

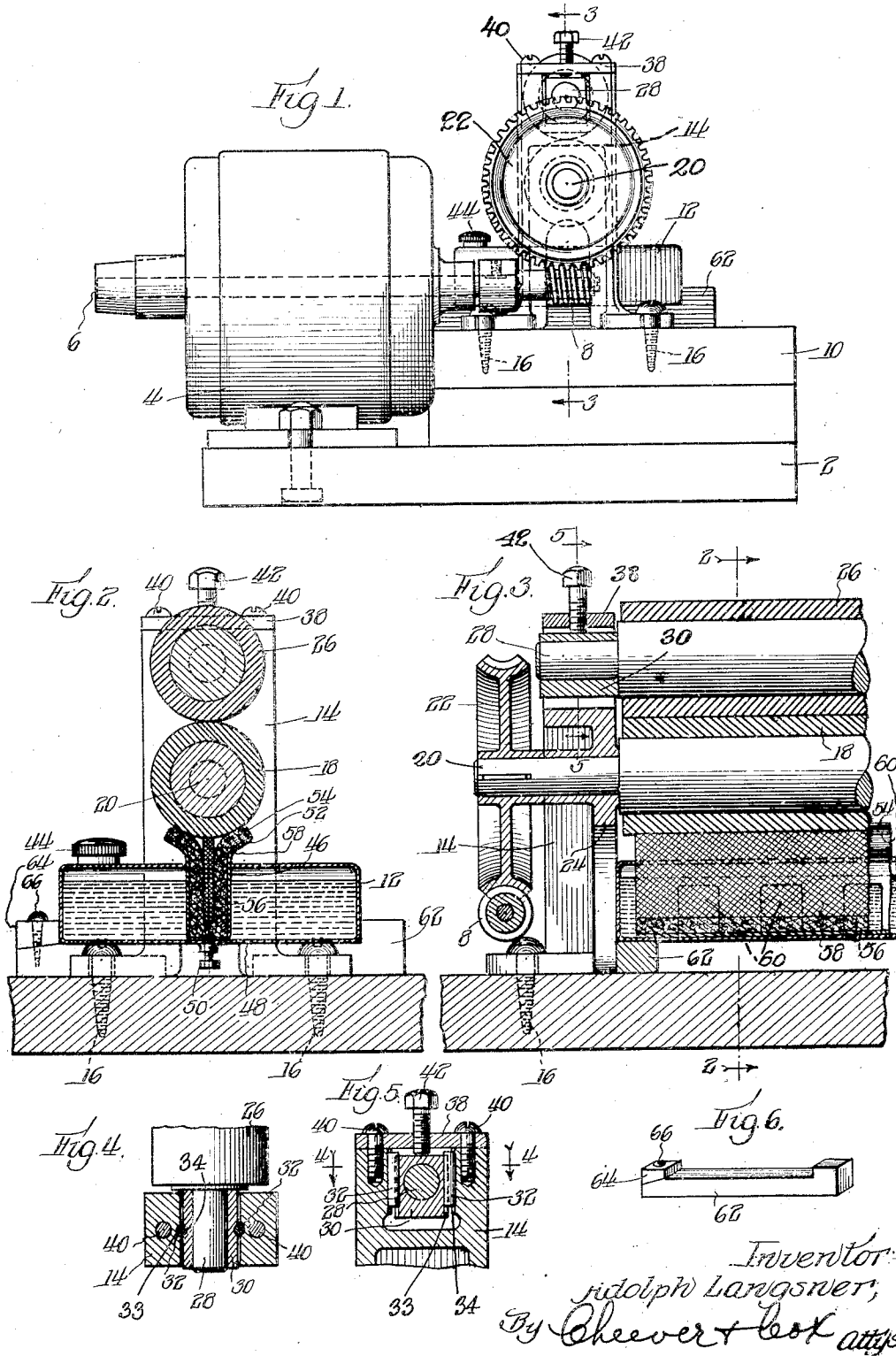
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A. LANGSNER

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DEVELOPING APPARATUS

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ADOLPH LANGSNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO EUGENE DIETZGEN COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE

DEVELOPING APPARATUS

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My invention relates to apparatus for developing sheets of light sensitive material, such for instance as paper, although not necessarily confined to paper, wherein the developing is accomplished by the application of a liquid alkali such as ammonia.

One of the objects of my invention is to provide a very simple type of apparatus for quickly and effectively developing sheets of this light sensitive material.

Still another object of my invention resides in providing an apparatus of this type which will apply the developing liquid to the sensitive side of the paper or other material to be developed in a uniform manner, while at the same time providing means for keeping the surface of the liquid-applying member, such as a roller, in clean condition.

Still another object of my invention resides in providing a simple type of mechanism consisting of opposing feed rolls through which the light sensitive material, such as paper, may be fed and which rolls will apply the developing liquid to the paper in a uniform manner.

An ancillary object of my invention resides in means for adjusting the relative position of the feed rolls.

Yet another object of my invention resides in the novel construction of the liquid developing wick for applying the developing liquid to the surface of the feed roll and particularly in the construction of a combined felt and wick member for applying the member to the roll, and in the provision of means for maintaining the felt and wick in firm wiping contact with the surface of the roll.

Yet another object of my invention resides in means for adjustably mounting the tank containing the liquid developer and the wick to a point beneath the lowermost roll.

These and other objects of my invention will be apparent from a perusal of the following specification when taken in connection with the accompanying drawings, wherein

Fig. 1 is a side view of my improved device;

Fig. 2 is a section on line 2—2 of Fig. 3;

Fig. 3 is a section on line 3—3 of Fig. 1;

Fig. 4 is a detailed sectional view of the roller bearing block;

Fig. 5 is a section on line 5—5 of Fig. 3; Fig. 6 is a perspective view of one of the blocks for holding the tank in position.

Referring now to the drawings in detail, the form of my device shown comprises a base plate 2 on which is bolted a motor 4, the shaft 6 of which is provided on one of its ends with a worm gear 8. The base plate 2 has a raised portion 10 which constitutes a support not only for the tank 12 containing the liquid developer, but also a support for two spaced uprights or brackets 14 which are secured to the base by means of the screws 16. A feed roll 18 having preferably a rubber surface is mounted on a shaft 20 having a bearing in these brackets 14 and this shaft carries at one end a large worm pinion 22 meshing with the worm gear 8 so that when the motor is driven the roller 18 will be driven thereby. This roller 18 in turn yieldingly presses against an upper roller 26 carried on a shaft 28 mounted in a block 30 which slides in vertical ways in the spaced uprights 14. Each way is preferably formed with a vertical wall having an arcuate cutout 33 which is adapted to register with a corresponding arcuate cutout 34 in the bearing block 30 and adapted to receive a pin 32 which while permitting the vertical adjustment of the bearing block 30, prevents its lateral removal.

This pin and groove construction provides a perfect vertical guideway for the bearing block 30 while permitting the removal of the block 30 and pin in an upward direction. In order to hold the block 30 from being pushed out upwardly through the open end of the spaced uprights 14, I provide a cap or bridge 38 consisting of a metallic cross bar adjustably fastened to the upper portions of the brackets 14 by screws 40. This bridge 38 carries an adjusting screw 42 threaded therethrough with the lower end of the screw contacting with the upper portion of the bearing block 30 carrying the shaft 28.

It will be appreciated that the constructions are the same on each end of the shaft; that is there are two brackets 14 and the construction shown in Figs. 4 and 5 is duplicated at each end of the shaft. By means of this construction the upper roll 26 is maintained

at a definite lowered position, preferably in contact with the lower roll 18, so that the upper roll is driven from the lower roll and the paper may be fed therethrough by inserting it into the bite of these two rolls.

In order to apply the developing liquid to the paper, I preferably apply it to the surface of the roll so that this liquid is transmitted as a uniformly applied form of developing liquid to the sensitized surface of the sheet as the paper is fed through and between the rolls.

The present invention includes a most effective means for not only applying the liquid in a uniform manner to the roll and thence to the paper, but also in a manner so as to keep the surface of the roll clean. This I accomplish by providing the liquid-containing tank 12, preferably enclosed, with a filling opening 44. This tank at its upper portion is slotted its entire length and receives therein and therethrough a substantially U-shaped sheet metal sleeve 46 which is adjustably fastened to the inner bottom surface 48 of the tank by means of an adjustable mounting 50 which is formed with a gasket and in a manner so as to prevent the leakage of the liquid through this adjusting joint. The upper ends of the sheet metal holder 46 are bent outwardly as at 52 and thence substantially at right angles as at 54. Into this sheet metal holder I place a combined wick and felt pad. The felt pad 56 envelops the wick except at the top, and the arrangement is such that the two outer sides of the felt pad are pressed firmly against the undersides of the roll 18 on each side of the upper portion of the wick 58, the upper end of the wick itself pressing and wiping against the face of the roller between the two opposed contacting portions of the felt pad.

By means of this construction it will be seen that irrespective of the direction of rotation of the feed roller 18 the felt will always serve as a means for cleaning the roller before it is brought into contact with the wick. Felt is particularly advantageous for its cleaning operation since the relatively short interlocking and interlaced fibres provide a homogeneous, uniform contact in all directions along the face of the roller and there are no gaps nor spaces which will not be cleaned. In addition the fibres are tougher and are more resilient than are the threads of the wick, thereby providing a better cleaning action. In addition the two sides of the felt pad support the wick in upright position providing a sort of resilient yielding mounting for it, while at the same time not interfering with the capillary flow of the liquid from the container 12 through the felt pad into the wick and out of the wick to the roller.

It will be noted that the upper ends 52 and 54 of the metal holder firmly support the felt pad and wick in position. In order to

permit the free flow of the liquid into the container 12 of the felt pad 56 I prefer to provide the sides of the metal holder 46 along its length with a plurality of cutouts 60.

Means are provided for holding the container 12 in position immediately beneath and in contact with the feed roller 18. This is accomplished by a spacing block 62 which when the container is inserted beneath, the roll is placed under the container and one end of this block is preferably formed with an upstanding lug to prevent sidewise movement of the container while the opposite end receives an additional lug 64 which is secured thereto by means of a screw 66 so that when in place the tank is prevented from moving in an opposite direction. If desired this block may be made adjustable by suitable means so that the height of the tank may be controlled from this block, but I prefer to provide an adjusting means for the wick by means of the adjustment 50.

It will thus be seen that my present device comprises a very simple yet effective means for quickly developing sheets of light sensitive material by means of contact with an alkaline developing liquid, such for instance as liquid ammonia. In this device the paper is inserted into the bite of the motor driven rolls and is fed therethrough. As it passes through the rolls the developing liquid which is drawn up by means of the wick and applied to the surface of the roll, is applied uniformly and evenly to the sensitized face of the paper and as it passes through it will be developed by contact with this developing liquid. By reason of the adjustability of the upper roll 26 I am enabled to determine the degree of pressure of the feed rolls, and this is accomplished by the adjusting screws 42.

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

1. In a developing apparatus of the character described, the combination of a base, two rolls adapted to rotate and contact with each other, means for rotating said rolls so as to feed a sheet of light sensitive material therethrough, a container for developing liquid, a wick extending into said container and having an edge contacting with the face of said roll, and a porous member disposed on each side of said wick and adapted to wipe the face of said roll.

2. In a developing device of the class described, the combination of a base, and rolls mounted on said base adapted to contact with each other so as to feed a sheet of light sensitive material therebetween, a container for developing liquid and means for applying the liquid uniformly to the surface of one of the rolls, said means consisting of a wick extending into the developing liquid, a felt strip supporting the wick with the ends of

said felt enclosing the wick and having its free ends lying on either side of that portion which contacts with the roller, said free ends of the felt wipingly engaging said roller.

3. In a developing device, the combination of a base, two feed rollers mounted thereon and rotating in contact with each other so as to feed a sheet of light sensitive material therethrough, means for rotating said rollers, a container for developing liquid, a sheet metal holder in said container and extending the length of the roll, said holder forming a pocket, a felt pad folded upon itself and lying in said pocket and supported by the holder and a strip of wick supported by the folded sides of said felt, the upper portion of said wick wiping against said roll and the upper folds of said felt wiping against the roll on either side of the wick, said holder being constructed and arranged to permit the discharge of the developing fluid through the felt and the wick.

4. In an apparatus for developing light sensitive material, the combination of feed rolls for feeding a sheet of light sensitive material therethrough, a source of developing liquid, a wick extending into said liquid and wiping against the surface of the roll, a resilient mounting for said wick, said mounting resiliently engaging and wiping against the surface of the roll on either side of the wick to clean the same.

5. In an apparatus for developing light sensitive material, the combination of feed rolls for feeding a sheet of light sensitive material therethrough, a source of developing liquid, a wick extending into said liquid and wiping against the surface of the roll, a resilient mounting for said wick, said mounting resiliently engaging and wiping against the surface of the roll on either side of the wick to clean the same and means for adjusting the mounting of said wick with respect to the roll.

6. In an apparatus for developing light sensitive material, the combination of a base, feed rolls rotatably mounted thereon for feeding a sheet of light sensitive material therethrough, a container having developing liquid therein, a substantially U-shaped metal holder mounted in the container and extending the length of the roll beneath the same, the upper ends of said holder being formed outwardly and having angularly disposed flanges, a strip of felt folded upon itself in substantial U-shape form and lying within said holder with the free ends abutting said flanges and wiping against spaced portions of the periphery of one of said rolls, and a strip of wicking lying between the folds of said felt with its upper end contacting with the roll.

7. A developing apparatus comprising a base, spaced uprights thereon, feed rolls carried by said uprights, means for rotating

said rolls to feed a sheet of light sensitive material therethrough, a liquid container mounted adjacent one of said rolls, a wick support mounted in said container, a wick carried in said support and adapted to wipe against the surface of one of said rolls and means for adjusting said wick support relatively to said roll.

8. In a developing apparatus, the combination of a base, spaced uprights carried thereon and carrying two feed rolls, means for rotating said rolls to feed a sheet of light sensitive paper therethrough, a liquid container adapted to be positioned beneath one of said rolls, a support standard in said container, a wick carried in said standard and wiping one of said rolls and a mounting block positioned beneath said container to hold it in predetermined position, said block having upstanding portions preventing the lateral displacement of said container.

9. In a developing apparatus, the combination of a base having two feed rolls, means for feeding light sensitive material therethrough, a fluid container on said base adjacent one of said rolls, means for conveying a fluid from said container to the surface of said roll, said means comprising a metallic holder, a strip of felt mounted thereon and a wick supported by said strip of felt, said wick and felt wiping against the adjacent surface of said roll.

10. In a developing apparatus for light sensitive material, the combination of a base, a motor thereon having a drive shaft, spaced uprights, two feed rolls mounted in said spaced uprights and adapted to receive a sheet of light sensitive material therebetween, gearing connection from said motor shafts to one of said rolls, a container for developing liquid mounted on said base beneath one of said rolls and a wick mounted in said container and wedgingly contacting with one of said rolls, means for supporting said wick in roll contacting position, and means to adjust the wick supporting means.

11. In a developing apparatus of the class described, the combination of an enclosing container adapted to receive and hold a quantity of developing liquid adapted to give off developing gases, said container being wholly closed except for an opening in its top, a wick device inserted through the opening and practically sealing the same so that gases cannot escape therethrough, feed rolls located above said tank, one of said rolls having the wet wick wipingly engaging its surface and means for driving the rolls for feeding the paper therethrough to be developed by the developing liquid.

12. A developing apparatus for light sensitive material comprising a frame, a roll rotatably mounted in the frame, means to press light sensitive material to be developed against said roll, means to rotate the roll, a

container for a developing fluid mounted in the frame, a strip of porous material having portions dipping into the developing fluid and portions wiping the surface of the roll and a shell comprising a perforated sheet of metal bent to provide an elongated clip having side walls embracing and supporting the strip in position, and means to adjust the clip relative to said roll.

13. A developing apparatus comprising a base, spaced uprights thereon, a feed roll carried by said uprights, means to press light sensitive material to be developed against said roll, means for rotating said roll to feed the light sensitive material, a wick support adjustably mounted in the frame, a wick carried in the wick support to wipe against the surface of one of the rolls, means to apply a developing medium to the wick and means to shift the support to adjust the wiping engagement between the wick and the roll.

In witness whereof, I have hereunto subscribed my name.

ADOLPH LANGSNER.