G. C. BEIDLER.

DEVELOPING APPARATUS.

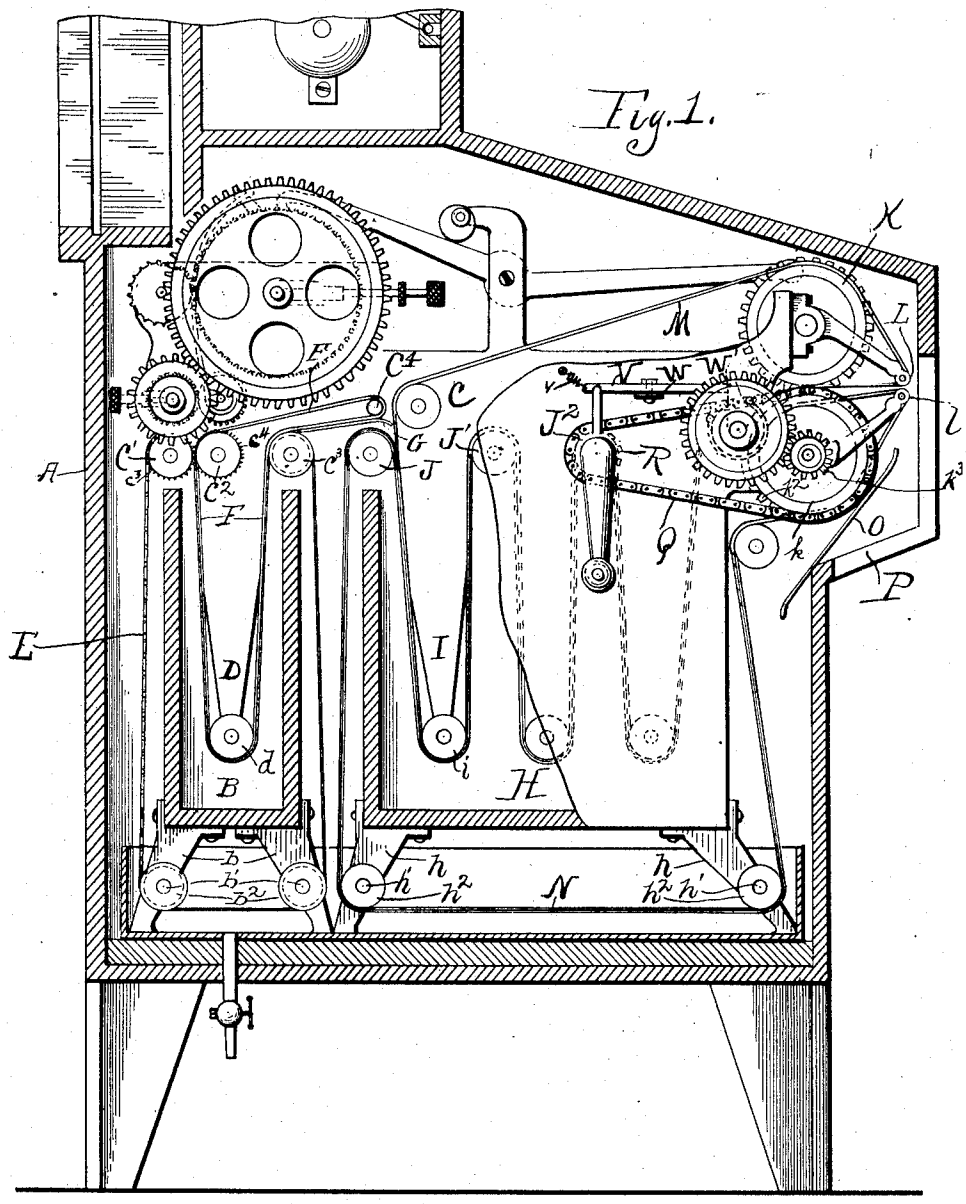
APPLICATION FILED NOV. 8, 1907.

**1,230,096.**

Patented June 19, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

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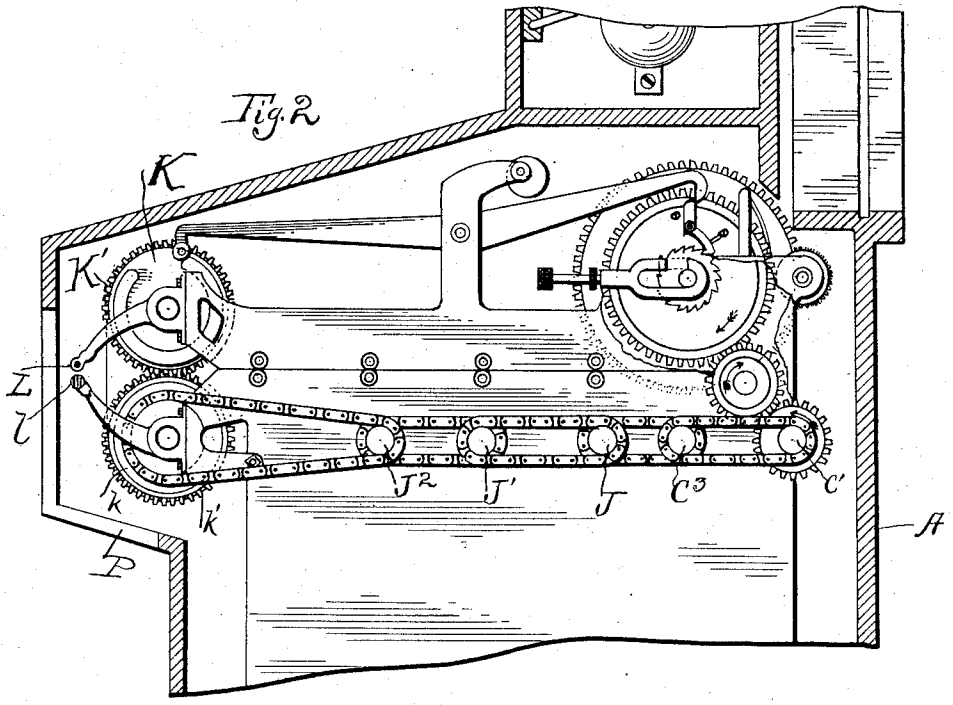
2 SHEETS—SHEET 2.

Fig. 2.



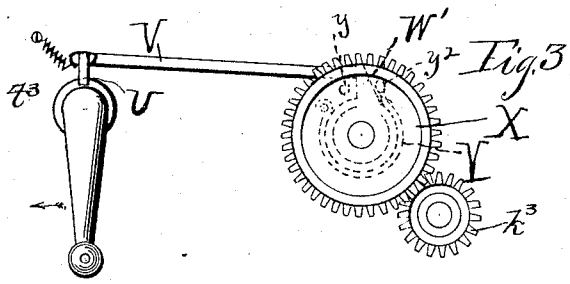




Fig. 3.

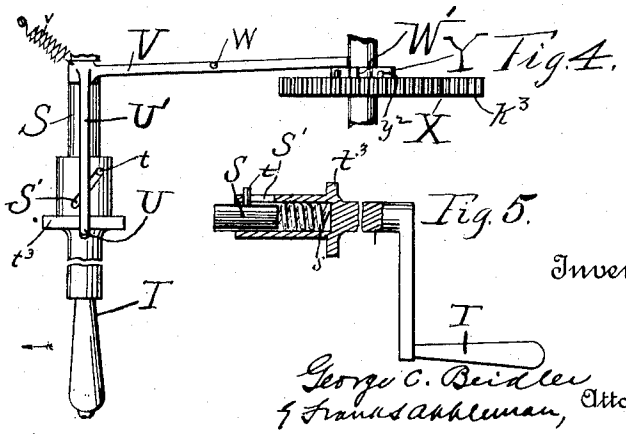



Fig. 4.




Fig. 5.

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# UNITED STATES PATENT OFFICE.

GEORGE C. BEIDLER, OF OKLAHOMA, OKLAHOMA.

## DEVELOPING APPARATUS.

1,230,096. Specification of Letters Patent. Patented June 19, 1917.

Application filed November 8, 1907. Serial No. 401,277.

*To all whom it may concern:*

Be it known that I, GEORGE C. BEIDLER, citizen of the United States of America, residing at Oklahoma city, in the county of Oklahoma and State of Oklahoma, have invented certain new and useful Improvements in Developing Apparatus, of which the following is a specification.

This invention relates to photographing and developing apparatus and particularly to means for carrying a film through tanks containing developing and fixing fluids.

An object of the present invention is to provide an apparatus having tanks or receptacles, one containing a developing fluid and the other containing a fixing fluid; means being also provided for conveying severed sections of film through the first named tank and for delivering said sections to a separate conveyer for carrying them through a second named tank, obviating the necessity of running the conveyer of one tank through the liquid of the other tank.

A further object of the invention is to provide carrying mechanism having novel means for arresting the movement of said mechanism when the sections of the film have reached predetermined positions with relation to the tanks, novel means being also provided for disengaging the arresting mechanism, (when the application of power for driving the carrying mechanism ceases), in order to permit further operation of the carrying mechanism on the reapplication of the power. In the present invention a crank handle is mounted on a shaft to drive the mechanism, said crank handle having a limited movement independent of the shaft, which is utilized to trip or operate the means for arresting or releasing the carrying mechanism before the motion of the crank handle is communicated to the shaft.

A still further object of the invention is to provide novel means for causing a disengagement of the film and belt. It has been found that paper film, when subjected to baths, becomes soft and pulpy and has a tendency to adhere to the belts of the conveyer. By running the belts over relatively small rollers or pulleys to provide "sharp" or abrupt turns for the belt, the film will break away from the belts at such turns and by gravity will reach the conveyer of the fixing fluid.

With the foregoing and other objects in view, the invention consists in the details of construction and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this specification in which like characters denote corresponding parts in the several views and in which—

Figure 1, is a view in elevation of the invention of a developing apparatus with the casing and tanks in section.

Fig. 2, is a detail view of the opposite side of the apparatus, the lower parts being broken away.

Figs. 3, 4 and 5 are detail views of the power applying mechanism, the arresting and releasing mechanism being illustrated.

In the drawings A, indicates a casing which may be of any preferred construction, the upper portion of the casing, containing the paper supply, exposure chambers, etc., being broken away. It is understood, however, that the said casing shall be provided with a film supply, exposure chambers and guides similar to those in my patent dated January 23, 1906, numbered 810,388.

B, is a tank to contain developing fluid, supported on legs $b$, forming bearings for the shafts $b'$, of the rollers $b^2$. C, is a frame forming supports for the shafts of the rollers C′, $C^2$, $C^3$, and for a relatively small roller $C^4$. The frame has a finger D, which depends into the developing tank and is provided with a roller $d$. The film conveyer for the developing tank consists in chains E, and a perforated rubber apron F, coacting to carry the film in contact with the apron, and the said apron supports the film throughout its surface, except, of course, at the perforations. The apron is run over the rollers $C^2$, $C^3$, $C^4$, and over the roller $d$, in the developing tank and the chains are

driven over the rollers $b^2$, C', $C^3$, and $d$, in the relation to the apron, well shown in Fig. 6.

The film G, is delivered between the chain and apron by a feeding and cutting mechanism (to be hereinafter described) and the movement of the chains and aprons in unison carries the film into the tank, which in practical use contains a developing fluid. As the film becomes saturated, it has a tendency to lie close to the apron and does not readily disengage therefrom. The chains, however, are in contact with the film during its travel through the developing tank and hence the film is prevented from disengaging from the apron until the said apron and chain diverge after passing over the roller $C^3$. The tendency of the film, being, as stated, to adhere to the apron, the film will be carried by the apron from the roller $C^3$, to the roller $C^4$, without the aid of any engaging member, but when the apron traverses the sharp curve around the roller $C^4$, the film will not be carried longer, but will become disengaged, and its edge will drop and pass under the influence of another conveyer applied to the tank H, for the fixing fluid.

The tank H, has supports $h$, forming bearings for the shafts $h'$, of the rollers $h^2$. The frame C has a series of fingers I, depending into the tank for the fixing fluid and said fingers support the rollers $i$. The frame is also provided with rollers J, J', $J^2$, which, with the rollers $h^2$, drums K, $k$, and relatively small rollers L, $l$, carry the aprons M, N, of the second conveyer. The aprons are perforated and are similar to those described in my patent, numbered 810,388, dated January 23, 1906.

As the several rollers are rotated, the aprons are carried in contact with each other and the film which gravitates into engagement with the aprons, is conducted through the fixing fluid in the tank H.

As with the first conveyer, so with this; the film adheres to an apron until the small rollers L, or $l$, are reached when, owing to the sharp curve, the film will leave the belt and depend into engagement with the guide O, and then fall through the opening P, in the end of the casing.

The drums K, $k$, are rotated in unison by the gearing K', $k'$, and motion is communicated to the drum $k$, by the chain Q, run on the teeth $k^2$, of the drum and the sprocket wheel R, on the shaft S. The drum $k'$, has a sprocket wheel $k^3$, on the end opposite to that containing the sprocket teeth $k^2$, and said sprocket wheel $k^3$, is utilized to drive the series of rollers on which the conveyer or apron is run. The trunnions of the rollers $J^2$, J', J, $C^3$, C', extend through the casing and are provided with sprocket wheels.

The roller C', has but one sprocket wheel, while the remainder have two sprocket wheels each, adapted to be connected by the chains, as fully shown in Fig. 2, and as the drums are rotated, the several rollers are likewise rotated and the conveyers thereby operated. The rollers C', $C^2$, are geared together by the toothed wheels $c^3$, $c^4$.

The end of the crank handle T, is provided with a recess to receive a spring $s$, adapted to bear against the end of a shaft S, the said shaft having a pin $t$, which is adapted to ride in the cam slot S', of the crank handle T. The crank handle fits and slides on the shaft, said crank handle having a flange $t^3$, to engage the angular end U, of the arm U', which arm projects from a lever V, pivoted on a stud or support W, on the casing. The lever V, is under the control of a spring $v$, which normally draws the end of the lever, to which it is connected, toward the casing and causes the opposite end of the lever to assume a position in the line of travel of the dog W', on the gear wheel X, the said gear wheel X, being in mesh with a wheel on the shaft of the drum $k$. The result of the dog contacting the end of the lever, is to arrest the mechanism of the developing apparatus. Said dog is automatically released, however, when the crank handle is released, owing to the movement of the said crank handle longitudinally and independently of the shaft, which causes the flange of the crank handle to engage the end of the arm. The force of the spring bearing against the crank handle overcomes the pull of the spring $v$, and swings the lever on its pivot, out of engagement with the dog.

The dog has a limited movement independent of the gear wheel X, and is under the influence of the spring Y. The movement of the dog is limited by the pins or studs $y$, $y^2$, but the movement permitted the dog is sufficient to allow its face to pass the end of the lever, in order that, when said lever is again under the control of the spring $v$, the end of the lever cannot arrest the dog until the wheel has made a complete turn. By mounting the crank with a limited movement independent of the shaft and providing the spring to force it longitudinally of the shaft when released by the operator, the arresting devices automatically release the mechanism and the apparatus may be thrown into action again by the application of power to the crank handle.

The feeding and cutting rollers and the means for intermittently throwing them into action is substantially the same as that contained in my patent heretofore referred to, hence the mechanism will not be described in detail.

In opening the apparatus, the film will be

drawn through the exposure chamber Z, and severed into appropriate lengths. The severed sections will then be delivered between the rolls C′, C², and taken between the chains and apron around the roller *d*. The mechanism is so set that when the film is submerged in liquid in the tank, the conveyers will come to rest. That is, the end of the lever V is in the path of travel of the dog W, and the dog abutting the end of the lever is brought to a stop and the conveyers arrested. When the operator releases the crank handle, the spring *s*, will force the crank handle longitudinally of the shaft and the flange thereon will abut the end of the arm U′, and as the spring *s*, is stronger than the spring *v*, the lever will be swung on its pivot, until its end is out of engagement with the dog; then said dog will swing on its pivot under the pressure of the spring Y, and the face thereof will pass the end of the lever. When the crank handle is turned in the direction of the arrow, Figs. 3 and 4, the cam slot and pin will cause the crank to ride longitudinally of the shaft until the end of the cam slot is reached and then motion is communicated to the shaft, and to the mechanism through the gearing and the conveyers will thus be driven intermittently. With the resumption of travel, the film that was in the developing tank will be carried out of the tank and over the roller C³. When the chain and apron separate, the film which will adhere to the belt will be carried until the belt turns the abrupt curve around the roller C⁴, when the film will break away from the apron and descend by gravity into engagement with the second conveyer. By a series of intermittent movements, the conveyer will carry the film through the fixing fluid in the tank H, and deliver said film through the opening P, of the case for, regardless of the apron to which the film adheres, it will break away from said apron before passing around either roller L, or *l*, and said film will be delivered by gravity through the opening indicated.

While the foregoing description relates to the manner of feeding the film through the receptacles or through portions of the receptacles intended to contain fluids for treating the film and as any appropriate means may be utilized for delivering film to the film carrying members from the exposing chamber or from the source of film supply, one method of carrying this into effect is illustrated in the drawing. In the illustration, the source of film supply is identified by the reference character 10 and the film may be fed therefrom through the channel 11 and delivered to the conveying members E and F. If the film is in web form wound on a spool and it is desirable to sever the film into appropriate lengths, this may be done by the mechanism illustrated, which mechanism substantially conforms to that illustrated in my patent numbered 810,388 and a detailed description of these features is believed to be unnecessary, as the details of construction for cutting the film or for driving the mechanism are not a part of the present invention.

What I claim is:—

1. In a developing apparatus, a conveyer to which film will adhere when wet, means for causing a separation of the conveyer and film, permitting the film to gravitate, a second conveyer consisting of two sections between which the film is fed, means for causing the sections of the conveyer to diverge, and means for causing the sections of the conveyer to travel in a sharp curve to cause a separation of the film and conveyer.

2. In a developing apparatus, means for carrying film through tanks, means for driving the carrying mechanism, means for locking and releasing the driving mechanism, means for arresting the carrying mechanism at predetermined intervals, and means for tripping the arresting means when the driving mechanism is released.

3. In a developing apparatus, a conveyer, mechanism for driving the conveyer, a power transmitting device, means for automatically arresting the mechanism, and means for tripping the arresting mechanism upon releasing the power transmitting device.

4. In a developing apparatus, a conveyer, means for moving the conveyer, means for applying power to the conveyer moving mechanism, means for arresting the conveyer moving means, means for tripping the arresting mechanism upon releasing the power applying device.

5. In a developing apparatus, a conveyer, mechanism for moving the conveyer, a crank handle for driving the mechanism, a shaft on which the crank handle has a limited rotary movement independent of the shaft, means for moving the crank handle longitudinally of the shaft as it is rotated, means for causing the shaft to take motion from the crank handle, means for arresting the conveyer mechanism at predetermined intervals, and a tripping mechanism under the control of the crank handle for releasing the arresting means.

6. In a developing apparatus, a conveyer, mechanism for moving the conveyer, a dog carried by a moving part of the conveyer moving mechanism, a lever movable into and out of the path of travel of the dog, a power applying means for the conveyer mechanism, and means under the control of the power applying means for regulating the movement of the lever.

7. In a developing apparatus, a conveyer,

mechanism for moving the conveyer, a lever adapted to control a part of the conveyer operating mechanism to arrest said mechanism, a power applying device, and means whereby said power applying device controls the movement of the lever.

8. In a developing apparatus, a conveyer, mechanism for moving the conveyer, means adapted to contact with a part of the conveyer operating mechanism for arresting said mechanism, a power applying element, and means whereby said power applying element controls the position of the arresting device.

In testimony whereof I affix my signature in the presence of two witnesses this 9th day of October, 1907.

GEORGE C. BEIDLER.

Witnesses:
L. E. BARKLEY,
L. A. SANDS.