Aug. 17, 1937. V. KUNSTÄDTER 2,090,389

PHOTOPRINTING AND DEVELOPING APPARATUS

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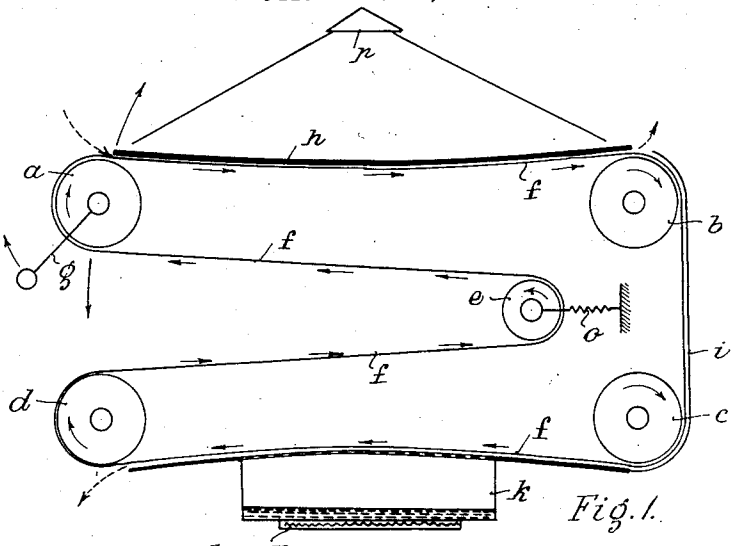


Fig. 1.

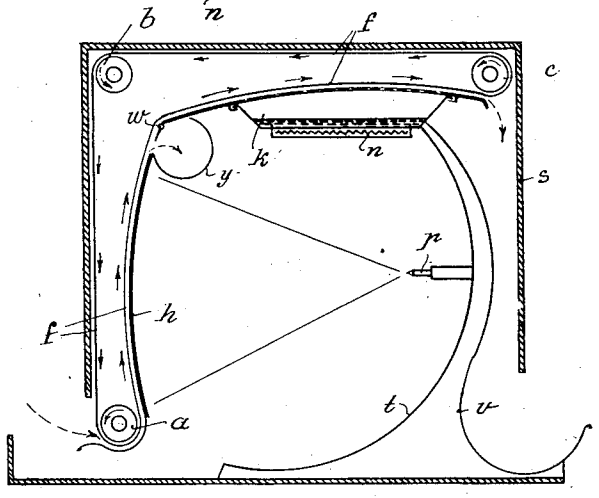


Fig. 2.

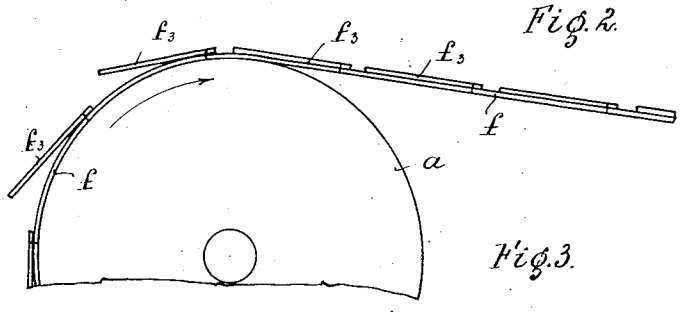


Fig. 3.

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PHOTOPRINTING AND DEVELOPING APPARATUS

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10 Claims. (Cl. 95—94)

The invention relates to a combined photographic contact-printing and developing apparatus which can be employed for the photo-printing by means of sunlight as well as for photo-printing by means of artificial light and which owing to its small dimensions, simple design and low cost is suitable for being employed as a photo-printing apparatus for their own private use by all kinds of offices. Its advantage as compared to the various known types of photo-printing apparatus is that the photo-print leaves the apparatus in developed condition.

In the accompanying drawing,

Figs. 1 and 2 show, in a diagrammatical manner, various embodiments exemplifying the invention, whilst

Fig. 3 is a detail drawing.

In the embodiment according to Fig. 1 a single endless belt *f* is slung over the rollers *a, b, c, d, e*. On this belt strips f_3 extending in the transverse direction are fixed along one of their longitudinal edges at definite distances from each other, so that the edge of the drawing placed on the belt can be clamped below these strips. (Fig. 3.) These strips f_3 may also consist of several strip-sections lined up in the continuation of each other, but they may also be made from the material of the endless belt itself by slitting up of one side of belt at spaced distances. The strips are lying with one of their surfaces on the even part of the endless belt, whereas they are slightly turned outwards from the curved part of the belt. The roller *a* is fitted with a driving handle *g*, by rotating which the belt *f* is made to move on the guiding rollers. The shaft of the roller *e* is subject to the action of the spring *o*, by which latter the belt *f* is permanently kept in a stretched condition. The rollers are supported in bearings in a common frame and above the belt part between the rollers *a, b* the concave glass plate *h* is arranged in such a manner as to enable the distance of this plate from the belt to be varied. The roller *a* as well as the glass plate *h* can be rotated around the shaft of the roller *b* which arrangement enables the drawing from which a photo-print is to be taken to be adjusted in each case into the position corresponding to the position of the source of light.

The belt portion between the rollers *b* and *c* is covered from outside by the sheathing *i* so that there remains a sufficient clearance for allowing the photo-print to pass through it to the roller *c*. A suitable transmission gear may be inserted between the roller *b, c* by means of which the photo-print arriving from the roller *b* is led to the roller *c*.

Below the belt portion between the rollers *c* and *d* the developing box *k* is arranged, above the upper opening of which the belt *f* is passing. This box may be filled with steaming developer liquor, so that it is only the vapours given off by this liquor which come into contact with the belt i. e. with the photo-printing paper, but it is also possible that a drum driven from one of the rollers *a, b, c, d, e* by means of transmission gears and immersed into the developer liquor should be supported in the box in which case the photo-print is guided further between this drum and the rollers and becomes developed by coming into contact with the drum surface wetted by the developer liquor. At the bottom of the box *k* the electric resistance *n* is provided which in the case of the employment of an artificial source of light represents at the same time the resistance of this source of light also, and by means of which the developer liquor may be heated and thus the production of vapours may be accelerated.

The apparatus may be united with the source of artificial light *t*, or may be used without such a source of artificial light merely for photo-printing by means of sunlight.

The drawing from which a photo-print is to be taken as well as the photo-printing paper are slipped in at the roller *a* between the glass plate *h* and the belt *f*, the edge of the photo-printing paper is pressed down by means of the strip f_3 and following this the roller *a* is rotated by turning the handle *a*. Hereby the strip *f* will become displaced on the guide rollers and will carry the drawing sheet and the photo-printing paper along with it and cause these to move along in front of the source of light. The drawing sheet which is situated nearer to the glass plate can be lifted out from the apparatus at the roller *b* but the photo-print will continue to travel between the belt *f* and the sheathing *i* to the roller *c* and from the latter to the roller *d* and in the meantime it is in contact with the developer material so that at the roller *d* it leaves the apparatus already in a developed condition. In the case of photo-printing performed outdoors, it is always possible, by turning over the roller *a* around the shaft of the roller *b* to set the apparatus into such a position in which the incidence of the sunrays on it is the most advantageous.

In case of taking photo-prints from a material of more substantial thickness the distance of the glass plate *h* from the belt *f* can be adjusted to suit such thickness.

The embodiment according to Fig. 2 is intended only for use in connection with a source of artificial light *p*. The endless belt *f* is slung over the guide rollers *a*, *b*, *c* supported in bearings in the box *s*. The adjustable glass plate *h* is arranged in front of the inner branch of the belt, in the interior of the box, and it is likewise in the interior of the box that the source of light *p* and the reflector *t* are arranged. The source of light *p* is fixed on the plate *v*.

At the end of the glass plate *h* the box *y* is arranged the inlet opening of which is closed by the small door *z* which can be set over around the pivot *w*. The belt portion between the box *y* and the roller *c* passes over the developer box. This box is situated above the source of light *p* so that the heat developed by the latter heats the developer.

The drawing to be developed and the photo-printing paper are introduced at the roller *a* between the belt *f* and the glass plate *h*, preferably in such a manner that the edge of the photo-printing paper should slightly project in front of the drawing from which a photo-print is to be taken. As soon as during the rotation of the roller *a* the edge of the photo-printing paper behind the small door has travelled past the latter, the door is slightly opened around the pivot *w*, so as to enable the photo-printing paper to continue to travel towards the drum *c* whilst the drawing from which a photo-print is to be taken is, owing to the small door having become opened, becoming introduced into the box *y*. Following this the photo-printing paper passes above the developer and leaves the endless belt at the roller *c* already in a developed condition.

What I claim is:

1. A combined photographic contact-printing and developing apparatus comprising a device for photographic contact-printing and a device for development as well as means for guiding of the photo-sensitive paper in a single working operation through both devices, the guiding means consisting in an endless belt having strips at distances attached to said belt for clamping the edge of the photo-sensitive paper during contact-printing and development.

2. A combined photographic contact-printing and developing apparatus comprising devices for contact-printing and for development and an endless belt for guiding of the photo-sensitive paper having strips at distances for clamping of the photo-sensitive paper, attached to said belt transversely to the direction of the travel of said belt.

3. A combined photographic contact-printing and developing apparatus comprising devices for contact-printing and for development and an endless belt for guiding of the photo-sensitive paper having transversely extending strips at distances for clamping of the photo-sensitive paper being attached to said belt along one of their longitudinal edges.

4. A combined photographic contact-printing and developing apparatus comprising devices for contact-printing and for development and an endless belt for guiding of the photo-sensitive paper having strips at distances extending transversely to the direction of travel of said belt and being attached to said belt along that of their longitudinal edges which is situated ahead in the direction of the belt's travel.

5. A combined photographic contact-printing and developing apparatus comprising devices for contact-printing and for development and an endless belt for guiding of the photo-sensitive paper having strips at distances attached to said belt on one of their longitudinal edges consisting of several shorter strip sections.

6. A combined photographic contact-printing and developing apparatus comprising devices for contact-printing and for development and an endless belt for guiding of the photo-sensitive paper having strips at distances consisting of several strip sections, being attached on one of their longitudinal edges transversely to said belt in continuation of each other.

7. A combined photographic contact-printing and developing apparatus comprising devices for contact-printing and for development and an endless belt for guiding of the photo-sensitive paper having strips at distances consisting of several strip sections being attached to said belt in continuation of each other on that of their longitudinal edges which is situated ahead in the direction of travel of said belt.

8. A combined photographic contact-printing and developing apparatus comprising devices for contact-printing and for development and an endless belt for guiding of the photo-sensitive paper having transversely arranged strips for clamping of the photo-sensitive paper formed from the belt itself by splitting up at places one side of the belt.

9. A combined photographic contact-printing and developing apparatus comprising devices for contact-printing and for development and an endless belt having transversely arranged strips for clamping of the photo-sensitive paper, these strips resting on the even part of said belt with their whole surface whereas they slightly project on the curved parts of the belt.

10. A combined photographic contact-printing and developing apparatus comprising devices for contact-printing and for development and an endless belt having strips at distances attached to said belt and guiding the photo-sensitive paper through a developer heated by the electrical resistance of the artificial source of light employed for contact-printing.

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