

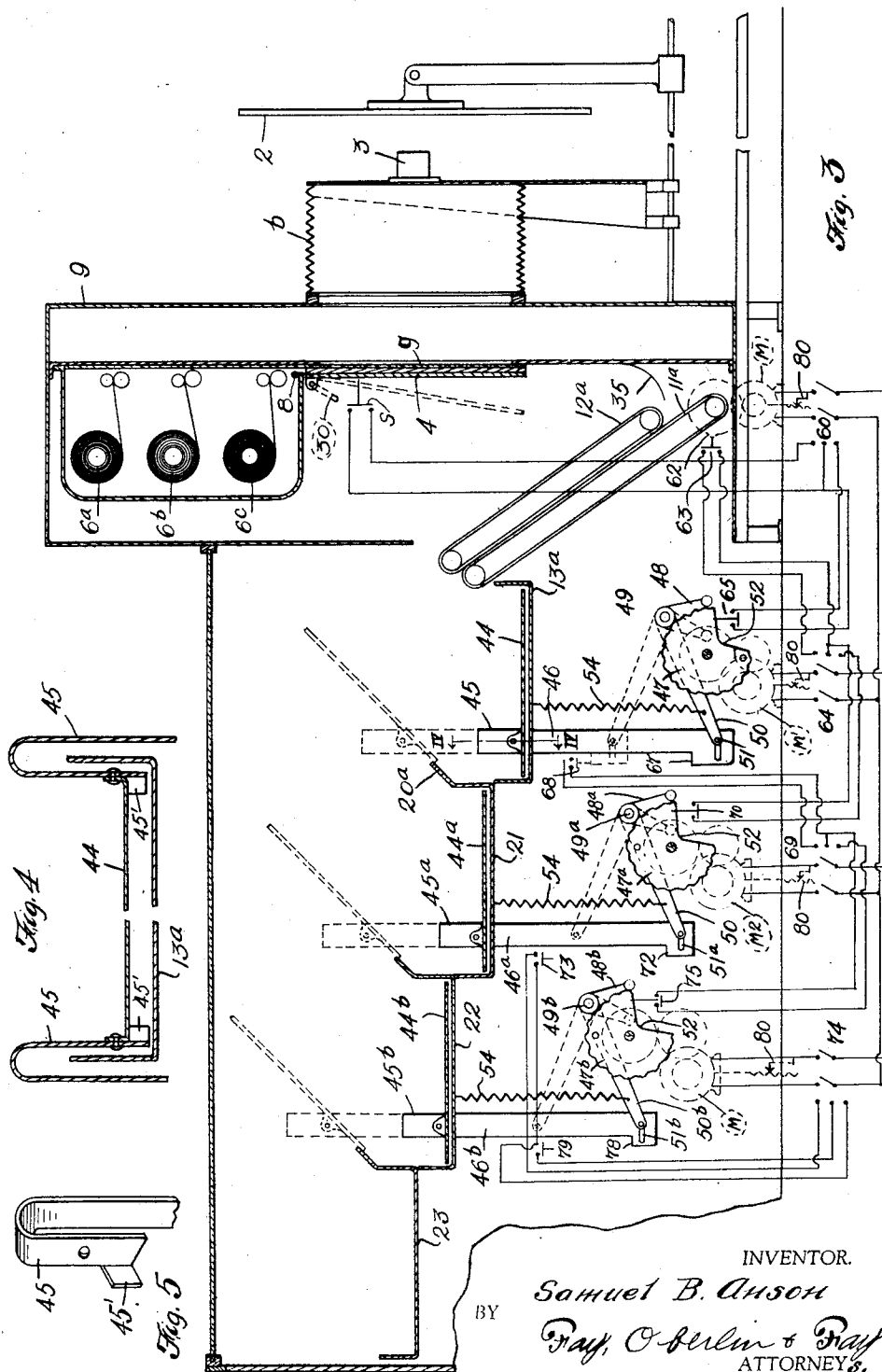
May 17, 1938.

S. B. ANSON
PHOTOENGRAVING EQUIPMENT

2,117,279

Filed April 10, 1937

2 Sheets-Sheet 2



INVENTOR.

Samuel B. Anson

BY

Ray, O'Brien & Ray
ATTORNEYS

UNITED STATES PATENT OFFICE

2,117,279

PHOTOENGRAVING EQUIPMENT

Samuel B. Anson, Cleveland Heights, Ohio, assignor to The Cleveland Shopping News Company, Cleveland, Ohio, a corporation of Ohio

Application April 10, 1937, Serial No. 136,147

7 Claims. (Cl. 95—14)

In photo-engraving, it is customary to take off a photograph of the subject matter to be reduced to an engraving form, such photograph being on a suitable carrier, e. g. as film, and thence the exposed film has to be developed and fixed in a dark room, which, in the customary photo-engraving plant has the very serious objection of occupying too much valuable space and precluding proper ventilation and light which are so essential. Furthermore, excessive refined technical control is necessary on the part of operators in particularly careful manipulation and timing of operations throughout, and even under the best conditions there are mistakes and losses and requirement of duplication of effort. In accordance with the present invention however, it now becomes possible to carry out the important and critical steps of operation, with control automatic to whatever extent it is desired, and with elimination of excessive technical supervision, and at the same time the plant space is not overdrawn upon and ventilation and lighting handicapped by the very large dark rooms heretofore required.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described, and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawings:—

Fig. 1 is a longitudinal vertical sectional view illustrating an embodiment of the invention; Fig. 2 is a horizontal section taken on a plane substantially indicated by line II—II, Fig. 1; Fig. 2a is an elevational view, slightly enlarged, showing a detail of cam means; Fig. 3 is a view analogous to Fig. 1, showing a modification; Fig. 4 is a fragmentary sectional detail taken on a plane substantially indicated by line VI—VI, Fig. 3; and Fig. 5 is a perspective detail of structure shown in Fig. 4.

Referring more particularly to the drawings, there is shown photo-engraving equipment of a character including a copy-holding board 2, whose copy-holding face may have any desired or usual means for clamping the copy sheets, as a framing, cover glass, thumb tacks, etc., detail of which need not be shown, and in line with the copy-holder is exposing means including a lens system 3, and a holder 4 for the sensitized element to be exposed, this illustratively being shown as a film 5 running from the stock roll 6 past the feed-

ing mechanism 7 whose detail need not be elaborated, and a cutter 8 which may be of any desired form, as for instance a small sharpened disc wheel movable in transverse sweep across the film in the manner generally well known, as controlled by an operating push and pull handle projecting through the outside of the light-proof casing 9. It will be understood also that the customary photo-engraver's graining-screen may be employed before the sensitized element, where desired in association. To receive the sensitized element as discharged from the holder 4 after it has been exposed, controlled means follow for the further stages of treatment. The holder 4 may discharge by any suitable means, as for instance a handle in reach of the operator, and while not necessary in all cases, generally it is desirable to have a conveyor to take the exposed sensitized element so discharged, into the developing tank. Such conveyor for instance may involve lower and upper aprons 11, 12, leading into the developing tank 13. In the latter, there is means for agitatively supporting the exposed sensitized element, and finally discharging it in controlled or timed relation into the next tank, which generally would contain a stopping solution for checking action on the sensitized surface, although in some instances the stopping solution is not necessary, and the next bath may be a fixing solution. For the operation of the agitation and discharge aforementioned, a suitable mechanism is applied, as for instance a perforated plate 14 which is carried by over-reaching bracket means 15 extending up and laterally from a stem 16 which is operated by a cam 17 carried by shaft 18 which is driven to a suitable reduction gearing by motor 19. The shape of the cam, as seen from Fig. 2a is such as to present an undulatory periphery causing a slight jogging motion up and down, and then finally the cam rise pushes the stem 16 upwardly to such an extent as to carry the bracket means 15 and the plate 14 which is hinged thereto (at one side of center line) up against the projection 20, which being stationary causes the plate 14 to tilt up at such a slope as to discharge-slide the sensitized element down into the next tank 21. Here again, there is equipment including a similar agitative perforated support plate 14a, carried by bracket means 15a on stem 16a and operated by cam 17a on the shaft 18. In turn, this tank discharges to the next tank 22, generally containing the fixing solution, and here again there is an agitative support equipment including a perforated plate 14b carried by the bracket means 15b on stem 16b which is oper-

ated by cam 17b on the shaft 18. Adjacent to and receiving the discharged element from tank 22 is a washing tank 23.

The lens system 3 is supported at the beginning of a housing system, usually including an adjusting focusing bellows b, the housing thence continuing in the portion 9 covering the sensitized elements and tank means, and thence to the portion 25 covering the associated treating tank equipment, the whole being in compact cabinet form, and providing sight glass means, as 26, 27 through which operation within may be observed by the operator outside, there being no obstruction of the space and ventilation in the photo-engraving room. As a particular advantageous result from the equipment described, the mechanism provides an exact time control automatically on the respective treating stages for the exposed film. Thus, the operator having set his copy on the copy-board 2 and adjusted his focus and having fed into position the sensitized element to be exposed, this, for purpose of illustration, being a stripping film held by the holder 4 in position, the exposure is made by the control shutter by the operator as usual, and then the operator draws out the cutter handle and returns it thereby severing the portion which has been exposed. On then manipulating the holder-handle 30, the holder 4 discharges the exposed sensitized element. In the discharge movement of the holder, a starter switch S which may be conveniently arranged in the path of the moving holder, starts the electric motor 19, which through driving connections whose detail is immaterial here and need not be shown, operates the pick-up conveyor 11, 12, and starts the operation of the tank equipment 14 etc. by the cam 17, the sensitized exposed element being almost instantaneously transferred into the development tank 13. By the operation of the cam 17, as aforesaid, the exposed element is agitated in the bath, and then with the final sweep of the cam in its rise portion the exposed element is discharged over into the next tank 21. Here the cam 17a in its timed relation similarly provides agitation and final discharge into the tank 22, where again the suitably apportioned cam 17b provides agitation and finally discharging into the washing tank 23. By electric switch 31 in the path of a lug 32 on the stem 16b, the motor is stopped, the cycle having been completed, and all is in readiness for the repetition which will be initiated by the operator in discharging a newly exposed sensitized surface from the holder 4, as described. The solutions, as for instance the indicated series of developer, stopping bath, and fixing bath may be of such strength and the timing of such gradation, the temperature factors of course being taken care of as usual, that a very rapid run-through may be had, and each particular stage may have its own fixed timing as controlled by the timing cams, and for example a developing time of 90 seconds may be apportioned for tank 13, a stopping time of 30 seconds for tank 21, and a fixing time of 120 seconds for tank 22, as controlled by the apportioned cams 17, 17a, 17b, respectively. Obviously also, if preferred, hand controlled switch operation of the motor 19 will allow the operator to manipulate each bath with its own start and stop if such would be desired, and with the motor 19 of D. C. wiring on D. C. current supply, rheostat and control may also be applied to vary the timing through the motor, by slowing or speeding faster than the above-required rate, such rheostat equipment and speed

rate control of motors being so well known as to require no detail here.

Still more refined individual selective control may be had, or a complete automatic operation as preferred, with equipment as illustrated in Fig. 3, wherein the copy-holder may be as a fore-described, and likewise the lens system 3, focusing bellows 4 and housing portion 9. Sensitized element supply means, as rolls 6a, 6b, 6c, may be employed, illustratively with stripping film of different widths which may be desired, and the feed down roller means and cutter knife rod 8 and a holder 4 being of any usual or preferred construction. The conveyor 11a, 12a may be arranged to pick up the severed sensitized element, a guide 35 being interposed if desired. Again, a series of tanks 13a, 21a, 22a, 23a, receive the exposed sensitized element in succession, the respective tank equipment including agitative support means involving perforated plates 44, 44a, 44b, respectively, carried by bracket means 45, 45a, 45b, respectively on the stems 46, 46a, 46b, respectively, like in the construction described foregoing. Operating cams for the agitative support elements may involve cams 47, 47a, 47b, and coacting with the periphery of these are roller-equipped lever arms 48, 48a, 48b, respectively, pivoted at 49, 49a, 49b, respectively and having the other arm 50, 50a, 50b, respectively, of the bell crank engaging by a pin and slot connection 51, 51a, 51b, respectively, with the stems 46, 46a, 46b. The cams are provided with an undulatory periphery, to occasion the slight jogging up and down movement of the sensitized element in the bath, and each cam is further provided with a depression 52 which occasions the inward-swing of the arms 48 etc. of the bell crank levers, and thereby causing the springs 54 to raise the stems 46 etc. at the appropriate time and discharge into the next tank.

In the operation of this form of the apparatus, the copy having been placed on the copy-board 2 and the adjustments having been made for the exposure and the sensitized surface having been put in position in its holder 4, the operator makes the exposure by his shutter control, and then cuts the exposed sensitized element and manipulates the handle 30 to open the swing-holder 4. Thereupon, the holder 4 operates the starter switch S, which in turn actuates the magnetic switch 60, thereby starting the motor M which operates the conveyor 11a, 12a. In association and operated by this motor, and for instance on the conveyor or one of the gearing elements in connection therewith, a projection 62 is arranged so as to engage the switch 63 and, through the magnetic switch 64 start the motor M' which operates the equipment of the tank 13a. With the movement of the cam 47 as driven by this motor, through suitable reduction gearing, a switch 65 is actuated by a suitable lateral projection from the cam, and through the magnetic switch 60 thereby stops the conveyor motor M. With the further travel of the cam 47, the exposed element in the bath 13a having been agitated as provided, the cam and spring 54 finally discharges the sensitized element by raising the stem 46 and support-plate 44 such that the forward edge of the latter engages the projection 20a on the next tank 21, and the pivoting of the plate 44 being off center, tilting is occasioned such as to slide the sensitized element down into the bath 21. In the raise of the stem 46 for such discharge, a projection 67 engages a switch 68 which starts the next motor

M², through the magnetic switch 69. The cam 47, by a lateral projection operates a switch 70 which, through the magnetic switch 64 stops the preceding motor M'. Running its cycle, the cam 47a agitates the sensitized element in the bath 21 and finally the stem 46a is raised to discharge such element into the next bath 22. In its raise, the stem 46a, by a lateral projection 72 operates switch 73 which, through magnetic switch 74, starts the next motor M³. The cam 47 being driven thereby, actuates a switch 75 by means of lateral projection, and this switch through the magnetic switch 69 stops the preceding motor M². Again, the cam 47a provides agitation in the bath 42, and finally the stem 46b is raised and the sensitized element is discharged into the next tank 23. In the upward movement of the stem 46b, a lateral projection 78 thereon actuates switch 79 which, through magnetic switch 74 stops the motor M³. The system is in a condition to have received new increments of exposed sensitized elements at any time after the cycle for the second bath was completed. A closer sequence of operation and over-lapping order is thus possible, and enormous throughput, without in anywise interfering with the proper cycle for each stage of treatment. If the motors M, M', M², M³; be single phase motors with alternating current supply, a complete automatic exact timing may be had for the whole treatment. By employment of D. C. motors, with control rheostats 80 however, a superposed individual control of the respective stages may be had also where desired. Thus, while the system may be set primarily for say cycles involving 90 seconds, 30 seconds, and 120 seconds in the respective first three baths, by manipulation of the control rheostats 80, the timing in any bath may be shortened or extended as may be desired. Full automatic control, and individualized manual-control may be had as well, in any given instance.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In apparatus of the character described, a photo-engraver's copy-holder, lens system and grain screen, means for holding a sensitized element in exposure therefore, an electric starter switch operated by discharge movement of the sensitized element holder, a motor and conveyor controlled by said switch, a developing tank for receiving said exposed sensitized element from the conveyor, a perforated plate to agitatively support the exposed element in the developing tank and finally discharge it therefrom, a motor for operating said perforated plate, a switch controlled by said conveyor motor equipment for starting the developing tank motor, a switch controlled by said developing tank equipment for shutting off said conveyor motor, a stopping tank to receive the exposed element from the developing tank, a perforated plate to agitatively support the exposed element in the stopping tank and finally discharge it therefrom, a motor for operating said stopping tank perforated plate, a switch controlled by said developing tank equipment for starting said stopping tank motor, a switch controlled by said stopping tank equipment for shutting off the developing tank motor, a fixing tank to receive the exposed element from the stopping tank, a perforated plate to agitatively

support the exposed element in the fixing tank, and finally discharge it therefrom, a motor for operating said fixing tank perforated plate, a switch controlled by said stopping tank equipment for starting said fixing tank motor, a switch controlled by said fixing tank equipment for shutting off said stopping tank motor, a wash tank to receive the exposed element from said fixing tank, a switch controlled by said fixing tank equipment for shutting off the fixing tank motor, light-excluding cabinet housing about said means for holding the sensitive element and said developing, stopping and fixing tanks, and sight glass means for observation from the outside.

2. In apparatus of the character described, a photo-engraver's copy-holder, lens system and grain screen, means for holding a sensitized element in exposure therefore, an electric starter switch operated by discharge movement of the sensitized element holder, a developing tank for receiving said exposed sensitized element, a perforated plate to agitatively support the exposed element in the developing tank and finally discharge it therefrom, a motor for operating said developing tank perforated plate, a switch for starting the developing tank motor, a switch controlled by said developing tank equipment for shutting off said conveyor motor, a stopping tank to receive the exposed element from the developing tank, a perforated plate to agitatively support the exposed element in the stopping tank and finally discharge it therefrom, a motor for operating said stopping tank perforated plate, a switch controlled by said developing tank equipment for starting said stopping tank motor, a switch controlled by said stopping tank equipment for shutting off the developing tank motor, a fixing tank to receive the exposed element from the stopping tank, a perforated plate to agitatively support the exposed element in the fixing tank, and finally discharge it therefrom, a motor for operating said fixing tank perforated plate, a switch controlled by said stopping tank equipment for starting said fixing tank motor, a switch controlled by said fixing tank equipment for shutting off said stopping tank motor, a wash tank to receive the exposed element from said fixing tank, a switch controlled by said fixing tank equipment for shutting off the fixing tank motor, light-excluding cabinet housing about said means for holding the sensitive element and said developing, stopping and fixing tanks, and sight glass means for observation from the outside.

3. In apparatus of the character described, a photo-engraver's copy-holder, lens system and grain screen, means for holding a sensitized element in exposure therefore, an electric starter switch operated by discharge movement of the sensitized element holder, a series of tanks for receiving the exposed sensitized element in succession, each tank having a perforated plate to agitatively support the exposed element and finally discharge it therefrom, a motor for operating each perforated plate, means for automatically starting each motor for a controlled cycle, means for automatically stopping each motor at the end of its cycle, super-control manually operating means for varying the timing on each cycle, light-excluding cabinet housing about said means for holding the sensitive elements and tanks, and sight glass means for observation from the outside.

4. In apparatus of the character described, a photo-engraver's copy-holder, lens system and

grain screen, means for holding a sensitized element in exposure thereof, an electric starter switch operated by discharge movement of the sensitized element holder, a series of tanks for receiving the exposed sensitized element in succession, each tank having a perforated plate to agitatively support the exposed element and finally discharge it therefrom, a motor for operating said perforated plate, means for automatically starting each motor for a controlled cycle run, means for stopping each motor at the end of its cycle, light-excluding cabinet housing about said means for holding the sensitive elements and tanks, and sight glass means for observation from the outside.

5. In apparatus of the character described, a photo-engraver's copy-holder, lens system and grain screen, means for holding a sensitized element in exposure thereof, a series of baths to receive the exposed sensitized element in succession therethrough, agitative support means for the sensitized element in each bath and then discharging it into the next bath, a cam for operating and timing each said agitating support element, a common motor drive for all of the cams, light-excluding cabinet housing about said means for holding the sensitized elements in said baths, and sight glass means for observation from the outside.

6. In apparatus of the character described, a photo-engraver's copy-holder and lens system,

means for holding a sensitized element in exposure thereof, a series of baths to receive the exposed sensitized element in succession therethrough, means for supporting the sensitized element in respective baths, means for discharging the sensitized element in connection with at least the first two baths, means for operating the support and discharge means for the respective baths, means for automatically timing the sensitized element through the respective baths, manually-controlled means for super-controlling the timing in any desired bath, and light-excluding cabinet housing about said means for holding the sensitized elements in said baths.

7. In apparatus of the character described, a photo-engraver's copy-holder and lens system, means for holding a sensitized element in exposure thereof, a series of baths to receive the exposed sensitized element in succession therethrough, means for supporting the sensitized element in respective baths, means for discharging the sensitized element in connection with at least the first two baths, means for operating the support and discharge means for the respective baths, means for automatically timing the sensitized element through the respective baths, and light-excluding cabinet housing about said means for holding the sensitized elements in said baths.

SAMUEL B. ANSON.