

No. 717,021

Patented Dec. 30, 1902.

A. POLLAK.
PHOTOGRAPHIC DEVELOPING APPARATUS.

(Application filed July 9, 1902.)

(No Model.)

2 Sheets—Sheet 1.

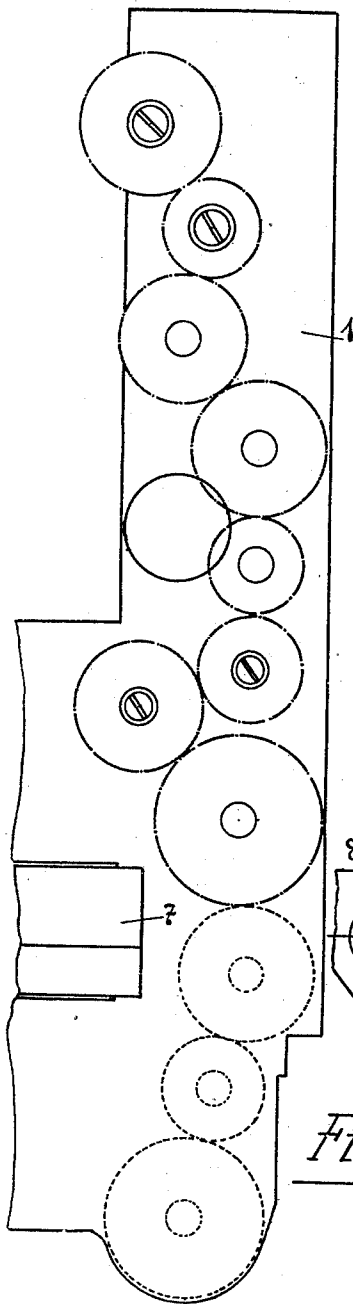
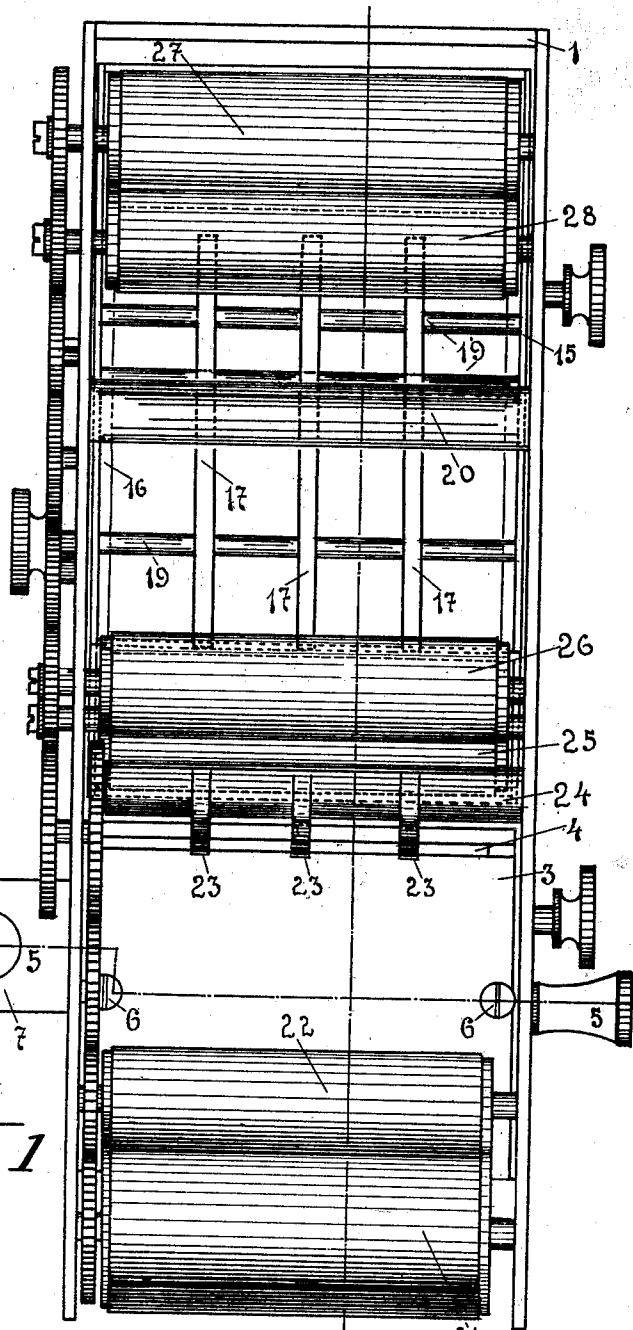


Fig. 1

Fig. 2

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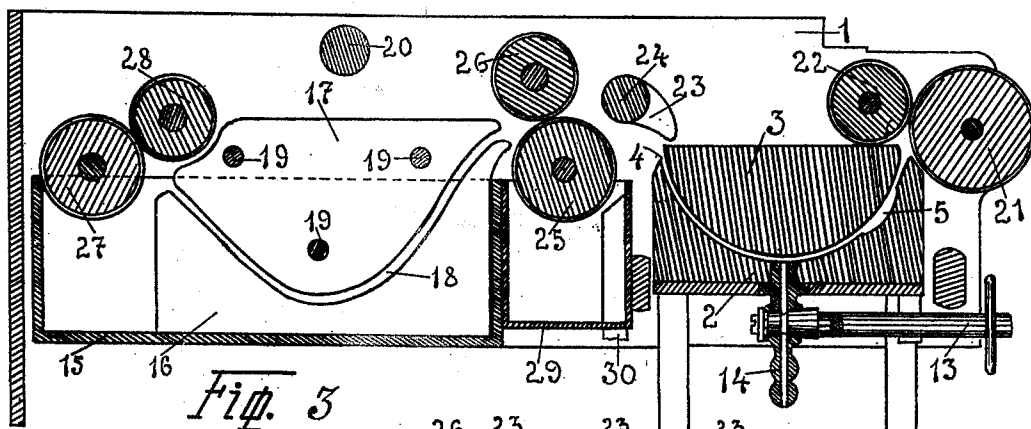


Fig. 3

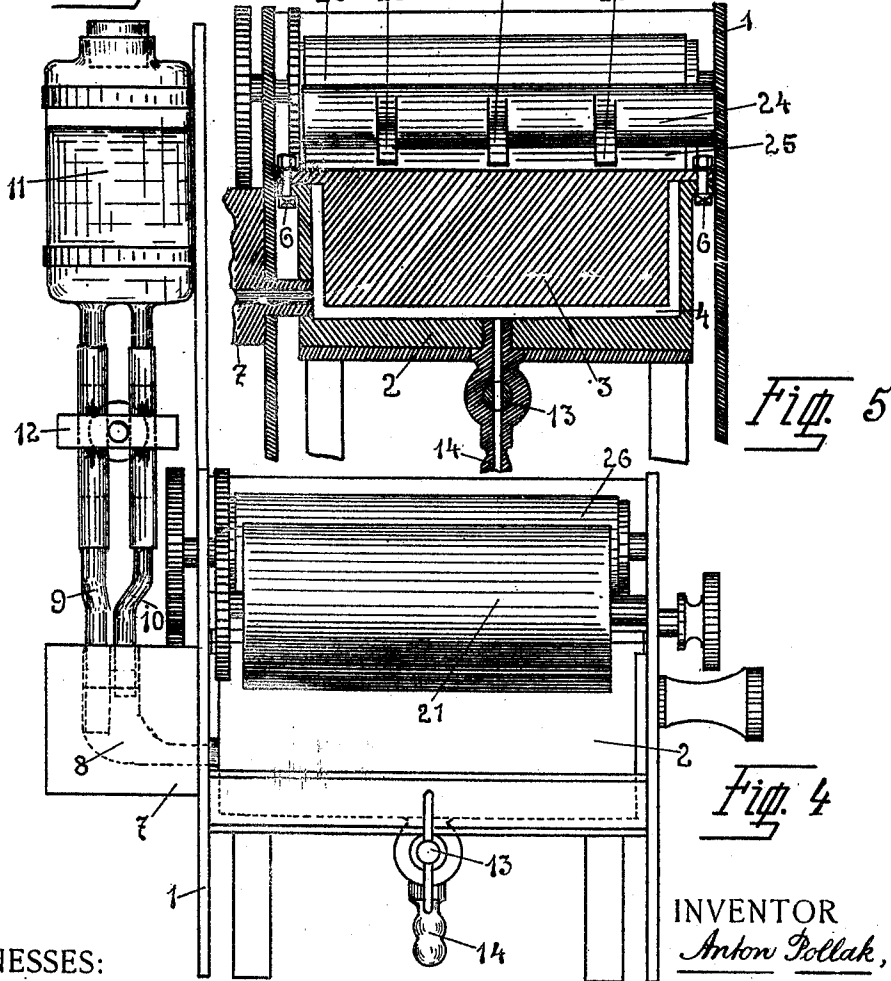


Fig. 5

Fig. 4

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UNITED STATES PATENT OFFICE.

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PHOTOGRAPHIC DEVELOPING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 717,021, dated December 30, 1902.

Application filed July 9, 1902. Serial No. 114,944. (No model.)

To all whom it may concern:

Be it known that I, ANTON POLLAK, a subject of the Emperor of Austria-Hungary, residing in Budapest, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Photographic Developing Apparatus, of which the following is a specification.

My invention aims to provide certain improvements in developing apparatus for photographic strips by means of which it is made possible to pass such strips of very short length mechanically through developing and fixing baths without the use of strip-moving rollers or bands in the fluid-receptacles.

The improved apparatus of my invention presents also various other advantages hereinafter specified in detail.

Referring to the accompanying drawings, illustrating an embodiment of the invention, Figure 1 shows the apparatus in plan. Fig. 2 is a side view of the same apparatus, illustrating the driving mechanism for the several rollers. Fig. 3 is a vertical longitudinal section on a smaller scale. Fig. 4 is an end view. Fig. 5 is a section on the line 5 5 of Fig. 1.

According to my invention the receptacle or receptacles for the liquid are provided with guides which guide the end of a strip into, through, and out of the liquid, and means—such, for example, as a pair of rollers—are arranged in advance of the receptacles to force the strip forward into the guides. Preferably also a similar pair of press-rollers is arranged at the rear end of the receptacle, and the strip emerging from the bath has its end guided into these press-rollers, which draw it out of the bath and at the same time press out the superfluous liquid thereon. By reason of this construction very short strips can be properly fed through the bath, which is an especial advantage in developing photographically - printed telegraph - messages, such, for example, as those of the rapid telegraph system of Pollak and Virag.

According to an important feature of the invention I may make the narrow passage in which the strip is guided the receptacle itself for the liquid, which receptacle will be of a substantially concave shape upward—that is to say, with only the advance and rear ends of the bath open to the air, so that the liquid

shall have a very small surface exposed to the air and shall be thus in a great degree protected from the decomposing influence of the air. This construction has also the advantage that the strip is continually brought into contact with fresh developing fluid which, for quick development, as in the Pollak and Virag system above referred to, is of the greatest value.

Referring now to the particular embodiment of the invention illustrated in the drawings, I arrange in a frame or chamber 1 a receptacle 2 for the developing fluid and a receptacle 15 for the fixing fluid, Figs. 3 and 5. The receptacle 2, as shown, consists of a trough of semicylindrical or similar longitudinal section, in which is fastened, by means of bolts 6, Fig. 5, an upper wall 3, preferably of semicylindrical or similar shape, so arranged that between it and the lower wall 2 there is formed a narrow passage 4, which serves at the same time as a receptacle for the developing fluid and also as a guide for the photographic strip. While the shape of these parts as shown is preferable for the purpose of properly guiding the strip, yet the intermediate portions thereof may be considerably varied in shape without sacrificing the advantage due to the exposing of the fluid to the air only at the two ends of the receptacle. For the purpose of insuring the complete wetting of both sides of the strip I preferably enlarge the passage at any desired point, as by cutting a transverse groove across the face of one of the walls—such, for example, as the groove 5, Fig. 3. The liquid at this point will be of greater depth and the strip which at this point is pressed against the concave side of the passage will have a space formed by the groove 5 in its rear, so as to insure complete wetting with the developing liquid.

As the passage 4 holds only a very small quantity of liquid, I provide a special means for always maintaining the latter at substantially the same level. For this purpose I preferably use a reservoir for feeding the liquid, operating on the principle of the Mariotte flask, Fig. 4. Connected with the passage 4 is a passage 8 in an attachment 7 alongside the receptacle. The open upper end of the passage 8 is widened, and in this upper end extend two tubes 9 and 10 from a res-

ervoir 11 for the purpose of conducting the liquid therefrom. The tube 9 extends nearly to the bottom of the passage 8, while the height of the lower end of the tube 10 is arranged according to the desired level of the liquid in the passages 8 and 4. As soon as the level of the liquid falls below the end of the tube 10 air entering the latter passes into the upper part of the otherwise closed reservoir 11 and permits the escape of a corresponding quantity of fluid through tube 9 into the passage 8 and thence into the receptacle 4. The area of the upper end of the passage 8 is of such magnitude that only a very little surface of the developing fluid is exposed to the air. The tube pincer 12 serves for cutting off flow from the reservoir. The reservoir 4 may be emptied of liquid, and also the passage 8, by means of a valve 13 in the tube 14. Obviously the maintenance of a constant level of the fluid in the reservoir may be secured by any other known or suitable apparatus than that described. The fixing-bath is preferably carried in a receptacle 15. This receptacle may be constructed identically like the receptacle for the developing liquid. Since, however, the fixing liquid is not injured, or is but slightly injured by exposure to air, the same measures of precaution are not necessary as in the case of developing liquid. The receptacle for the fixing liquid may therefore be made of somewhat simpler construction—as, for example, that shown in Fig. 3.

The receptacle 15 is a simple tray with a flat bottom, in which a number—as, for example, three—ribs 16 are provided, Figs. 1 and 3, the upper edges of which are suitably curved—as, for example, in the concave form shown. Above these ribs are corresponding ribs 17, with correspondingly-curved convex lower edges, so arranged that between the pairs of ribs are formed narrow guide-passages 18. The bolts 19 serve for the fixing of the ribs 17 in their proper position. A stiffening-bolt 20 is preferably provided between the side walls of the chamber 1. The fixing liquid fills the space between the ribs, as indicated in Fig. 1, while the narrow spaces between the upper ribs 17 and the lower ribs 16 serve to guide the strip properly through the liquid.

The moving of the strip through the apparatus may be accomplished in the following way: The strip is first conducted (preferably directly from the exposing-chamber) between the rollers 21 and 22, of which the roller 21 is directly driven, while the various other press-rollers of the apparatus are simultaneously driven from the roller 21 by means of suitable toothed pinions or the like, Figs. 1 and 2. The strip passing through the rollers 21 and 22 is forced into the passage 4, being constrained in direction by the shape of the passage, and escapes at the other end of the passage developed. The suitably-curved guide-fingers 23 on the cross-bolt 24 guide

the end of the developed strip between the press-rollers 25 and 26. The latter, as also those previously described, are covered with elastic material—such, for example, as rubber—and press out the superfluous liquid, which flows into the collecting-receptacle 29. The discharge-tube 30 serves for running the fluid out of the receptacle when the fluid has reached a certain desired level. Preferably the liquid in this receptacle is maintained at such a level, as indicated by the top of the tube 30, that the roller 25 is kept wet in order to avoid the sticking of the strip to the rollers. From the rollers 25 and 26 the strip runs into the fixing-bath and is there in a similar way forced forward by the rollers through the guide-passage 18, after which by means of the press-rollers 27 and 28 the fixing liquid is pressed out. The latter flows back into the receptacle 15 or may be otherwise disposed of. The number of pairs of press-rollers may be increased, if desired, by arranging one or more pairs in succession. For example, two or more pairs might be arranged in the rear of the developing or the fixing bath, and also a washing-bath of any suitable construction may be provided, although by a suitable pressing out of the liquid by means of the press-rollers the washing of the strip can in most cases be dispensed with.

The apparatus of my invention is characterized by extremely simple and cheap construction, which is due largely to the avoidance of guiding-rollers or guiding-bands and which insures certainty and simplicity of operation of the apparatus. Also the apparatus accomplishes a great saving in developing fluid, which in a telegraph system is a matter of considerable importance.

The entire apparatus may be inclosed in a light-proof chamber and the exposed strip thus protected from the injurious influence of intense light.

Though I have described with great particularity of detail an apparatus embodying my invention, yet it is to be understood that the invention is not limited to the particular apparatus disclosed.

Various modifications of the details and of the arrangement and combination of the parts are possible to those skilled in the art without departure from the invention.

What I claim is—

1. In a developing apparatus for a photographic strip, the combination with a receptacle for the liquid, of means at the entrance end of said receptacle for pushing the strip forward, and guides adapted to automatically engage the end of said strip as it is pushed forward and to guide the same through and out of the liquid.

2. In a developing apparatus for a photographic strip, the combination with a receptacle for the liquid having an upper wall and a lower wall arranged with an upwardly-con-

cave passage between them for submerging the strip, of means at the entrance end of said receptacle for pushing the strip forward, said concave passage being so narrow as to properly guide the free end of the strip directly through and out of the liquid.

3. In a developing apparatus for a photographic strip, a receptacle for the liquid having an upper wall and a lower wall arranged with a narrow upwardly-concave passage between them for submerging and guiding the strip, and one of the walls having a transverse groove across its face.

4. In a developing apparatus for a photographic strip, a receptacle for the liquid having a fixed upper convexly-curved wall and a fixed lower concavely-curved wall arranged with a passage between them upwardly curved at its ends for submerging the strip, said passage being so narrow as to properly guide the free end of a strip directly through and out of the liquid as said strip is pushed forward into said receptacle.

5. In a developing apparatus for a photographic strip, a receptacle for the liquid having an upper convex wall and a lower concave wall arranged with a narrow passage between them for submerging and guiding the strip, and having a transverse groove across the concave face of the lower wall.

6. In a developing apparatus for a photographic strip, the combination with a receptacle for the liquid, of ribs forming guiding-passages through the liquid, and means for moving the strip in said passages through the liquid.

7. In a developing apparatus for a photographic strip, the combination with a receptacle for the liquid, of pairs of ribs having between them guide-passages for guiding the end of a strip into, through and out of

the liquid, and means for moving the strip in said passages through the liquid.

8. In a developing apparatus for a photographic strip, a receptacle for the liquid having an upper wall and a lower wall arranged with a narrow upwardly-concave passage between them for submerging and guiding the strip, in combination with means for automatically feeding liquid to the receptacle and maintaining the same at a substantially constant level therein.

9. In a developing apparatus for a photographic strip, the combination with a receptacle for the liquid, of press-rollers at the rear end of said receptacle and between which the strip runs, and means for keeping said rollers wet.

10. In a developing apparatus for a photographic strip, the combination with a receptacle for the liquid, of press-rollers at the rear end of said receptacle and between which the strip runs, a separate receptacle below said rollers for receiving the liquid pressed out from the strip, and means for maintaining the liquid in said separate receptacle in contact with said press-rollers so as to keep the latter wet.

11. In a developing apparatus for a photographic strip, the combination with a receptacle for the liquid, of press-rollers at the rear end of said receptacle and between which the strip runs, and guides adjacent to the rear end of the receptacle for guiding the end of the strip to the press-rollers.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ANTON POLLAK.

Witnesses:

FRANK DYER CHESTER,
RELERNESS ANDRIES.