

Feb. 7, 1928.

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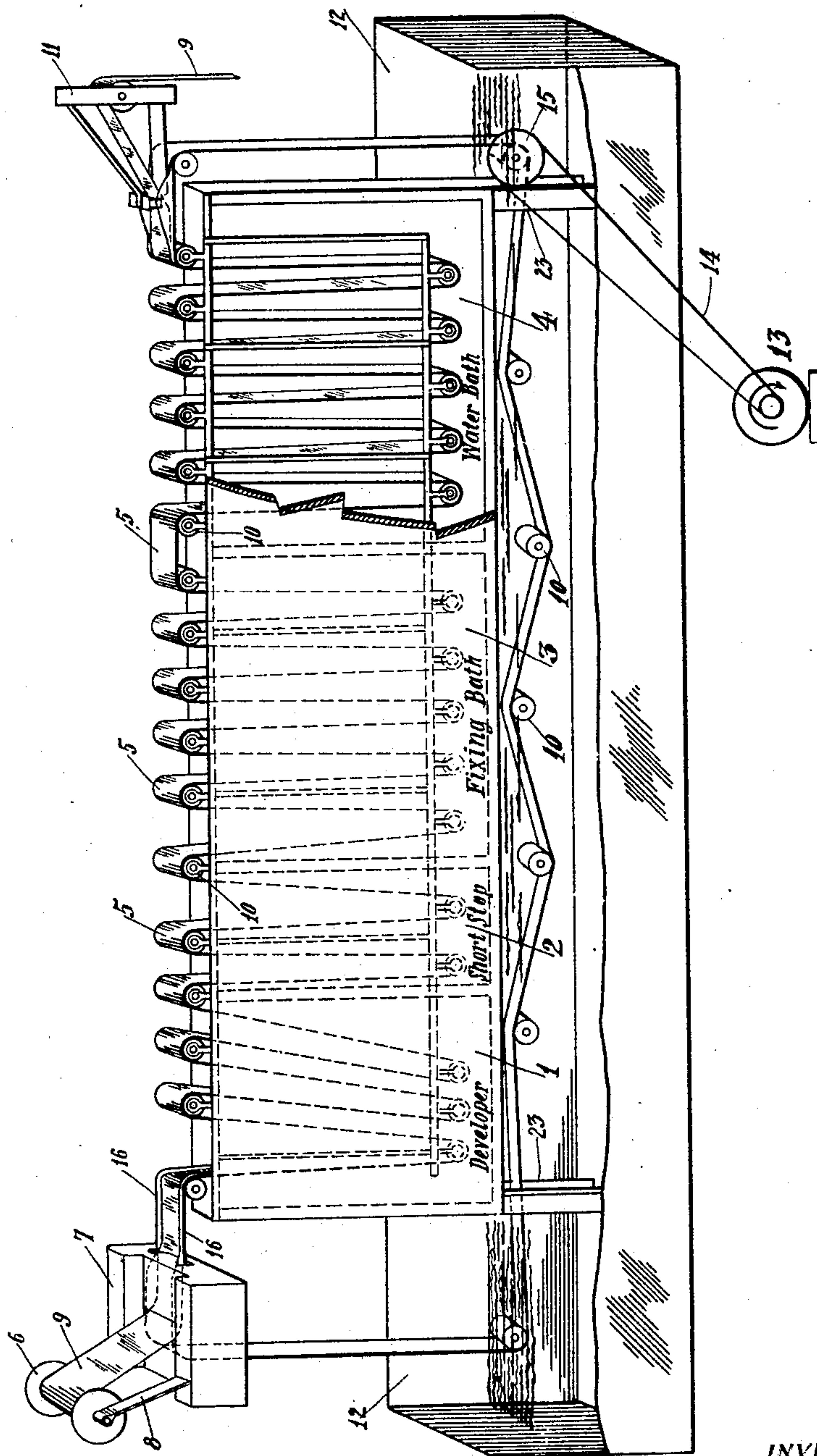
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PAPER CONVEYING SYSTEM

Filed Dec. 5, 1925

2 Sheets-Sheet 1

Fig. 1



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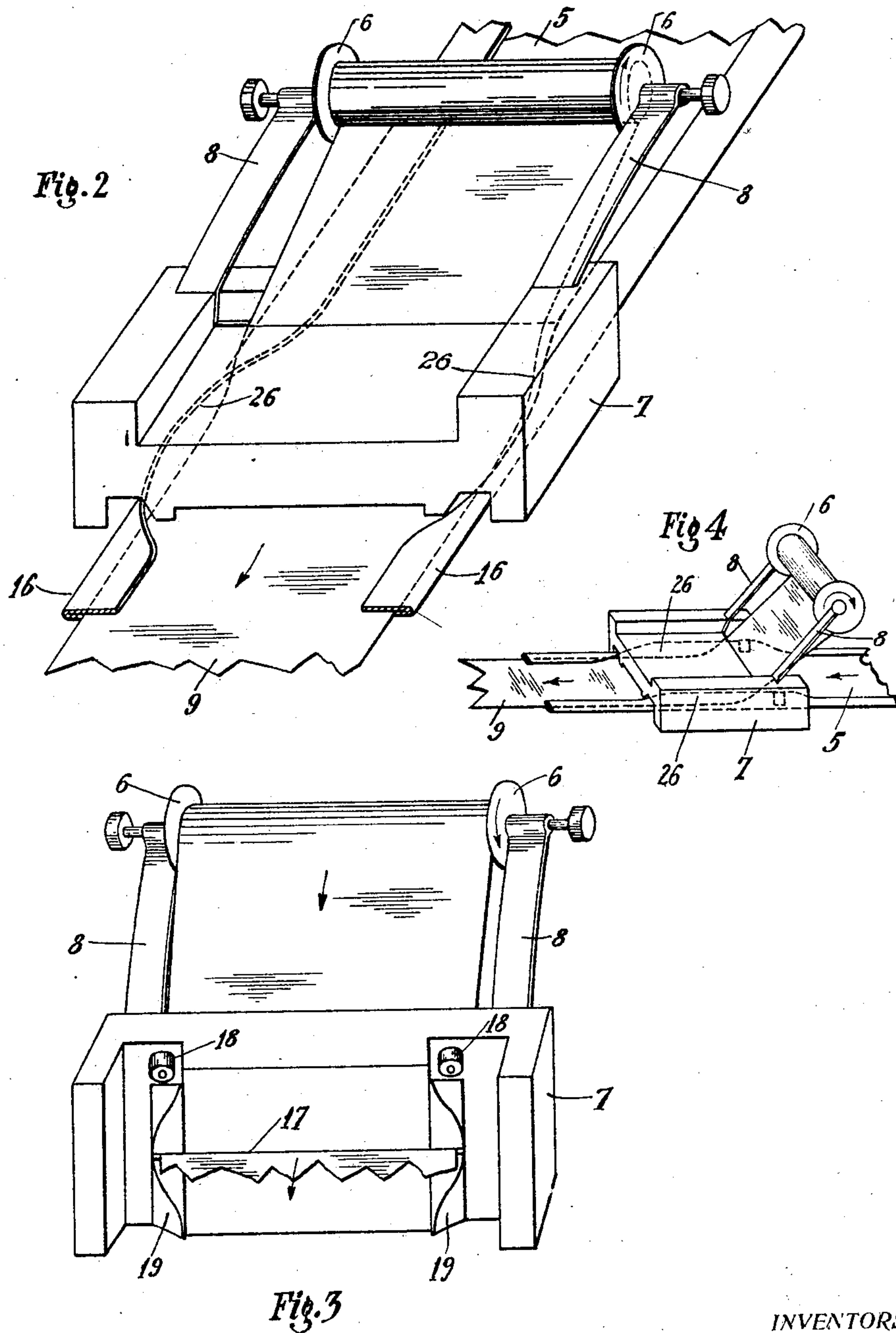
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Filed Dec. 5, 1925

2 Sheets-Sheet 2



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1,658,094

UNITED STATES PATENT OFFICE.

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PAPER-CONVEYING SYSTEM.

Application filed December 5, 1925. Serial No. 73,494.

This invention relates to systems for conveying flexible material, and more particularly to systems for conveying paper through a plurality of baths of various chemical solutions to be acted upon by said solutions.

In photography, after a reel of paper having a film of emulsion thereon has been exposed to an image formed by the lens of a camera, it has to be developed before the image becomes visible. This reel of paper is fed on a continuous or endless belt to be immersed in baths of various chemical solutions, some of which are commercially known as the developer, the "short-stop," the "fixing bath," and the water bath. Briefly, the developer brings out the lights and shadows; the "short-stop" prevents the image on the paper from being over-developed; the "fixing bath" removes any of the emulsion on the paper not acted upon by the exposure to the lens of the camera and permanently fixes that which has been exposed to the light so that no further change takes place; and the water bath acts to wash out all superfluous chemicals not making up the image. Finally the paper is dried, and the picture is then said to be developed.

A long strip of paper when conveyed through chemical solutions obviously becomes wet and tends to increase in length. Furthermore, by virtue of the low tensile strength of the paper, it will tear when pulled through such solutions.

It is therefore an object of this invention to provide a system for conveying paper through a plurality of baths of various chemical solutions to be acted upon chemically by these solutions, the system being arranged so that the paper does not tear while passing through these solutions.

It is a further object of this invention to provide a flapped belt to convey paper from a feeding device to an unloading device, the flaps of the belt being employed for holding the paper to the belt.

While the nature of the invention will be pointed out with particularity in the appended claims, the invention itself, both as to its further objects and features, will be better understood from the detailed description hereinafter following when read in connection with the accompanying drawing, in which Figure 1 is a perspective view illustrating one embodiment of the invention

having a feeding device and an unloading device; Fig. 2 is a more detailed view of the feeding device; Fig. 3 is a view of the bottom side of the feeding device; Fig. 4 shows still another view of the feeding device. Similar parts will be designated by similar reference characters wherever they appear throughout the drawing.

Referring to Fig. 1, there is shown a plurality of baths 1, 2, 3 and 4. Bath 1 may be the developer; bath 2 may be the "short-stop"; bath 3 may be the "fixing bath;" and bath 4 may be the water bath. It will be understood, however, that while only four baths have been shown which have particular reference to a photographic system, any number of baths may be included in any system whatsoever, and the solutions in the baths may be of any desirable chemical compositions without in any way affecting the scope of the invention.

A belt 5 is shown, and this belt may be a continuous or endless belt. It may be made of any material, preferably some flexible material, such as rubber, canvas, etc. The belt has along its edges two flaps which will be better shown in the other figures and the descriptions thereof hereinafter given. A reel of paper, or of any other flexible material, is designated by the reference character 6 and forms part of the feeding device 7. The reel of paper is supported on the feeding device by means of the supports 8. The paper 9 rolled from the reel 6 is fed between the flaps 16 of the belt 5 by means of the feeding device 7. The feeding device 7 has means associated therewith for spreading the flaps of the belt 5, so that the paper 9 may engage the belt 5 and be held in position by the flaps of the belt. After the paper 9 has been gripped, the flaps are released and the belt moves over rollers 10 through the baths of the various chemical solutions.

After the paper on the belt has been treated by the various chemical solutions, it is removed from the belt at the unloading device 11. The unloading device comprises means for spreading the flaps of the belt so as to allow the paper to be separated from it and means for releasing the flaps of the belt after the paper has been removed. The paper, after being treated by the various chemical solutions and after being released

from the belt, is put through a dryer, thus completing the process of developing the image on the paper.

The rollers 10 function to direct the belt with the paper thereon through the various solutions in the baths. The length of time that the paper will remain in any particular bath will depend on the number of rollers therein. By increasing the number of rollers in any bath, the length of time that the paper will remain in that bath will increase, and vice versa. The water bath 4 is shown cut away so as to make visible how the belt moves over the rollers in that bath.

Before the belt returns from the unloading device 11 to the feeding device 7, it is moved through another water bath 12. This bath is employed for washing out any chemicals that may be left on the belt or between the flaps thereof before it returns to the feeding device 7. The baths 1 to 4, inclusive, stand on legs 23 in the water bath 12, and as the belt moves from the unloading device 11 to the feeding device 7, it is rinsed by the water in the bath 12, the level of the water in bath 12 being above the rollers under the baths 1 to 4, inclusive.

A motor 13 is employed for driving the belt 5. Another belt 14 connects a pulley 15 with the motor 13, the pulley 15 being on the same shaft as one of the rollers, thereby driving the belt 5.

In Fig. 2 a more detailed view of the feeding device is shown. The supports 8 hold the reel of paper 6 in place so that the paper may be rolled from the reel to be engaged by the endless flapped belt 5. The flapped belt moves in the direction indicated by the arrow, and at 26 the flaps 16 are spread apart so as to allow the paper rolled from the reel 6 to come in contact with the belt 5. After the paper has come in contact with the belt 5, the flaps are gradually released so as to firmly grip the paper to the belt.

Fig. 3 shows a view of the bottom side of the feeding device and the means at the feeding device for spreading and releasing the flaps of the belt before and after engaging the paper rolled off the reel 6. Paper coming off the reel 6 passes through the slot 17. The endless flapped belt moves along the under surface of the feeding device in the direction indicated by the arrow. As the flaps of the belt come in contact with the pins or rollers 18, the flaps of the belt are spread apart so as to permit the paper to come in contact with the belt as the paper passes through the slot 17. After the paper passing through slot 17 engages the belt, the flaps are gradually released, this release being accomplished by allowing the flaps of the belt to be moved against the curved surfaces 19.

Fig. 4 shows another view of the feeding device, again showing the reel of paper 6, the

endless belt 5 and the paper 9. The reel of paper 6 is held by the feeding device by means of supports 8. The belt moves from right to left, as indicated by the arrows. At 26 the flaps of the belt are spread apart so as to allow the paper to come in contact with the belt, and after the contact has been made the flaps are gradually released so as to firmly grip the paper.

The unloading device is not shown in any separate view, but it is similar in construction to the loading device, involving primarily means for spreading the flaps of the belt and for releasing the paper from the flaps of the belt after the paper has been treated by the various chemical solutions in the baths. The unloading device may also have pins or rollers similar to those described herein for the feeding device, the pins or rollers functioning to spread the flaps of the belt so that the paper may be easily released therefrom.

While this invention has been described with particular reference to a system for conveying paper from a loading device to an unloading device, it is to be understood that the invention may be applied to a system for conveying any other flexible material or substance without substantially deviating from the principles disclosed herein. The chemical solutions named herein are given merely for the purpose of illustration, and in practice other solutions may be employed without departing from the spirit of the invention.

While certain particular embodiments of the invention have been shown and described herein, it is to be distinctly understood that the invention may be set forth in other and widely varied organizations without departing from the spirit of the invention and the scope of the appended claims.

What is claimed is:

1. In a conveying system, in combination, an endless flapped belt, means for continuously feeding paper unrolled from a reel to the flapped belt, and means for continuously releasing the paper from the flapped belt.
2. In a conveying system, in combination, an endless flapped belt, means for spreading the flaps of the belt for receiving paper unrolled from a reel at the feeding terminal, the flaps of the belt being released at the feeding terminal after the paper has come in contact with the belt, and means for again spreading the flaps of the belt at the unloading terminal to allow the paper to be taken off the belt, the flaps of the belt being again released at the unloading terminal after the paper has been taken off the belt.
3. In a conveying system, in combination, an endless flapped belt, means at the loading terminal of the system for spreading the flaps of the belt for receiving paper unrolled from a reel, the flaps of the belt be-

ing then released in order to grip the paper to the belt, and means at the unloading terminal for again spreading the flaps of the belt to allow the paper to be withdrawn from the belt, the flaps of the belt being again released after the paper has been withdrawn from the belt.

4. A system for conveying paper from a loading device to an unloading device, which comprises an endless belt moving between said loading and unloading devices for conveying a strip of paper of substantially uniform width throughout therebetween, a flap on the belt for holding the paper thereon, and means for spreading the flap at said loading and unloading devices to allow the paper to be put on and to be taken off the belt, respectively.

5. In a system for conveying flexible material, such as paper, the combination of an endless belt which is normally flapped, and means for spreading the flaps of the belt, the flaps being thereafter released so that the belt may assume its normally flapped position.

6. In a system for conveying paper, in combination, an endless rubber belt having the edges thereof flapped over to hold paper thereon which is unrolled from a reel, means for driving the belt, and a plurality of rollers, the belt being moved by said driving means over said rollers.

7. A conveying system for conveying a long strip of paper continuously from a feeding device to an unloading device, comprising a belt, a device for feeding the paper continuously to the belt as the paper reaches the belt, means for fastening the paper continuously to the belt, and a device for unloading the paper continuously from the belt.

8. In a conveying system, in combination, an endless flapped belt, a loading device, and an unloading device, the loading device com-

prising means for spreading the flaps of the belt to receive paper unrolled from a reel, the flaps of the belt being released so as to grip the paper to the belt, the unloading device comprising means for spreading the flaps of the belt to allow the paper to be taken off the belt after being conveyed through the system, the flaps of the belt being again released after the paper has been removed from the belt.

9. In a conveying system, a belt flapped for conveying a flexible substance through the system, a device for spreading the flaps of the belt for feeding the flexible substance to the belt, and a device for again spreading the flaps of the belt and for releasing the flexible substance from the belt after passing through the system.

10. In a conveying system, a continuous belt moving through the system having a flap thereon, the flap functioning to hold the flexible material to the belt while passing through the system, a device for feeding the flexible material to the belt to be held by the flaps thereof before passing through the system, and a device for removing the flexible material from the flaps of the belt after passing through the system.

11. In a conveying system, a continuous belt moving through the system having a flap thereon, the flap functioning to hold flexible material to the belt while passing through the system, a device for spreading the flaps of the belt and for feeding the flexible material to the belt before passing through the system, and a device for spreading the flaps of the belt and for removing the flexible material from the flaps of the belt after passing through the system.

In testimony whereof, we have signed our names to this specification this 3rd day of December, 1925.

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