

No. 854,026.

PATENTED MAY 21, 1907.

F. A. BROWNELL.
PHOTOGRAPHIC DEVELOPING MACHINE.

APPLICATION FILED JAN. 25, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

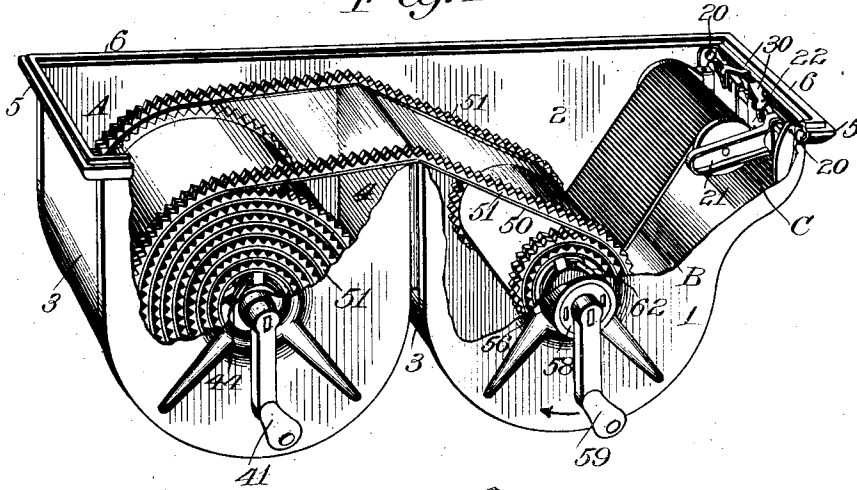


Fig. 5.

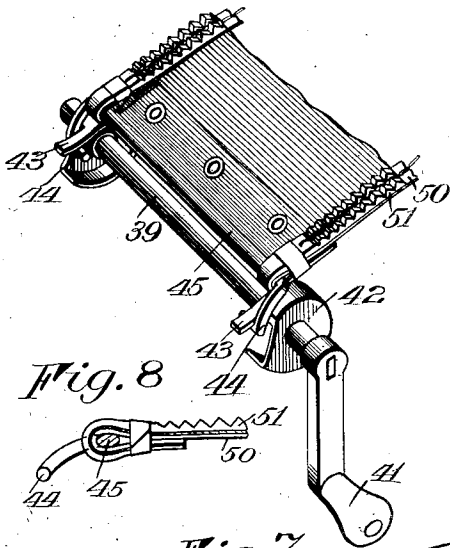


Fig. 6.

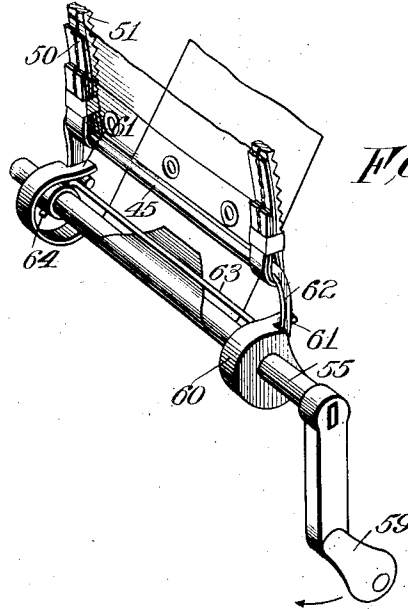


Fig. 8.

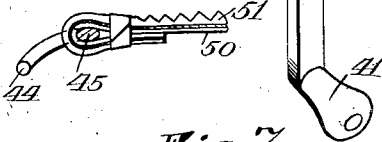
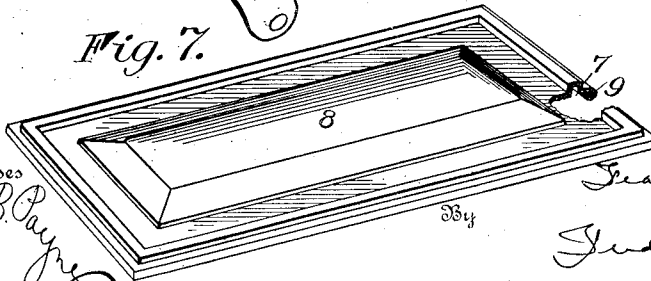


Fig. 7.



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2 SHEETS—SHEET 2.

Fig. 2.

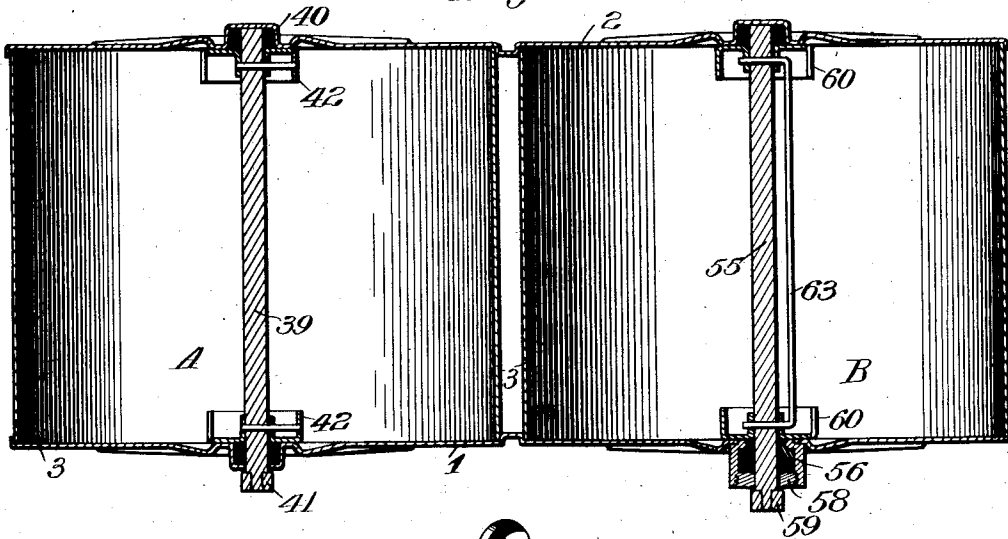


Fig. 3.

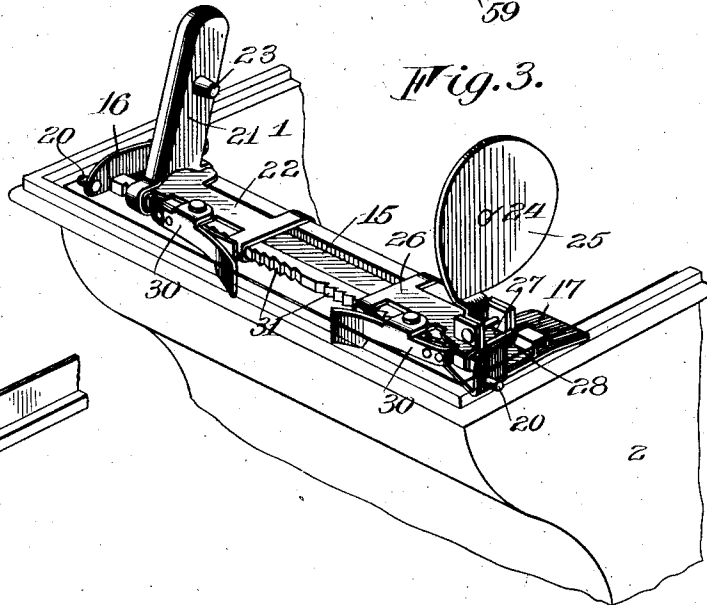
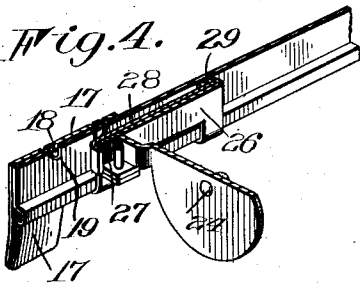


Fig. 4.



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UNITED STATES PATENT OFFICE.

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PHOTOGRAPHIC DEVELOPING-MACHINE.

No. 854,026.

Specification of Letters Patent.

Patented May 21, 1907.

Application filed January 25, 1904. Serial No. 190,527.

To all whom it may concern:

Be it known that I, FRANK A. BROWNELL, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Photographic Developing - Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

My present invention relates to photographic developing machines, and particularly that class employed for developing negatives made upon a continuous strip of sensitized material, or prints formed upon a similar strip of printing paper, and it has for its object to provide a suitable apparatus embodying generally a casing or receptacle, in which a spool or cartridge of film or like material may be arranged, together with an apron and means for winding sensitized material thereon and subjecting it to the action of the developing agencies.

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

In the drawings: Figure 1 is a perspective view of the machine, shown with the cover removed and portions of the casing broken away to more clearly illustrate the arrangement and operation of the inclosed parts. Fig. 2 is a horizontal sectional view taken through the center of the casing. Fig. 3 is a detail perspective view of one end of the casing illustrating the cartridge holder. Fig. 4 is a fragmentary perspective view illustrating the construction of the cartridge holder. Fig. 5 is a perspective view of the shaft or arbor on which the apron is mounted and illustrating the means of attaching the latter thereto. Fig. 6 is a similar view of the apron winding shaft or arbor, and Fig. 7 is a perspective view of the cover of the receptacle removed from the casing. Fig. 8 is a sectional view through the end of the apron.

Similar reference numerals in the several figures indicate similar parts.

A developing machine constructed in accordance with my invention embodies a casing having the front and rear sides 1 and 2 and containing the separate chambers A and

B, the bottoms of which are preferably rounded and formed by a curved plate 3, composing the ends of the casing and also extending upwardly to form a partition 4 between the chambers. The top of the partition is slightly lower than the sides 1 and 2, so that a supporting apron for the sensitized material may be passed from one chamber into another, as will be more fully explained hereinafter. By forming the bottoms of both chambers of a single piece of sheet material the latter may be bent to provide the partition with a rounded top or edge so that the apron may be drawn from one receptacle to the other without liability of injury, an arrangement which also obviates the necessity of employing a roller for guiding the apron.

Surrounding the upper end of the casing is an outwardly extending flange 5 and extending upwardly therefrom is a rim or tongue 6, adapted to be received in a corresponding groove or channel 7, formed in the cover 8 shown in Fig. 7, said cover being also provided with a downwardly extending rim 9 adapted to overlap the edge of the flange 5 so that when the cover is in place a light tight joint is formed between it and the casing.

The end of the receptacle B is extended outwardly as indicated at C to form a recess adapted to accommodate a spool or cartridge of film or sensitized material, and arranged therein is a supporting device for the spool or cartridge. This device embodies a frame consisting of a bar 15 provided at one end with the upturned portion 16 and having at its opposite extremity a plate 17, provided with ears or projections 18 adapted to be inserted through apertures 19 in the bar and secured thereto by being bent downward into engagement with the latter, as shown in Fig. 4. Both the plate 17 and the upturned portion 16 are provided with pins 20 adapted to extend into apertures in the sides 1 and 2 of the casing to form pivotal connections or journals for the spool or cartridge support and as the ends of these parts 16 and 17 project beyond the bar 15 they serve as stops which engage the inner surface of the receptacle to limit the inward movement of the supporting device.

Mounted on the bar 15 is an outwardly extending arm 21 supported on a slide or carriage 22 and provided with a pin 23 adapted to form a journal or bearing for one end of

the usual film spool or cartridge. The bearing for the opposite end of the spool is formed by a similar pin 24 mounted on a plate or head 25 pivoted to a slide or carriage 26.

- 5 The head is provided with a shoulder 27, at one side of its pivotal point, with which engages a spring 28, arranged beneath the carriage and secured thereto by lugs 29, as shown, and adapted to permit the head to be moved
10 to allow a spool or cartridge to be applied and also to hold said head when in its normal position in yielding contact with the end of the spool so that the film or sensitized material may be unwound therefrom under sufficient tension to cause it to lie smoothly on the supporting apron. The carriages or slides 22 and 26 are movable longitudinally on the bar 15 whereby the journal pins may be adjusted relatively to accommodate
20 spools of various sizes, and by making both of the carriages adjustable said spools may be located centrally of the casing. In order to lock the slides, I provide them with spring operated pawls 30 the ends of which cooperate with ratchet teeth 31 formed in one of the edges of the bar 15, said teeth at opposite sides of the center of the bar extending in opposite directions whereby the slides or casings may be adjusted relatively toward each
25 other without releasing the pawls.

- Extending transversely through the chamber A is a shaft or arbor 39 journaled in recesses or depressions 40 formed in the sides 1 and 2 of the casing and having an end extending to the exterior thereof and provided with a crank arm or operating handle 41. Secured to the shaft, and located thereon adjacent to the sides of the casing, are hubs or caps 42, having fingers 43 thereon adapted to cooperate with the hooked ends 44, formed on a bar 45, attached to one end of the support or apron D. The latter is formed of flexible material and for convenience is constructed of an insoluble transparent substance such as celluloid which is preferably given a non-actinic color so that the film or sensitized material contained between the convolutions of the apron will not be affected by rays of light that might be allowed to pass
50 into the casing during the manipulation of the apparatus by a careless operator. The bar 45 is secured in a loop formed at the end of the apron, as shown in Figs. 5 and 8, and to prevent its rotating freely in the loop the bar is flattened in cross section so that the hooked ends of the latter while permitted a slight relative movement thereto, will be normally held in approximate alinement with the apron, but to facilitate the engagement of the projections 43 with the hooks, the latter are curved inward slightly, relatively to the inner surface of the apron, as shown. As the overlapping ends of the apron increase its thickness at the ends, the
65 members 42 are arranged eccentrically of the

shaft so that, after the fingers 43 have engaged the hooks 44 and the shaft given a single revolution, the portion of the apron wound thereon will be concentric of the shaft, and the subsequent convolutions thereof will form a perfect spiral.

The apron is provided at the edges of its inner surface with a smooth binding piece 50 and on its outer surface is arranged a thicker corrugated strip 51 which serves to hold the overlapping portions or convolutions of the apron separated when wound upon the shafts, said binding strips being secured by lines of stitching. The interstices formed between the points of the corrugations on said strips permitting the developing solution in which the apron is immersed to flow freely through the coils of the apron and to come in contact with every part of the sensitized film supported thereon.

Arranged in the chamber B is a shaft 55 similar to the shaft 39, and as this chamber is the one adapted to receive the developing solutions, or agents, the operating end of the shaft extends outwardly through a stuffing box 56 provided with a compressible material held in position by a perforated head or nut 58 whereby a liquid tight joint may be formed. This shaft is also provided with an operating handle 59 and the caps 60 provided with fingers or projections 61 adapted to cooperate with hooks 62 provided at one end of the apron which are similar to the hooks 44 before described. A developing machine of this kind is adapted particularly for use with the cartridge form of film rolls in which the film is wound upon a spool with a continuous strip or cover of opaque material, which is longer than the film and is attached thereto at the ends of the latter as will be understood. To this end I provide means on the shaft 55 for engaging the end of the opaque covering, consisting in the present instance, of a small rod or bar 63 arranged parallel therewith and spaced a short distance therefrom, beneath which the end of the covering or film may be inserted previous to the attachment of the apron hooks 62, as illustrated in Fig. 6. In order to avoid a complication of the parts; the rod 63 is provided with downwardly extending ends 64 and the latter are inserted through apertures formed in the shaft and in the hubs of the caps 60, said ends performing the dual purpose of rigidly connecting the caps to the shaft and also of attaching the rod 63 thereto.

The operation of the machine will be readily understood. Before developing a strip of sensitized material, the apron is attached by means of the hooks 44 to the projections 43 and the shaft 39 is revolved thus winding the apron into the chamber A. The cartridge or film spool is then secured between the journals 23 and 24 and the supporting device is turned or rotated into the chamber B when

the end of the sensitized material, or the covering therefor, is attached to the shaft 55 and the free end of the apron is also secured thereto, by engaging the hooks 62 thereon beneath the projections 61. The developing solution may then be poured into the chamber and the cover 8 applied to the casing. By revolving the handle 59, in the direction indicated by the arrows in Figs. 1 and 6, the rotation of the shaft 55 causes the simultaneous unwinding of the film from the spool and the winding of the apron D thereon, as illustrated in Fig. 1. As the end of the apron is unwound from the shaft 39 the hooks 44 thereon will be automatically disengaged, allowing said end to trail over the partition 4 into the chamber B. The continued rotation of the shaft 55, for the desired length of time, will cause the entire film contained between the coils or convolutions of the apron to be subjected to the action of the developing agent. The latter may be poured out of the chamber by slipping the cover back a short distance from the edge of the casing, and the fixing solution, or other agent, poured into the chamber and the film subjected to the action of the latter by again rotating the shaft 55.

After the developing operation has been completed the apron and the sensitized material thereon may be removed, and the apron again wound upon the shaft 39 in readiness for subsequent operations.

In the claims:—

1. In a photographic developing machine, the combination with a casing open at the top, a shaft and an apron adapted to be wound thereon, of a supporting device for holding a spool or reel and connections between it and the casing whereby it may be operated to carry the spool or reel into and out of the casing.

2. In a photographic developing machine, the combination with a casing open at the top, a shaft and an apron adapted to be wound thereon, of a supporting device for a spool pivoted to the casing in proximity to its open side whereby the device may be operated to move the spool out of the casing and a stop for limiting the inward movement of the device.

3. In a photographic developing machine, the combination with a casing open at the top, a shaft and an apron adapted to be wound thereon, of a supporting frame for holding a spool, connections between the frame and the casing whereby it may be operated to carry the spool outside of the casing and a stop on the frame adapted to engage the casing to limit its inward movement.

4. In a developing machine the combination with the casing open at the top, of a spool supporting device having adjustable spool centers thereon and pivotally con-

nected to the casing so as to be rotated into and out of the same, and means within the casing for receiving the contents of the spool.

5. In a photographic developing machine the combination with the casing and a frame pivoted therein, of spool centers adjustable on the frame and adapted to be moved into and out of the casing and means within the casing for receiving the contents of the spool.

6. In a photographic developing machine, the combination with a casing and a frame therein, of arms adjustable longitudinally of the frame carrying journals adapted to support opposite ends of a spool of sensitized material, devices for locking the arms and means for supporting said sensitized material when removed from the spool.

7. In a photographic developing machine, the combination with a casing and a frame extending transversely thereof, and provided with ratchet teeth, of relatively movable arms on the frame, adapted to support a spool of sensitized material, pawls cooperating with said teeth to lock the arms and means for supporting said sensitized material when unwound from the spool.

8. In a photographic developing machine, the combination with a casing and a frame arranged therein and having ratchet teeth thereon extending in opposite directions, of slides on the frame, arms on the slides adapted to support a spool of sensitized material and pawls on the slides cooperating with said teeth to prevent the slides being moved relatively away from each other and means for supporting said sensitized material when unwound from the spool.

9. In a photographic developing machine, the combination with a casing and a laterally movable frame arranged therein, of relatively movable slides on the frame, an arm on one of them adapted to support one end of a spool of sensitized material and a head on the other slide movable relatively thereon and adapted to support the opposite end of said spool, and means for supporting said sensitized material when unwound from the spool.

10. In a photographic developing machine, the combination with a casing and a frame arranged therein, of relatively movable slides on the frame, an arm on one of the slides provided with a journal adapted to support one end of a spool of sensitized material, a movable head on the other slide provided with a journal adapted to support the opposite end of said spool and a spring for holding the head in its normal position, and means for supporting said sensitized material when unwound from the spool.

11. In a photographic developing machine the combination with a casing, a frame pivoted therein and slides movable longitudinally thereon and adjustable laterally of the casing, of a rigid arm on one of the slides adapted to support a spool of sensitized ma-

terial, a pivoted arm on the other slide and means for normally holding it in normal position in engagement with the opposite end of said spool, devices for locking the slides on the frame and means for supporting said sensitized material when unwound from the spool.

12. In a photographic developing machine, the combination with a casing, a flexible apron having a looped end and a bar extending through the loop flattened in cross section and provided with hooks at its ends, said hooks extending toward the inner surface of the apron, of a winding shaft having projections adapted to engage the hooks, means for revolving it and a device for supporting a spool of sensitized material in the casing.

13. In a photographic developing machine, the combination with a casing, an apron having a looped end and hooks secured therein, of a winding shaft, caps arranged eccentrically on the shaft having fingers adapted to cooperate with said hooks, a rod extending over the shaft between the caps and having the ends securing the latter to the shaft and a device for supporting a spool of sensitized material in the casing.

14. In a photographic developing machine, the combination with a casing and a winding shaft therein, of a flexible apron adapted to be wound upon the shaft, flexible ribs or fill-

ing strips having transversely-extending corrugations therein attached to the edges of the apron and a device for supporting a spool of sensitized material in the casing.

15. In a receptacle for photographic developing machines, the combination with side pieces, of a bottom piece having the end portions forming the ends of the casing and the central portion extending upwardly and forming a partition dividing the receptacle into separate chambers.

16. In a receptacle for photographic developing machines, the combination with side pieces, of a bottom piece having a central portion extending upwardly in the casing to form a partition wall and curved to provide rounded ends on the casing and bottoms for the chambers located at each side of said partition.

17. In a photographic developing machine, the combination with a casing and a shaft therein, of a flexible apron adapted to be wound thereon composed of colored transparent material which will arrest the passage of actinic rays of light, and a device for supporting a spool of sensitized material in the casing.

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