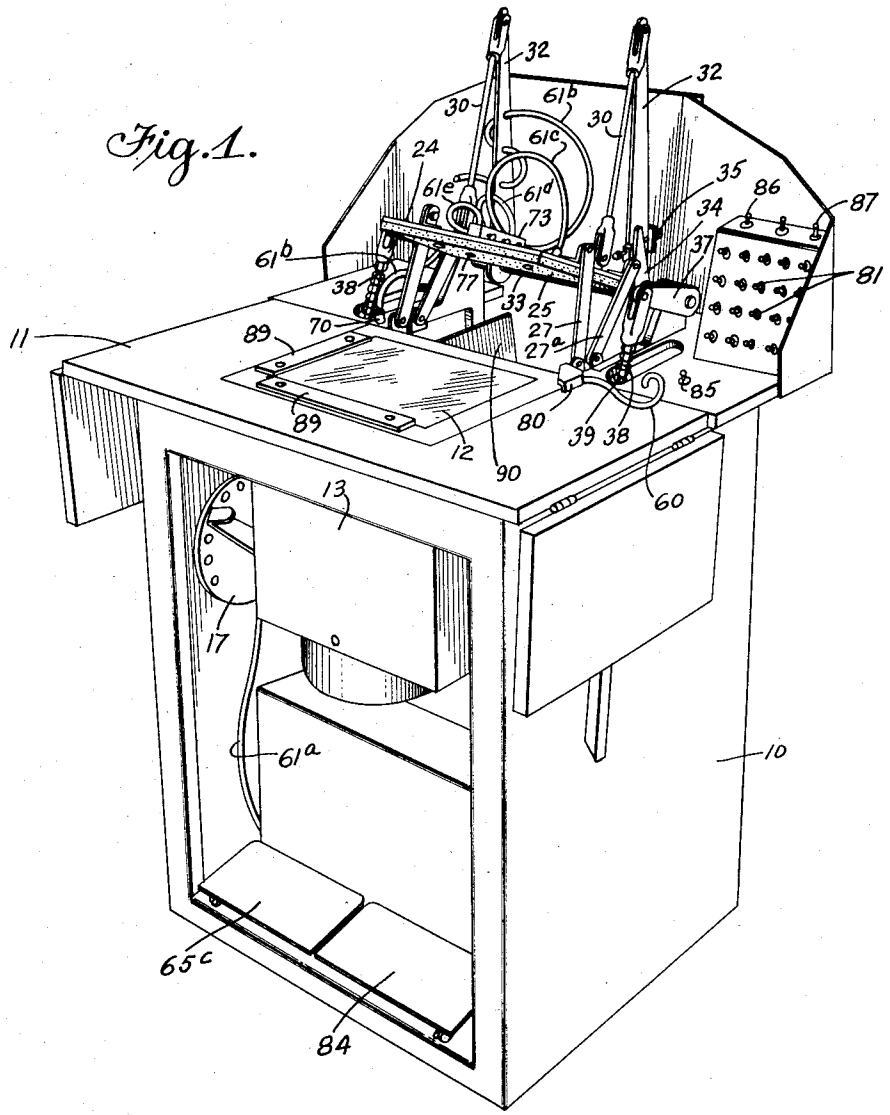
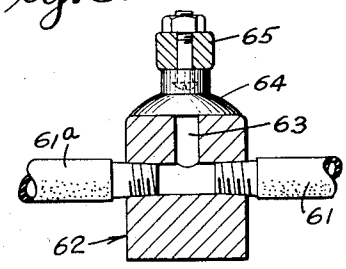



Fig. 5.




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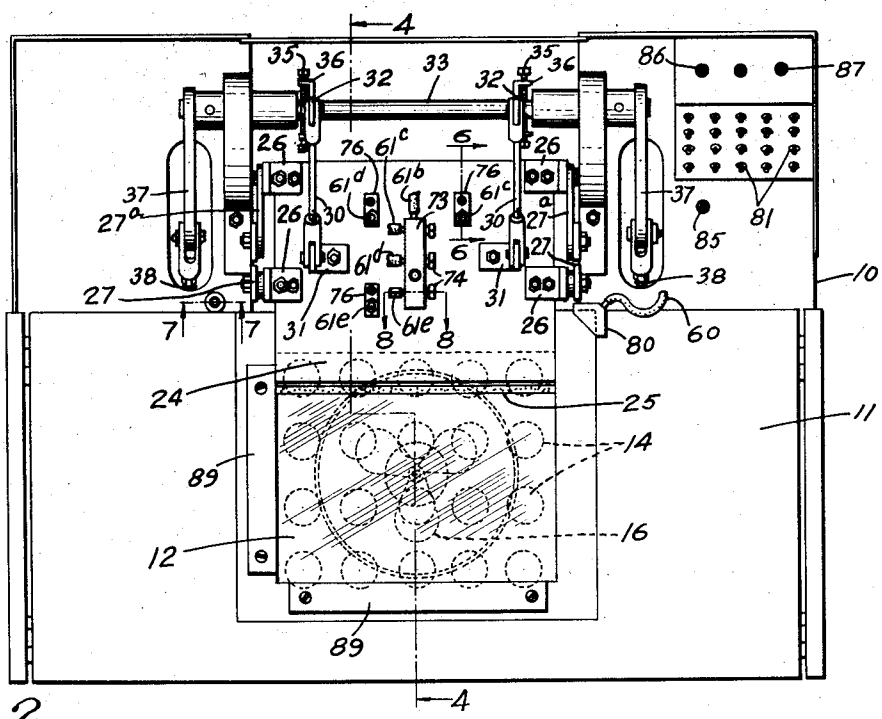



Fig. 2.

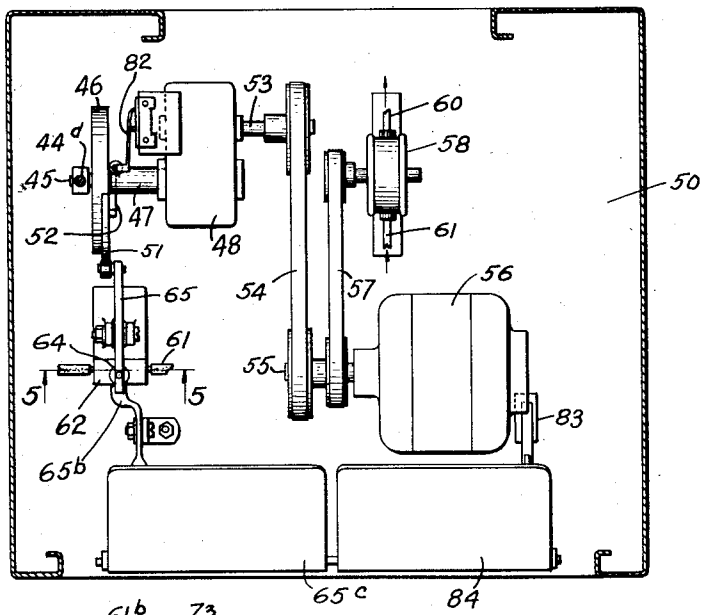



Fig. 3.

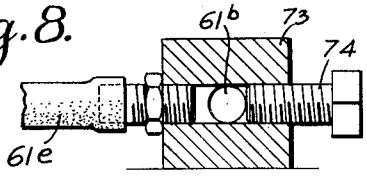



Fig. 8.

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Fig. 4.

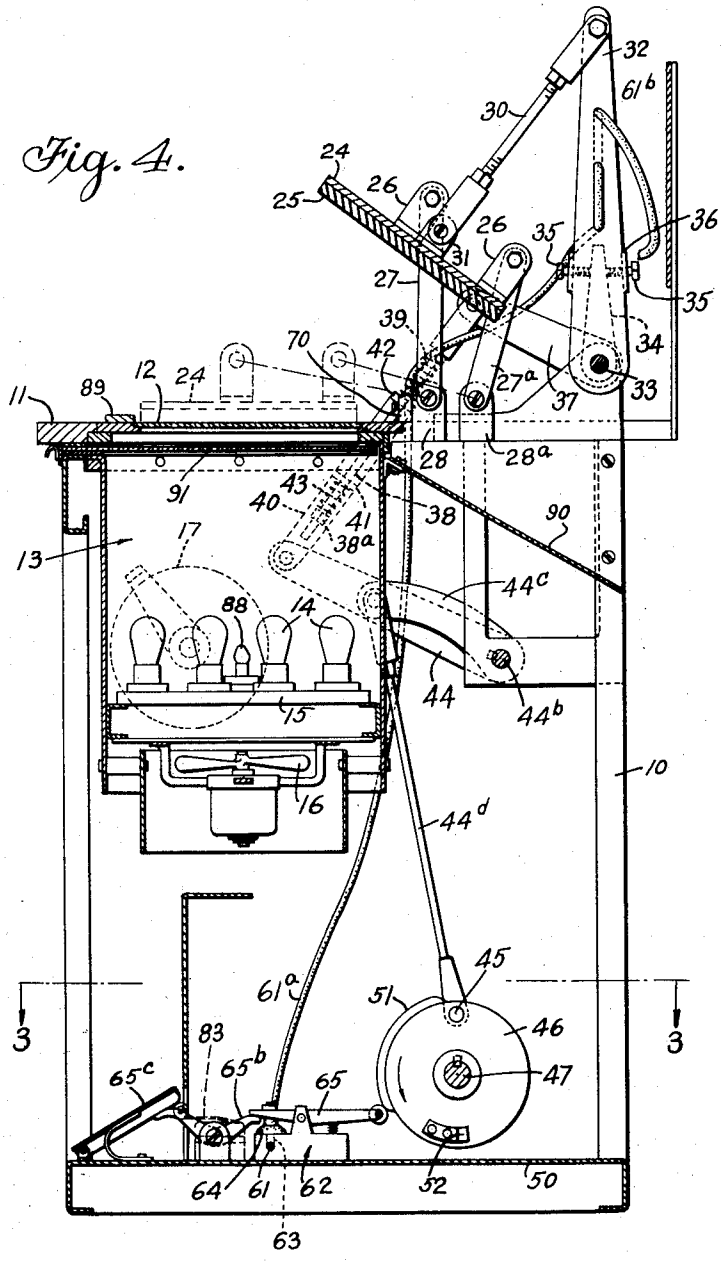
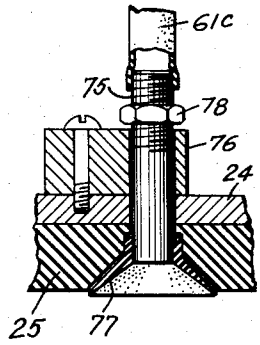



Fig. 6.



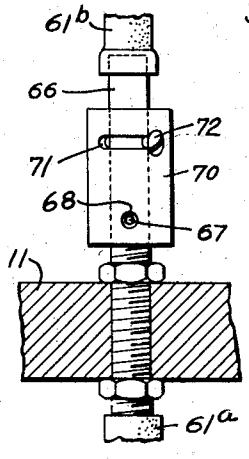




Fig. 7.

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2,869,447

# PHOTOGRAPHIC PRINTING MACHINE

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Application September 17, 1953, Serial No. 380,678

2 Claims. (Cl. 95—73)

This invention relates to photographic apparatus and more especially to a photo printing machine.

An object of the invention is to provide novel improvements in an automatic photo printing machine.

Another object of the invention is to provide a photo printing machine adapted for mass production.

An additional object of the invention is to provide in a production printer means for automatically ejecting the printed paper utilizing a suction control.

A further object of the invention is to provide in a production printer an adjustable exposure control whereby the speed of the machine is constant; however, all prints are given adequate exposure.

An additional object of the invention is to provide a mass production printer having an air flow over the negative free from lint.

Other objects and advantages will appear and be brought out more fully in the following specification, reference being had to the accompanying drawings wherein:

Fig. 1 is a perspective view of an embodiment of my invention.

Fig. 2 is a plan view of the same.

Fig. 3 is a sectional view taken along the line 3—3 of Fig. 4.

Fig. 4 is a sectional elevation view taken along the line 4—4 of Fig. 2.

Fig. 5 is a fragmentary sectional view showing the vacuum release valve.

Fig. 6 is an enlarged partial sectional view taken along the line 6—6 of Fig. 2.

Fig. 7 is an enlarged partial sectional view taken along the line 7—7 of Fig. 2.

Fig. 8 is an enlarged partial sectional view taken along the line 8—8 of Fig. 2.

Referring more particularly to the drawings I show a mass production printer comprising a frame or cabinet **10** providing a table **11** having a wide opening covered by glass plate or other window **12** disposed above a light well **13** of any suitable construction. A plurality of lamps **14** are supported on plate **15** within well **13**, the plate being positioned above a motor driven cooling fan **16**, a rheostat **17** being suitably mounted within cabinet **10** as shown in Figure 1 for varying the current to lamps **13**. By this construction the light intensity of lamps **14** may be raised and lowered for different exposure conditions, the time of exposure being constant.

A rectangular plate **24** has a resilient pad **25** such as sponge rubber secured to the lower face thereof, and a plurality of brackets **26** are secured to the upper side of the plate, and two pairs of links **27** and **27***a* connect brackets **26** with pairs of pivot brackets **28** and **28***a* secured on table **11**, links **27** being longer than links **27***a* and the brackets being spaced as shown.

A pair of links **30** are pivotally connected to a pair of angle plates **31** secured to plate **24**, and the upper ends of links **30** are each connected to a lever arm **32** mounted on but not connected to a shaft **33** having a suitable bearing mounting on table **11**. A lever arm **34** connected to shaft **33** is provided for each lever arm **32** and is adjustably connected thereto by a pair of adjusting screws **35** which are carried by flanges **36** on arm **32**.



A pair of lever arms **37** are connected to shaft **33** and a link rod **38** is connected to each arm **37**. A link member **40** guides link **38**, has slidable flanges **41** and **42** through which rod **38** extends, and carries a spring **43** positioned between a nut **38***a* on rod **38** and flange **41** on link **40** whereby a cushion connection is made between links **38** and **40**. A rebound spring **39** may be provided as shown, if desired. Links **40** are each connected to a lever arm **44** secured to a rock shaft **44***b* suitably mounted to frame **10**, and a lever arm **44***c* secured on shaft **44***b* is connected by a link **44***d* which has a crank pin connection **45** with a cam disc **46** mounted on a shaft **47** extending from a reduction gear mechanism **48** mounted on a base plate **50** carried by frame **10**.

Cam disc **46** has a radial cam **51** and a surface cam **52**. Shaft **47** is driven by a reduction gear shaft **53** through a belt **54** from a shaft **55** of a motor **56** mounted on base plate **50**. A belt **57** driven by shaft **55** drives the shaft of a vacuum and air pressure pump **58** mounted on plate **50**.

Pump **58** has a pressure line **60** and a vacuum line **61** which is connected to a vacuum breaking device **62**. Device **62** has a bleeder port **63**, and a port valve **64** is mounted on a spring biased rocker arm **65** carrying a roller which engages and is actuated by cam **51** to unseat valve **64** from port **63** for breaking the vacuum at the required time. A suitably mounted rocker arm **65***b* is actuatable by a safety pedal **65***c*. A vacuum line **61***a* leads from device **62** and is connected to a pipe **66** having a bleeder port **67** controlled by port **68** in a sleeve **70** having a slot **71** through which extends a stop pin **72** mounted on pipe **66**. Thus sleeve **70** may be rotated on pipe **66** to register port **68** with port **67** for manually breaking the vacuum in the vacuum line when desired.

A vacuum line **61***b* is connected to pipe **66** and to a header block **73** from which lead a plurality of vacuum lines **61***c*, **61***d* and **61***e*, block **73** providing control means for these lines comprising screws **74** which may be adjusted to restrict the vacuum in each of these lines as they are connected to the header. Each vacuum line **61***c*, **61***d* and **61***e* is connected to a tube **75** as shown in Figure 6 extending through a block **76** mounted on plate **24** and through aligned apertures in plate **24** and pad **25**, a vacuum cup **77** being secured to the end of each tube **75** which is threaded and has an adjusting nut **78**. Tube **75** has a loose fit in block **76**, plate **24** and pad **25**, so that the tubes may drop slightly to facilitate release of the printed paper during the printing operations. A dispersion nozzle **80** is connected to pressure line **60** and disposed adjacent one corner of plate **12** and directs a dispersed jet of air over plate **12** in order to free the printed paper therefrom when being lifted by the plate **24** mechanism including the vacuum from lines **61***c*, **61***d* and **61***e* which are disposed at several places about plate **24**, as shown in Figure 2.

A plurality of lamp selector switches **81** are suitably mounted as shown in Figures 1 and 2, and each of the lamps **14** is connected to one of the switches **81** so that the intensity of illumination from the lamps **14** may be varied and controlled throughout a wide range. A cam switch **82** mounted on the reduction gear housing has a cam lever arm actuated by cam **52**, and switch **82** is an actuating switch for all of lamps **14**. A switch **83** which is paralleled with switch **82** is adapted to be actuated by pedal **84** so that the lamps **14** may be lighted to provide illumination for testing or adjusting the set-up prior to making a run of prints. A motor switch **85**, a master switch **86** and a signal switch **87** are provided as shown,

switch 87 controlling a pilot lamp 88 mounted on plate 15. Guide blocks 89 may be provided for window 12 as shown, and a chute 90 is formed in the cabinet as shown for dispensing the work after being printed and when dropped from the pad 25. A transparent plate or frame 91 is positioned below plate 12 for holding the usual negatives.

The operation of the invention should be clear from the foregoing description. The operation of the machine is continuous, plate 24 being swung downwardly over window 12 and returned to a position over chute 90 as shown and indicated in Figure 4. During the period plate 24 is in position with pad 25 holding a positive to be printed, cam 52 will actuate switch 82 momentarily for lighting lamps 14 for making the exposure, and upon the upward movement of plate 24 the positive will be picked up by the vacuum lines 61*c*, 61*d* and 61*e*, and at the upper point of the plate movement cam 51 will actuate bleeder device 62 for releasing the vacuum, whereupon the positive will be dropped into chute 90, and this action will be repeated at a rapid rate. The connection between links 27*a* and their pivot brackets 26 or 28*a* is sufficiently loose so that upon upward movement the front portion of plate 24 will be lifted from window 12 before the rear portion, thus breaking the vacuum therebetween.

It will be understood that the foregoing description is illustrative rather than restrictive of my invention and that changes and modifications may be made without departing from the spirit and scope of the sub-joined claims.

Having described my invention what I claim is:

1. An automatic photo printer as described, comprising in combination, a frame providing a work table having a light well, a light in said well, means for supporting a negative at the top of said well, a sheet supporting window over said means, a pressure plate for said window, a rotary drive shaft having a crank and a cam wheel, rod means connected between said crank and said pressure plate for raising and lowering said plate, long and short, respectively, swingable front and rear link means connecting said pressure plate to pivots at the rear part of said frame, said rear link means having a loose connection with said pressure plate, whereby said pressure plate when raised is shifted to a rearward inclined position and the front edge of said plate is first to break contact with the window surface and the rearward movement of the plate takes place only after the rear edge thereof has left the window surface, vacuum supply means, said pressure plate having a plurality of transverse ducts, a conduit system connecting said ducts to said vacuum supply means, a valve for said conduit system actuated by said cam wheel when said pressure plate has reached uppermost position whereby a printed sheet is lifted from said window and released from said plate when at rearmost position as said shaft is rotated.



2. Structure according to claim 1 including air pressure supply means and dispersion nozzle means on said work table to direct a jet of air across said window from a marginal portion thereof.

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