

H. BROWN.
 APPARATUS FOR WATERMARKING PAPER.
 APPLICATION FILED JULY 28, 1916.

1,362,598

Patented Dec. 21, 1920.

2 SHEETS—SHEET 1.

Fig. 1

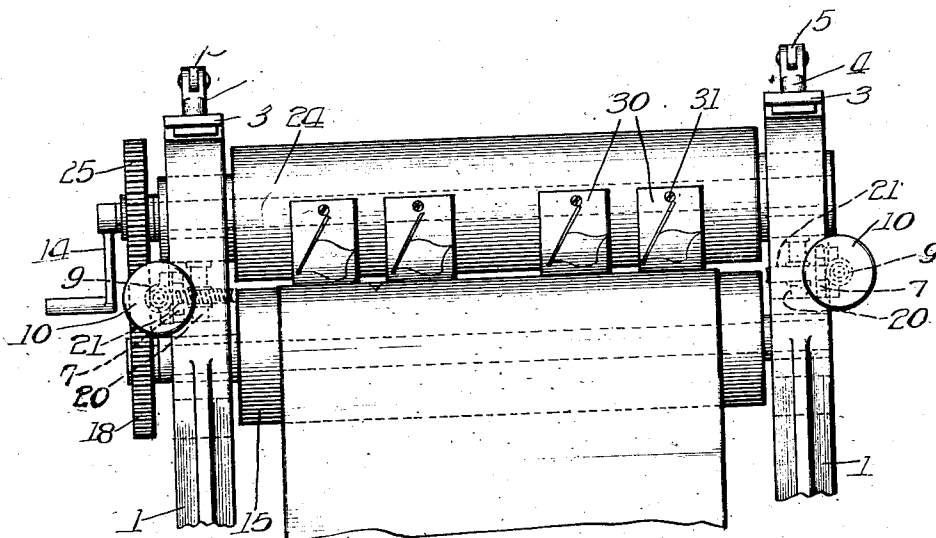
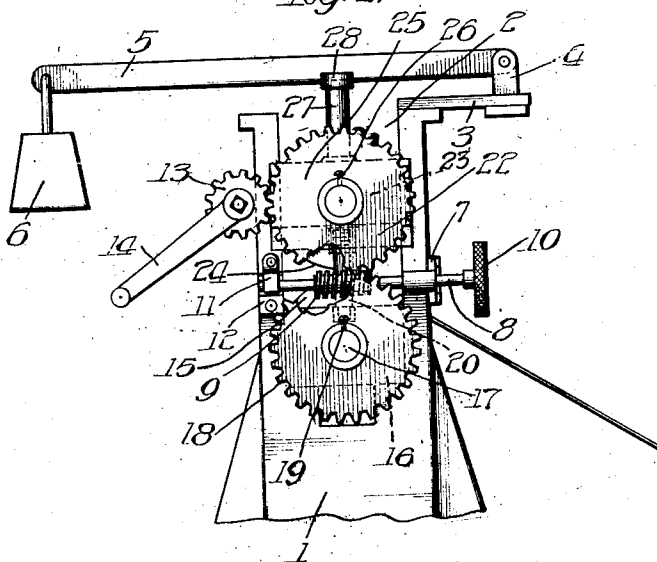


Fig. 2



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Fig. 3.

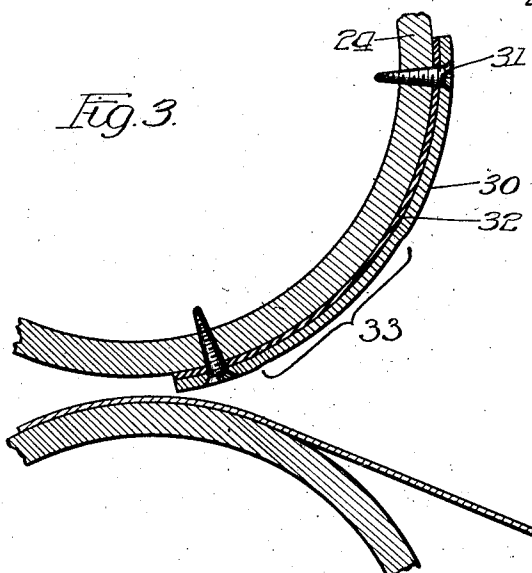


Fig. 4.

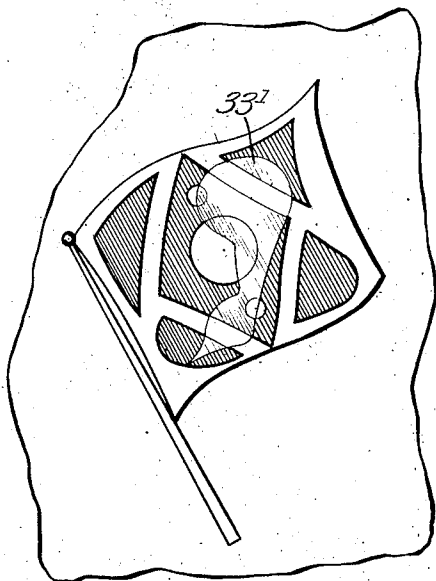


Fig. 5.

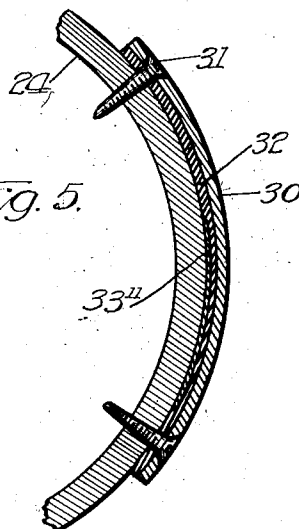
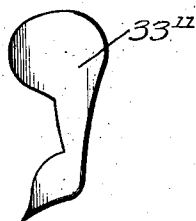


Fig. 6.



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HOWARD BROWN, OF SPRINGFIELD, MASSACHUSETTS.

APPARATUS FOR WATERMARKING PAPER.

1,362,598.

Specification of Letters Patent.

Patented Dec. 21, 1920.

Application filed July 28, 1916. Serial No. 111,794.

To all whom it may concern:

Be it known that I, HOWARD BROWN, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Watermarking Paper, of which the following is the specification.

This invention relates to water marking methods and apparatus for water marking paper, and particularly to a proving device whereby the set-up of the actual impressing devices may be satisfactorily adjusted prior to the application of these devices to the machine so as to insure perfect operation upon paper passing through the last stages of the paper making machine.

My invention is designed to be used in combination with the invention described and claimed in certain co-pending applications, in which I have disclosed a water marking attachment adapted to be applied to a paper making machine intermediate the drier drums thereof, and comprising, roughly, a hard backing roll, a pressure roll adapted to be applied thereagainst with a heavy, regulable and yielding pressure, and a design plate mounted on the pressure roll whereby paper which has been completely formed and partially but not completely dried in the process of its manufacture is impressed with whatever design may appear upon the design plate employed.

I have found in actually carrying out my invention that to obtain the best results each design plate employed should be individually adjusted and set up so that it produces a perfect mark upon the paper. The reason for this is that the variation of a thousandth of an inch between the surfaces between which the paper is squeezed to make the mark may result in an imperfection in the mark, and it is very difficult to obtain a design plate having an absolutely perfect surface. Furthermore, certain regions of the design plate may be covered with numerous lines of the design while other portions thereof may be only lightly marked.

It has also been found in order to obtain the best results a resilient backing should be employed under the design plate, as specified in my Patent No. 1,152,393, dated September 7, 1915. Because of this resilient backing the design plate will bend or buckle to an infinitesimal extent and the result will frequently be that the regions of the design in which are few lines will be heavily and clearly stamped upon the paper while those upon which are many lines will be only faintly stamped into the body of the paper so as to result in an uneven and imperfect mark.

It is an object of my invention to forestall this possibility and to provide a proving apparatus whereby its occurrence is rendered impossible or is prevented. My invention contemplates the provision of a special separate machine capable of hand operation, in which the actual rolls, or at least the pressure roll to be used in the water marking process, may be set up and actually tried out, the design plate being adjusted by means of such trials until it is perfectly satisfactory and produces a perfect mark.

It is an essential feature of the invention that the proving machine is quite separate and distinct from the paper making machine, the reason for this being that it is impossible to make trials on a paper making machine, because such machine having once started cannot be stopped until the completion of the run, each stoppage involving the loss of several hundred feet of paper in various stages of its formation, as is well known.

As a particular embodiment of my invention, I have devised the structure illustrated in the attached drawings, in which,

Figure 1 is a front elevation of the operating parts of my device,

Fig. 2 is an end elevation thereof,

Fig. 3 is an enlarged cross sectional view of the design plate and its coöperating mechanisms,

Fig. 4 is an elevation of an imperfect water mark,

Fig. 5 is a cross sectional view on a large scale showing a design plate corrected to remedy the defect.

Fig. 6 is an elevation of the correcting agency.

In the drawings:—

1 represents a pair of standards mounted on any suitable bed, not shown, or directly bolted to the floor, each provided with cut away portions 2 at their upper ends and with outwardly extending arms 3, carrying brackets 4, in which weighted arms 5 carrying weights 6 are pivotally mounted. Hinged to the standards 1 by hinges 7 are shafts 8 carrying worms 9 and operated by capstans 10, the shafts 8 being capable of being swung outwardly upon the hinges 7 but being locked into the position in which they are shown by clips 11 overlying the half bearings 12, as will be clearly understood. Mounted upon an integral extension of one of the standards 1 is a bearing, upon which is the driving pinion 13, operated by the crank 14.

Upon comparison of the construction so far described with that disclosed in my Patent 1,152,393 above referred to, it will be apparent that I have provided substantially a duplicate of the mechanism actually applied to the paper making machine except that this mechanism is so designed in this instance as to permit the removal of the upper and lower rolls, their bearing boxes, and the adjustable shaft controlling the distance therebetween. It is to be understood that a duplicate of the mechanism above described, except for the driving mechanism 13 and 14, is placed upon the paper making machine, the idea being to transfer the rolls as a unit from their position in which they serve as an operating attachment during the paper making process to a position in a supplementary machine where they may be operated by hand. To effect this possibility, it is necessary to somewhat modify the construction of the backing and pressure rolls. The lower roll 15 is mounted in bearing boxes 16 firmly situated in the bottom of the recesses 2, as will be clearly understood. The axis 17 of this roll is prolonged at one end and provided with a gear 18 removably attached thereto as by the set screw 19. Revolvably situated in a bushed recess in the top of the bearing block 16, is a shaft 20 having thereon a worm wheel 21 and being provided at its upper end with a screw engaging with screw threads in the block 22, which supports the bearing block 23 for the upper or pressure roll 24, which is provided with a removable gear 25, secured thereto as by a set screw 26. The standard 27 projects upwardly from the upper block 23 and is provided at its top with a fork 28, in which rests the lever 5, it being understood that all of this mechanism, except the driv-

ing gears 13 and 14, and the meshing gears 18 and 25, is duplicated at the other end of the rolls.

It will be immediately seen by this construction that the backing and pressure rolls and their adjusting mechanism can be bodily transferred from the attachment secured to the paper making machine to the independent subordinate proving machine and back, to do this it merely being necessary to remove gears 18 and 25, swing back the hinged shafts 8 and the lever 5 and take the pressure and backing rolls out and reassemble them in the same relation and by the same steps, reversed, in the other machine.

Having now described the method of applying the pressure and backing rolls actually employed in the paper making process to a subordinate proving machine, I will now describe the method of setting up the design plates. The design plates 30 are mounted by screws 31 or the like upon the upper roll 24, a resilient pad 32 underlying each design plate. In the operation of the proving apparatus, paper is torn from the traveling web of the Fourdrinier machine at a point adjacent the location of the marking attachment on that machine and put through the proving apparatus. If there be a defect in the design as shown and very much exaggerated in Fig. 3, at 33, wherein a portion of the design plate is shown as depressed, the result will be an imperfect mark, and paper having traveled through the proving machine when inspected will reveal a water mark such as indicated in Fig. 4, in which a portion 33' thereof is faint or entirely obscured. A piece of tissue paper, such as cigarette paper or the like is then cut out, as in 33'' to fit the defective region of the water mark and inserted under the design plate as shown in Fig. 5, in the corresponding region thereof and the proving machine again operated on paper torn from the same place in the traveling web, this process being kept up as long as is necessary until the design plate is so adjusted by inserting paper under different regions thereof that it gives an absolutely perfect mark.

It is to be particularly understood that whereas in Fig. 3 has been shown a design plate having very much exaggerated depressions therein, this showing being made to illustrate the invention, such an enlarged depression practically never actually occurs in design plates, the imperfections, irregularities and variations in thickness of the plate being generally so minute as to escape detection by the eye, so that sometimes the insertion of a single thickness of cigarette paper under such portion of the design plate will serve to bring it up to a level with the rest of the plate and correct the mark. Furthermore, as explained at the beginning of

this specification, the imperfections may arise, not because the design plate is itself imperfect but because the design upon it is much heavier in some parts than others, requiring that these parts be more strongly reinforced or advanced relatively to the lighter parts of the design. Whatever the defect may be, each design plate should be set up and adjusted by the method and means herein disclosed until repeated hand trials on the proving machine show perfect results. Thereupon the backing and pressure roll with the associated adjusting mechanisms are transferred bodily to the marking attachment on the paper making machine and the run commenced, each mark impressed in the paper continuing to be perfect because nothing in the shifting of the pressure and backing rolls has at all affected the relation between the surfaces of the backing roll and the design plate by which the mark is made.

It is of course to be understood that a satisfactory backing roll may be provided in the stationary proving machine so that it will only be necessary to remove the pressure roll from the marking attachment upon the paper making machine, this method rendering the mechanism less complicated and requiring a simpler operation, and in many instances giving satisfactory results inasmuch as the backing rolls comprising merely smooth, steel rolls can be made to all intents and purposes identical, so that except for the very finest work practical success can be obtained where different backing rolls are employed in the attachment to the paper making machine and in the proving machine.

It is of course also within the scope of my invention to remove the entire paper marking attachment from the paper making machine and set it up separately, driving the same by hand or by special power attachments. No further drawings are required to illustrate this, because the showing in Figs. 1 and 2 may be taken to indicate as well the attachment to the paper making machine as the special proving apparatus, as explained. This method is a somewhat laborious undertaking, however, requiring the loosening of numerous heavy bolts and the like as well as the shifting of the heavy levers and is not to be recommended. For practical purposes, it is generally safe to simply transfer the pressure roll with the design plates, but for the finest work both pressure and backing rolls actually employed should be transferred. By this means, actual surfaces which cooperate to produce the mark in the commercial paper are adjusted to each other in the proving operation, and any irregularities not only in the design plate but also in the backing roll are accounted for and counter-acted.

Having now described my invention, I claim:—

1. In apparatus for use in proving water-marking, having a frame provided with substantially upright slots, substantially identical in dimensions with corresponding slots in the watermarking frame of the paper-making machine but separate and distinct therefrom, the combination of backing and pressure rolls provided with shafts adapted to enter the aforesaid slots, bearing blocks for said shafts in said slots, the openings of said slots being entirely unobstructed whereby the rolls and bearing blocks may be moved out of the slots for transfer from one machine to the other.

2. In proving mechanism, a pair of standards, a pair of worm shafts thereon, pivoted means for permitting said worm shafts to be swung outwardly to permit the introduction or removal of a pair of rolls into or from said standards, adjusting means associated with said rolls, said pivotal means permitting thereafter bringing said worm shafts into cooperative relation with said adjusting means.

3. In apparatus of the class described a proving mechanism, comprising a pair of standards having cut away portions to receive a water mark unit comprising backing and pressure rolls, adjusting devices associated with said standards for adjusting the distance apart of said backing and pressure rolls, including means adapted to engage a movable part of said adjusting means and to be swung laterally away therefrom, and readily releasable holding means permitting said first-named means to be readily swung laterally whereby said backing and pressure rolls may be easily introduced into or removed from said standards.

4. In apparatus for proving the set up of water marking impressing devices, a proving mechanism comprising a pair of standards arranged adjacent to but independent from a paper making machine, said standards being formed to receive a water mark unit comprising a backing and a pressure roll, together with their bearings and adjusting screws, immediately upon the transfer of the same from a paper making machine, and means for rotating said adjusting screw, said last mentioned means being hinged to the standards whereby the same may be quickly swung outwardly laterally to permit the quick and ready removal of the water mark unit from the standards for replacement upon the paper making machine.

5. In apparatus for use in proving water-marking, having a frame provided with substantially upright slots, substantially identical in dimensions with corresponding slots in the watermarking frame of the paper-

making machine, but separate and distinct therefrom, the combination of backing and pressure rolls provided with shafts adapted to enter the aforesaid slots, bearing blocks
5 for said shafts in said slots, adjusting means associated with said bearing blocks, the openings of said slots being entirely unobstructed whereby the rolls, bearing blocks and adjusting means may be moved out of

the slots for transfer from one machine to 10 the other.

In witness whereof, I hereunto subscribe my name to this specification in the presence of two witnesses.

HOWARD BROWN.

Witnesses:

HARRIS A. COLWELL.

WILLIAM H. HASKINS,