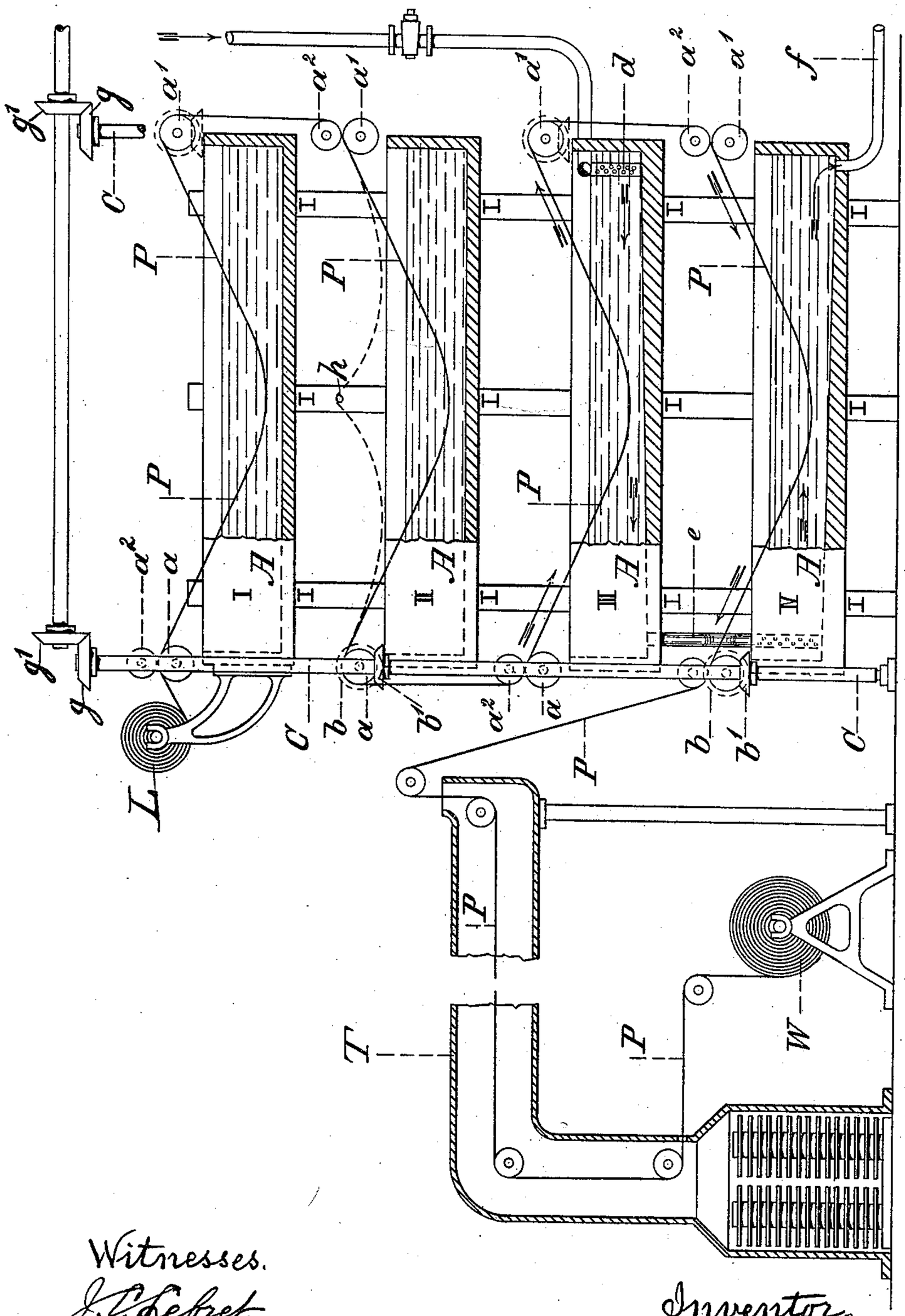
No. 607,649. Patented July 19, 1898.

A. SCHWARZ.

APPARATUS FOR TREATING AND WASHING PHOTOGRAPHIC PAPER.

(Application filed May 3, 1897.)

(No Model.)



Witnesses.
J. C. Lebret.
C. Block.

Inventor.
Arthur Schwarz,
By Wade Bros.
Attorneys.

UNITED STATES PATENT OFFICE.

ARTHUR SCHWARZ, OF BERLIN-SCHÖNEBERG, GERMANY.

APPARATUS FOR TREATING AND WASHING PHOTOGRAPHIC PAPER.

SPECIFICATION forming part of Letters Patent No. 607,649, dated July 19, 1898.

Application filed May 3, 1897. Serial No. 634,927. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR SCHWARZ, a subject of the German Emperor, residing at Berlin-Schöneberg, Germany, have invented certain new and useful Improvements in Apparatus for Treating and Washing Photographic Paper, of which the following is a specification.

In the manufacture of photographs in large quantities the strip of paper after having been exposed is passed through the baths containing the solutions for developing, toning, and fixing the pictures. For this purpose the paper has been advanced in vertical loops by means of guiding and driving rollers, so as to obtain the continuous feeding of the paper through all the baths. Such operation presents a great disadvantage very important for the thorough treatment of the paper—viz., that the photographs are only visible to the attendant during the small period that the paper emanating from the bath passes around the driving-rollers to enter into the next bath. It is evident that great care and practice are required to judge during this short period whether the photograph has been duly developed or toned. A thorough view of the paper can only be obtained after it has passed through all the baths, but if it is then ascertained that the time during which the paper was submitted to the action of the solution was not correct the whole length of paper then in the baths is spoiled or of inferior value, which represents a rather considerable loss, considering the length of paper thus lost.

The purpose of my invention is to devise an apparatus for developing, toning, and fixing photographs, enabling the attendant to control the action of the solutions upon the paper at all times and in all phases of the treatment.

To the accomplishment of the foregoing and such other objects as may hereinafter appear the invention consists in the construction and the combination of parts hereinafter particularly described and then sought to be specifically defined by the claims.

I have illustrated a schematic construction of this apparatus in the annexed drawing, making a part of this specification.

The baths consist of elongated shallow receptacles A of, for instance, eight meters in length by 0.5 meter in depth and are arranged one above the other in a solid structure, so that between each bath an open space of about 0.5 meter is left, enabling the attendant readily to overlook the surface of each bath. Above the short side walls of each bath are mounted guiding-rollers a a', over which the strip of paper P is passed in such manner that it forms a loop between said rollers, and thus becomes immersed in the bath. The reel L, upon which the exposed strip of paper P is wound, is arranged near the upper bath I, and the paper emanating from the reel passes over roller a of bath I toward roller a', its loop passing through the solution contained in the bath, as shown. The strip of paper then passes downward from roller a' of bath I to roller a' of bath II and after traveling through the solution contained in this bath passes over roller a of bath II downward to roller a of bath III, and so on.

At the ends of the bath where the strip of paper is fed into the solution are provided drive-rollers a^2, coöperating with the guiding-rollers a or a' for the purpose of providing the continuous feeding of the strip of paper. To this end the axles of the guiding-rollers a or a', that coöperate with the rollers a^2, are provided with conical gear-wheels b, engaging with the conical wheels b' of the vertical shafts C. The shafts C are rotated by means of conical gear-wheels g and g', as shown in the drawing, or in any other suitable manner.

From the above it is evident that the attendant can observe the paper over the entire length of the baths, and thus ascertain whether the action of the solutions is duly regulated. He is also enabled to interrupt the treatment at any time in a very simple manner—for instance, by pushing a stick h under the loop of paper in the bath and lifting the same, as shown in dotted lines in bath II.

It is admitted that in consequence of their great length the individual baths occupy more space than those through which the paper is fed in vertical loops; but this disadvantage is removed by the arrangement of the baths one above the other. Consequently the entire apparatus will occupy less space than

similar apparatus so far used and the cost of installation will be less; but the essential advantage is that the attendant has always all the baths under his control, and a further important advantage is that in the baths in which the paper is washed a very efficient countercurrent of the washing liquid in regard to the direction of the motion of the paper may be created. If, for instance, this countercurrent is to be provided in baths III and IV, the washing liquid may be advantageously fed in the bath through a perforated pipe *d* at the end where the paper leaves the bath and be drawn off at the other end through a pipe *e* into the lower bath IV. The pipe *e*, suitably bent, thus serves again as feeding-pipe for bath IV, the washing liquid flowing off at the other end through pipe *f*.

By making the bottoms of the baths III and IV inclined toward the discharge-pipes the effect of the countercurrent of the washing liquid in regard to the motion of the paper is still increased.

It is further to be remarked that no mechanical parts are located in the baths, so that a greater durability is obtained than in such apparatus where the driving or guiding parts are immersed in the solution and are more or less affected by same. If the paper is fed through the baths in the manner described, no special guiding devices for the wet paper will be required, for although it is immersed in the solution still it is to a large extent carried by same, and the solution presents a smooth path, over which the paper slides.

The paper after leaving bath IV is carried into a drying apparatus consisting of an elongated flue T, through which passes hot air. The paper is finally wound upon a reel W.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for treating photographic paper, the combination of a series of independent baths arranged one above the other in horizontal planes so as to leave an open space between the baths for observation of the paper as it passes through the baths, guide-rolls arranged at opposite ends of each bath, outside thereof, for supporting the photographic paper at opposite ends of the bath and permitting it to hang loosely in the bath, and means for moving the paper from one bath to the other, substantially as and for the purposes described.

2. In an apparatus for treating photographic paper, the combination of a series of independent baths arranged one above the other in horizontal planes so as to leave an open space between the baths for observation of the paper as it passes through the baths, guide-rolls and feed-rolls located at opposite ends of the baths outside thereof for supporting the paper at opposite ends of the bath and permitting it to hang loosely in the bath, means for operating the feed-rolls for moving the paper lengthwise of one bath and thence downward to the next bath and so in opposite directions through the series of baths, and means for admitting a washing liquid into one end of certain of the baths and delivering from the opposite end into the bath next below, substantially as and for the purposes described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

ARTHUR SCHWARZ.

Witnesses:
W. HAUPT,
HENRY HASPER.