A. W. McCURDY.

DEVICE FOR COATING SURFACES.

APPLICATION FILED DEC. 29, 1917.

1,313,197.

Patented Aug. 12, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

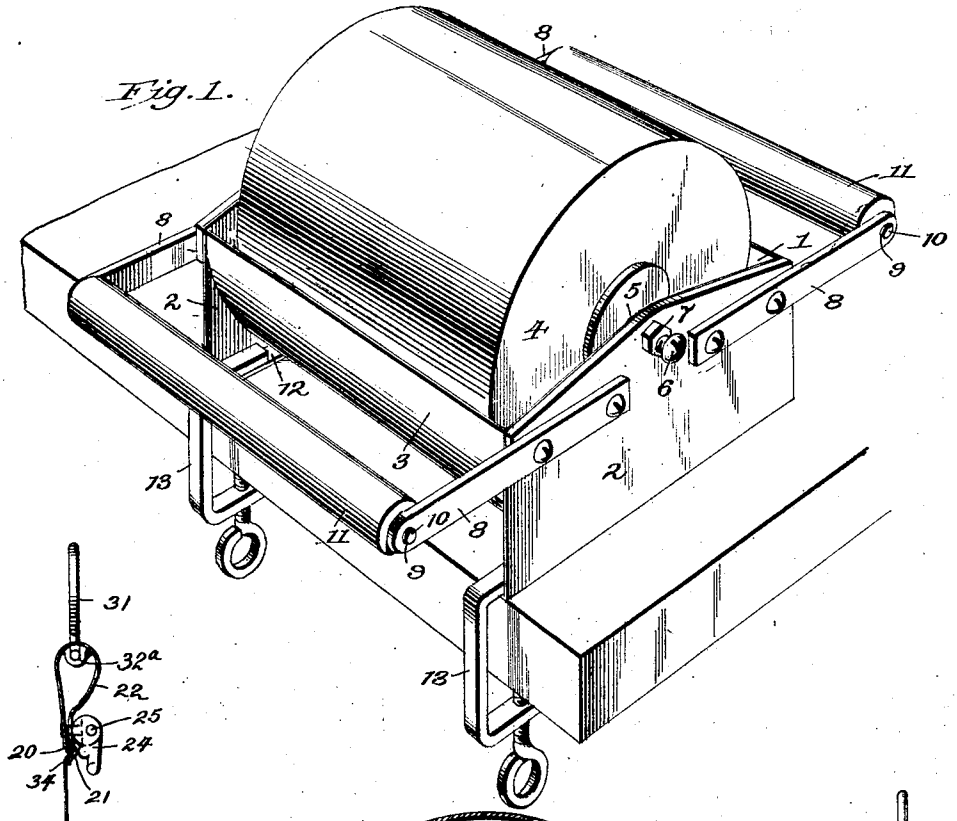
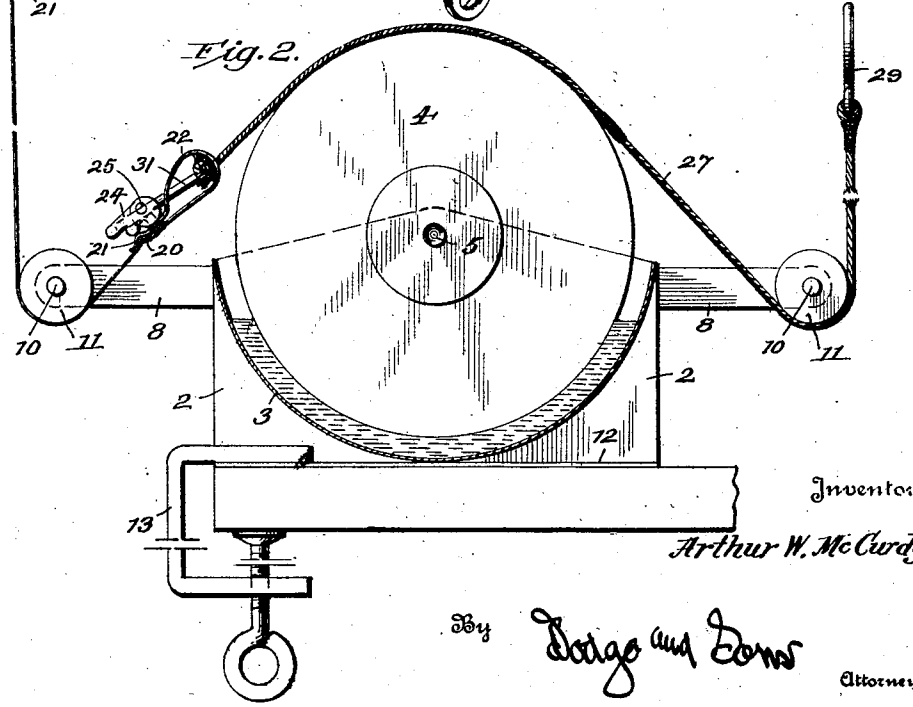


Fig. 2.



Inventor:

Arthur W. McCurdy,

By Dodge and Dodge

Attorneys.

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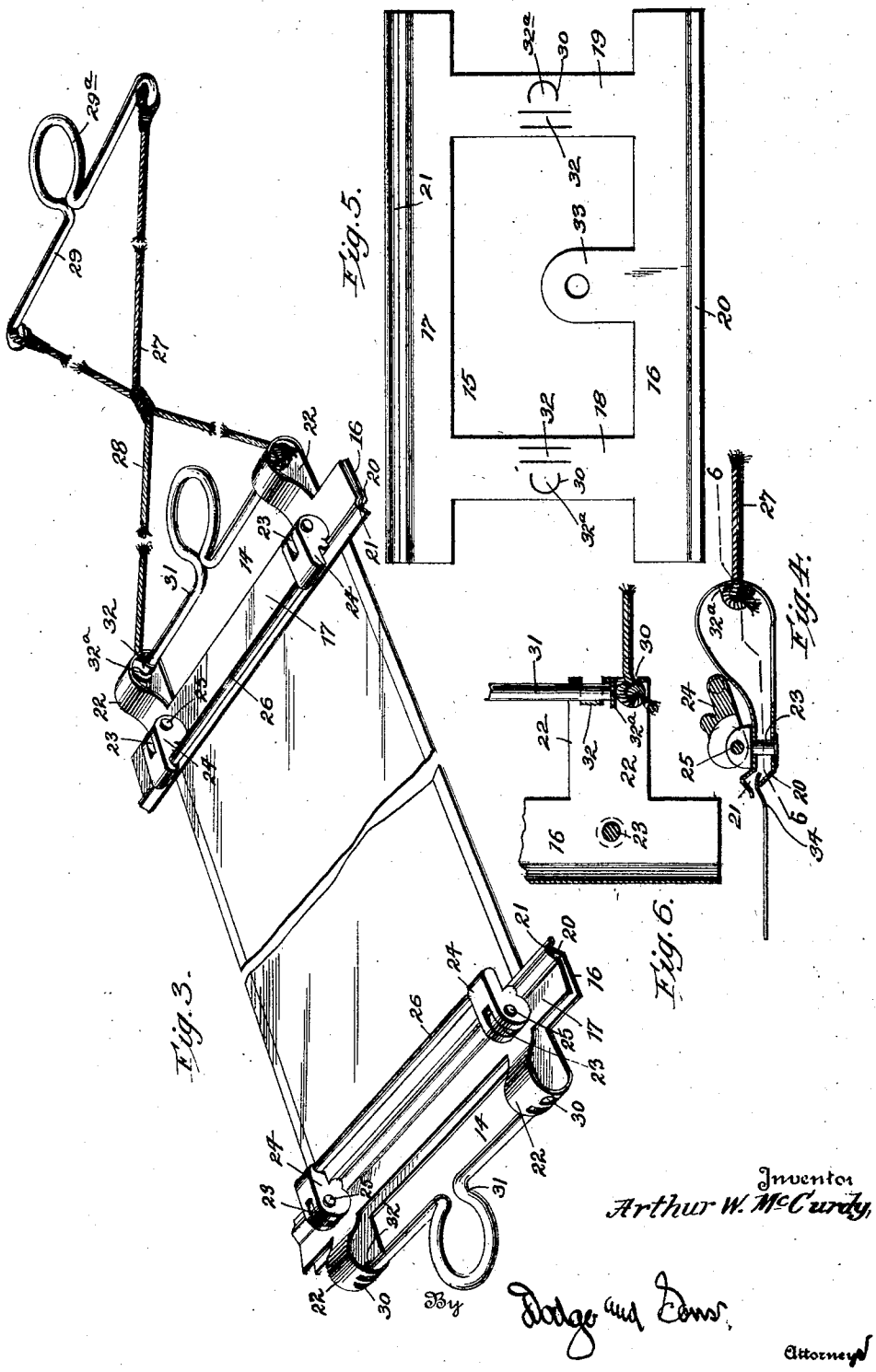


Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Inventor
Arthur W. McCurdy,

By Dodge and Sons,

Attorneys

UNITED STATES PATENT OFFICE.

ARTHUR W. McCURDY, OF VICTORIA, BRITISH COLUMBIA, CANADA.

DEVICE FOR COATING SURFACES.

1,313,197. Specification of Letters Patent. Patented Aug. 12, 1919.

Application filed December 29, 1917. Serial No. 209,506.

To all whom it may concern:

Be it known that I, ARTHUR W. McCURDY, a subject of the King of Great Britain, residing at Victoria, British Columbia, Canada, have invented a certain new and useful Improvement in Devices for Coating Surfaces, of which the following is a specification.

This invention consists in a novel device for coating thin sheets or strips of material of any kind, but is intended more particularly for applying a film or coating of waterproofing substance or solution to a single face of a photographic negative after the image has been developed and fixed. If desired, it may be used to coat both faces of a sheet or strip, but ordinarily this is neither necessary nor desirable, and its chief use is to apply the coating to a single face without causing or permitting it to pass about the edges to the opposite face.

The contrivance is illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of the structure proper;

Fig. 2, an elevation with one side wall of the tank or liquid receptacle removed;

Fig. 3, a perspective view of a strip to be treated, showing clips or grippers applied to its ends, together with the cords, tapes, or other flexible bands and hand-hold or bar by which the strip is led under the directing or guiding rolls, and over and in contact with the coating drum or cylinder;

Fig. 4, a transverse sectional view of the clip;

Fig. 5, a view of the blank from which the clip is formed;

Fig. 6, a sectional view taken on the line 6—6 of Fig. 4, and showing a detail of the clip or gripper.

The present invention is one of a series having for their object the production of more perfect photographic negatives and positives, and the maintenance thereof unimpaired despite frequent and long continued use, whether for printing or picture projection. To this end I aim to protect the sensitized face of the film roll from being softened, stained, abraded, or otherwise disfigured up to the time of exposure, development, and fixation, by making the film cartridge waterproof, and thereafter making the developed and fixed negative as a whole waterproof.

The device is intended particularly for the use of the amateur and the commercial photographer, for which reason compactness and portability are prime requisites, and are carefully kept in view.

Referring again to the drawings, 1 indicates a tank or vessel having upright side walls 2 and, preferably, a curved bottom 3, which, rising to the upper edge of the side walls at their ends, constitutes also the ends of the chamber. This is merely a preferred construction, for which a rectangular chamber with a horizontal bottom may be substituted. Within the tank and rotatable about its central axis is a drum or cylinder 4, preferably made of sheet metal, and hollow for lightness and convenience of quantity production.

In the drawings I have shown the heads or ends of the drum centrally reinforced, and each provided with a central stud 5 having a central conical seat or depression to receive the conical end of a pivot screw 6, which passes through a side wall of the tank or vessel 1, and is seated in the socket of the stud 5. A jam nut 7 holds the pivot screw at the desired adjustment or prevents its working loose. The pivot screws 6 are preferably concentric with the axis of the tank bottom 3, so that there shall be a like body of the coating solution between the drum and the tank throughout the depth of the liquid, this arrangement tending to insure a more uniform coating of the drum than would otherwise result, and lessening the tendency to produce air bubbles in the liquid.

Carried by the side walls of the tank 1 and projecting longitudinally from each end thereof, are arms or brackets 8, four in all, arranged in pairs, and each having near its outer end a circular hole 9 to receive a journal or gudgeon 10 of a roller 11. Each pair of arms or brackets serves to support the journals or gudgeons of opposite ends of one roll, permitting the roll to turn freely therein. As the structure is designed to be packed in small compass so that it may readily be carried about by travelers, the arms or brackets 8 are preferably made demountable in any convenient way. In the

drawings I have shown them secured in place by small machine screws, and where the tank and arms or brackets are made of metal with the aid of jigs, dies, etc., the screw holes can be so accurately placed and the brackets made so absolutely alike that they can be used interchangeably, with the certainty that all parts will be properly positioned when the screws are introduced and turned to their seats.

Each side wall 2 has an inturned flange 12 along its lower edge, to afford an adequate footing for the tank, and a proper hold or clamping surface for clamps 13 by which the tank may be rigidly secured upon a table, work bench, window sill, or like support, it being important that it be held firmly against movement when in use. I have here shown a well known form of work or bench clamp, having two parallel arms connected by an intermediate section at right angles to said arms, and a screw passing through one arm and carrying at its inner end a swiveled disk. Any other suitable clamp of common form may be used.

The purpose of the guiding or directing rollers 11 is to cause the strip or sheet to be coated, to hug closely and firmly to the periphery of the drum, thus insuring a complete coating of the entire face of said strip or sheet. To this end the rollers 11 have their axes in about the same horizontal plane as is that of the drum, or it may be, a little lower, and the strip or sheet is led under one roller 11, thence upward over the drum and in contact with its surface, and thence under the second roller 11, the free ends of the strip or sheet being drawn upward relatively to the rolls 11 with force sufficient to rotate the drum and cause said strip or sheet to maintain close contact with it throughout the entire opposing areas. In this way the formation of bubbles and blisters is avoided, and any surplus of coating liquid or solution lying upon the surface of the drum is pressed or squeezed out, and a uniform coating of the strip or sheet insured.

It is important that provision be made for applying to and maintaining adequate tension on, the strip or sheet from the instant its leading end comes into contact with the drum until its trailing end leaves the same. For this purpose I provide suitable clips or gripping devices, denoted generally by 14, capable of securely binding and holding the ends of the strip or sheet, and each having a suitable hand-hold. It is also important that the clips or grippers hold the strip or sheet securely, as any slipping or detachment thereof would in most cases impair, if not destroy, a series of negatives. I have hence provided a gripper or clip which can be positively locked in its clamping adjustment, free from danger of accidental opening or release while in use. This is illustrated in Figs. 3, 4 and 5, and will now be described in connection therewith.

The body of the clip or gripper is formed from a blank 15, Fig. 5, which may be stamped from sheet metal of suitable resiliency, and is afterward bent to the form shown in Figs. 3 and 4. This blank comprises two parallel bars or jaws 16 and 17, connected by (preferably) two transverse bars 18 and 19. The bar 16 is formed with an upwardly extending lip 20 adapted to enter a longitudinally disposed groove 21 formed adjacent the outer edge of the bar 17 when the blank is bent to its final shape. Such bending consists primarily in forming the cross bars 18 and 19 into approximately circular loops or bows 22, which owing to the resilience of the metal employed, form springs, which normally hold the bars 16 and 17 separated as in Fig. 4, sufficiently to permit the ready introduction of the end or edge of the strip, sheet, or negative to be coated. To guard against possible injury to the film or other sheet, the outer edge of the bar or jaw 16 is advisably rounded or curled, as shown.

The separation of the plates or jaws 16 and 17 is limited by T-headed studs or rivets 23, two or more, the heads of which are above and rest upon the bar 17, as seen in Fig. 4. The stems of the studs 23 pass through and are riveted or headed beneath the lower bar 16, and in addition to their noted function, serve as stops to limit the insertion of the strip or sheet to be handled and treated. The T-heads of the studs 23 form supports for levers 24, here shown as slotted to straddle said heads and pivotally connected thereto by pins 25. When thrown back to the position indicated in Fig. 4, the short radius portion of each lever rests upon the upper bar 17, but as the lever is thrown outward the portion of increasing radius bears upon and presses down the grooved bar or jaw 17, causing said bar to overlie the inserted strip or sheet and to press the same downwardly onto the lip 20, thereby producing a somewhat sharp bend in the sheet or strip and affording a firm hold thereon. When the levers are thus thrown forward, as the bearing point is directly below the pivot axis or slightly to the rear thereof, the parts will be locked in position and free from any tendency to open during use of the clip or gripper. The levers 24 are for convenience of manipulation connected by a bar or rod 26, so that both may be actuated at the same time and by the same operation. The groove 21 and lip 20 are so designed that when they grip the film it will be bent downward as at 34, and come in close contact with the drum in the operation of coating the film.

The clip 14 applied to the leading end of

the strip or sheet to be treated, has attached to it flexible bands 27 and 28 here shown in the form of two cords, for which tapes, straps, or other flexible members may be substituted. Cords are preferred because they make a minimum contact with the surface of the drum, and take up a minimum quantity of the coating liquid or solution, a quantity so small that it will be promptly replaced by the spreading or flow of that at each side of the line of the cords when they pass off the drum. Preferably, these cords at their outer ends are attached to or connected by a cross-bar or hand-hold 29. A convenient mode of attachment of the cords or bands to the clip or gripper is by passing their ends through perforations 30, formed in the bows or loops 22, and the formation of knots within said loops. The cords 27 and 28 are of a length to pass from one roll 11 to the other, and over the intervening drum, and to reach an inch or two, more or less, beyond the second roll. In order to facilitate the passage of the cords over the drum, and to prevent them from slipping off over the edges of the same, the cords are preferably crossed and fastened at their point of crossing, as indicated in Fig. 3.

For convenience in hanging up the clip or gripper, I may provide a hanger 31, seen in Fig. 3, consisting of a wire bent to form a loop midway between its ends, and having said ends carried into the bows 22 to form journals, which turn within sheet metal clips or bearings 32. Any equivalent device as, for instance, a perforated ear or tang 33, shown in Fig. 5, may be employed. The loop of the hanger 31, when the wire construction is adopted, may be turned inward, and made to rest upon the upper bar or jaw 17 of the gripper for convenience in packing. To guard against endwise movement of the hanger 31, the metal of the loops 22, when the holes for the reception of the cord are formed, may be turned, inwardly, forming stops 32^a, as shown in Figs. 3 and 6. So, too, the cross-bar or hand-hold 29, which is preferably formed of a single piece of wire, will be provided with a loop or ring 29^a intermediate its ends, which facilitates handling as well as affording means for hanging up the cords and attached clip.

The clip or gripper 14 which is to be applied to the rear or trailing end of the strip or sheet, is similar to that just described, but requires no cords or bands, being merely provided with a movable handle, loop, or ring, which may be directly grasped by the fingers of the person using the device.

The device constructed as above described is utilized by first passing the hand-hold 29 and the flexible bands 27, 28 beneath one of the rollers 11, thence upward over and in contact with the drum 4, and finally downward and beneath the second roll 11. The cords or bands 27, 28 are of sufficient length to permit the leading clip or gripper to be placed to the left of the first roll 11, while the hand-hold 29 is reasonably to the right of the right-hand roll 11. By then holding back the attached strip, sheet or negative with the left hand and drawing upward thereon, and simultaneously drawing upward on the hand-hold 29, the cords or bands will be caused to bear upon the cylinder or drum 4 with sufficient force to insure the rotation thereof, and the coating of its surface by the liquid in which its lower side is immersed. This will insure such coating in advance of contact of the leading end of the strip or negative with said drum, and consequently insure delivery of the coating solution to the drum throughout its entire length, as the strip, sheet, or negative will itself continue such rotation of the drum so long as it is drawn over and in contact therewith.

The second clip, which is attached to the trailing end of the strip, sheet, or negative, maintains such strip or negative in flat and stretched form.

The consistency of the coating solution may be varied as desired. Ordinarily I prefer to employ a quite thin solution, and to apply a thin coating, as such interferes less with the flexibility of the finished strip or film, and with the passage of light to and through the negative when the device is used for coating negatives.

Various minor changes in construction will, of course, readily suggest themselves to the skilled mechanic, and are within the scope of my invention.

Having thus described my invention what I claim is:—

1. A portable device for coating flexible sheets or strips of material, comprising in combination, a tank; a drum mounted and rotatable within said tank; rollers one in advance and the other in rear of the drum, serving to guide the strip or sheet to be coated and to enable pressure to be applied by the strip or sheet to the drum to hold said strip in contact with the upper surface thereof; positive gripping devices for gripping the ends of the strip or sheet to be coated; and a flexible band attached to one of the gripping devices, and serving to impart initial rotation to the drum in the act of leading the strip or sheet to said drum, and thereby charging the surface of said drum with coating material from the point at which the strip to be coated meets it.

2. A portable device for coating flexible strips or sheets, comprising a tank to contain the coating material, provided with base flanges; a drum or cylinder mounted to rotate within said tank; demountable guide

rollers applied to said tank in advance and in rear of said drum; detachable clamps to overhang the base flanges of the tank and secure said tank to a table or support; and means for drawing in a sheet or strip to be coated and moving the same over and in contact with the drum, comprising positive gripping devices to grip the opposite ends of the sheet or strip to be coated, and a flexible band attached to one of said gripping devices.

In testimony whereof I have signed my name to this specification.

ARTHUR W. McCURDY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."