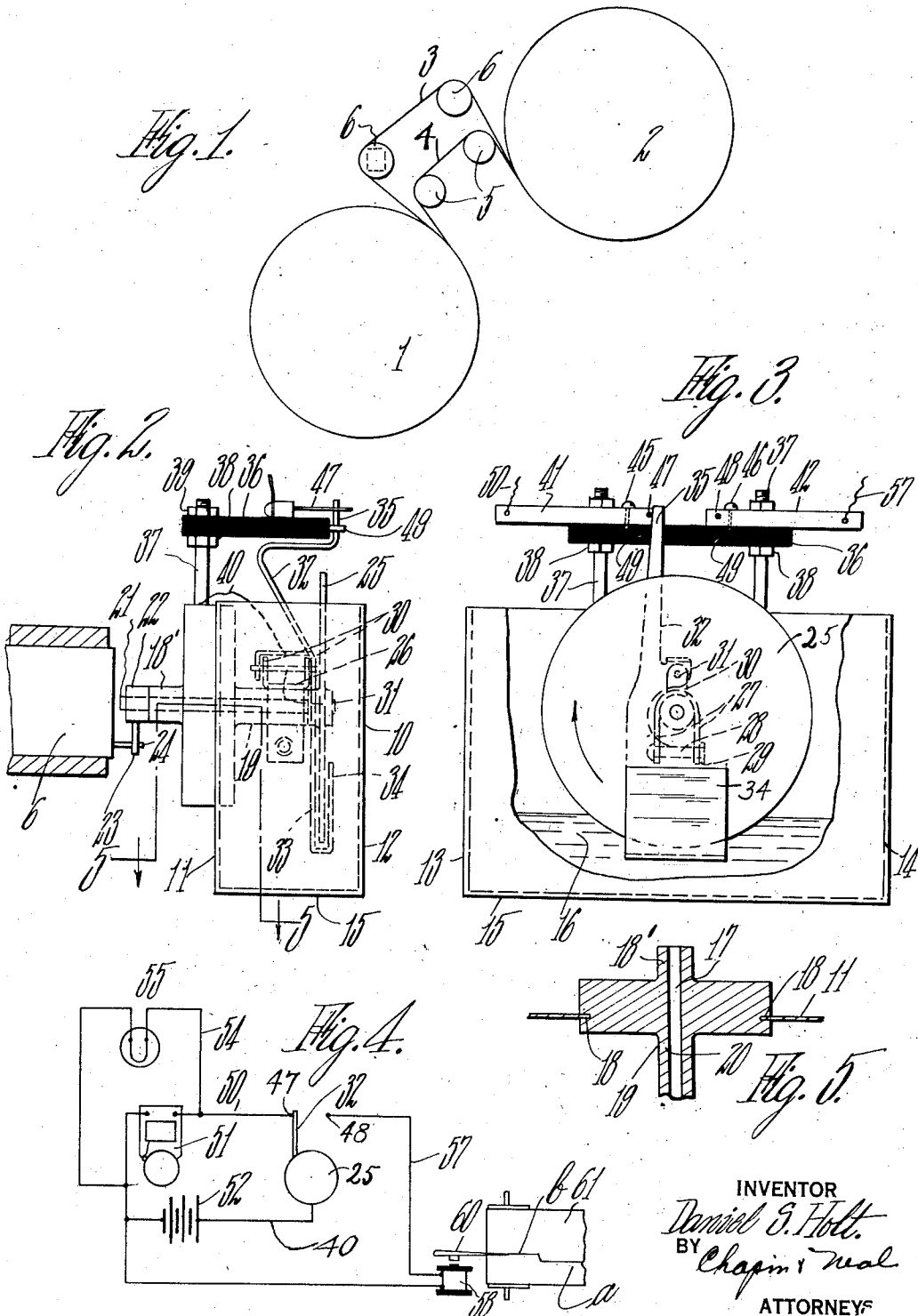


D. S. HOLT.
CIRCUIT CLOSER.
APPLICATION FILED OCT. 20, 1920.

1,410,308.

Patented Mar. 21, 1922



INVENTOR
Daniel S. Holt.
BY *Chapin & Neal*
ATTORNEYS

UNITED STATES PATENT OFFICE.

DANIEL S. HOLT, OF MITTINEAGUE, MASSACHUSETTS.

CIRCUIT CLOSER.

1,410,308.

Specification of Letters Patent. Patented Mar. 21, 1922.

Application filed October 20, 1920. Serial No. 418,286.

To all whom it may concern:

Be it known that I, DANIEL S. HOLT, citizen of the United States, residing at Mittleague, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Circuit Closers, of which the following is a specification.

This invention relates to an improved circuit closer especially suitable for use in connection with a recording and signaling device adapted to be employed in connection with a rotating member for at once calling attention to any failure on the part of the mechanism to operate satisfactorily.

While the structure is shown and described in connection with one of the idler rolls of a paper-making machine where it is useful for indicating a break occurring in the paper strip so that the attention of the operator may be immediately called thereto, it is capable of use in connection with many widely different mechanisms for the purpose of indicating breakage of a movable part or the failure of a rotating member to maintain the necessary speed of rotation.

One object of the invention is to provide a device of this character which is capable of operating a variety of signals for calling the attention of the operator to any failure of the parts to operate in the required manner.

Further objects of the invention are to provide a device of this character which is of simple construction capable of ready application to a variety of different mechanisms, and which, while the parts are so constructed and arranged as to operate efficiently under different conditions of use, is of sufficient delicacy to quickly indicate failure of the mechanism with which it is connected to operate satisfactorily.

Another object of the invention is to provide a simple and efficient form of contact-making device, readily responsive to the impulses communicated to it by reason of currents set up in a mobile fluid.

Further objects of the invention relate to details of construction and improved methods of operation, as will be more fully set forth in the detailed description to follow.

Referring to the drawings:

Fig. 1 is an end view of certain of the drying rolls usually employed in paper-making machines, illustrating the manner of applying the signaling device thereto;

Fig. 2 is a sectional view illustrating the arrangement of the parts and the manner of operating the signaling device from one of the idler rolls of a paper-making machine;

Fig. 3 is a front elevational view of the mechanism, certain of the parts being broken away;

Fig. 4 is a diagrammatic view illustrating the arrangement of the electric circuits; and

Fig. 5 is a detail sectional view taken along the line 5—5 of Fig. 2.

In the embodiment of the invention illustrated herewith, the improved recording and signaling device is shown in connection with one of the paper-tensioning rolls of a paper-making machine, although it will be understood that the device is capable of wide application in connection with various different machines and operating mechanisms where it is desirable to provide suitable means for indicating immediately any breakage of the machine parts or failure of the mechanism to operate properly. As shown in the accompanying drawings,—1 and 2 designate a pair of spaced drying-rolls of the type ordinarily employed in paper-making machines, for the purpose of drying the paper strip before it is subjected to the various finishing operations usually employed. In the drying operation the paper strip 3 is usually passed over the drying-rolls 1 and 2 beneath a belt 4 of felt or other suitable material, which facilitates the drying operation and tends to support the paper strip. In passing from one drying-roll to the other the felt strip 4 is passed over guide-rolls 5 while the paper strip 3 is separated from the felt strip 4 and passed over idler rolls 6 in order to separate the paper strip from the felt and hasten the drying of the same. There is at times a considerable tendency for the paper strip 3 to break in passing over the rolls 6, and unless the operator observes the break at once a considerable quantity of paper is ruined by becoming wedged between the rolls, as well as a considerable delay necessitated before the paper can be removed and the strip 3 again properly guided over the drying-rolls. The structure shown herewith can be readily applied to the end of one of the rolls 6 and serves to give immediate warning to the operator when the paper strip becomes broken so as to cause the roll 6 to stop turning.

The structure comprises a casing 10 comprising side walls 11 and 12, ends walls 13 and 14, and a base 15. The casing serves as a container for a quantity of liquid 16, and a block 17 of suitable material is seated in an opening formed in the side wall 11, as shown in Fig. 5, the edges of the side wall 11 adjacent the opening formed therein fitting into grooves 18 formed in the sides of the block so that the block serves, in effect, as a part of the casing and constitutes therewith a liquid-tight chamber for containing the liquid. The block 17 is provided with aligned bosses 18' and 19 projecting outwardly from opposite sides thereof, and a transverse opening 20 is formed in the block 17 which serves as a bearing for a shaft 21 rotatably mounted therein. A collar 22 is keyed or otherwise firmly secured to the outer end of the shaft 21, and this collar is provided with a radially-projecting pin 23 which, when the mechanism is in proper operative relation to a rotating member with which it is adapted to cooperate, engages a pin 24 carried by the end of the rotatable member, which, in the present instance, is an idler-roll 6 of a paper-making machine. Keyed, or otherwise firmly secured to the other end of the shaft 21, is a disk 25 which extends below the level of the liquid 16 contained in the liquid chamber, and is partially immersed therein.

A bracket 26 is secured to the inwardly-projecting boss 19 carried by the block 17 by means of a pair of downwardly-extending arms 27 which partially embrace the boss 19 and are clamped thereupon by means of a bolt 28 and nut 29, or other equivalent fastening means passed through the ends thereof below the boss 19 for holding the bracket firmly in position. The bracket 26 is provided with a pair of upstanding parallel arms 30 carrying a pivot-pin 31 upon which is pivotally mounted a pivoted member 32. The pivotally-mounted member 32 extends downwardly and is provided with a portion 33, of enlarged area, located beneath or partially beneath the surface of the liquid and in proximity to one face of the disk 25, this portion 33 of enlarged area being bent back upon itself to provide a second portion 34, of enlarged area, located partially below the surface of the liquid and in proximity to the opposite face of the disk 25. The pivoted member 32 is also provided with an upwardly-extending portion 35 projecting upwardly from the main body portion thereof and arranged to swing adjacent one face of a block 36, formed of hard rubber or equivalent non-conducting material, and adjustably supported from the block 17 in any suitable manner, as a pair of threaded standards 37 upon which it is capable of being secured in a variety of adjusted positions by means of nuts 38 and 39. A ground-wire 40 is electrically connected with a portion of

the pivoted member 32 and with a suitable ground, such as the metal block 17.

A pair of electric terminal plates 41 and 42 are secured to the non-conducting block 36 in any suitable manner, as by screws 45 and 46, and these plates are each provided with an electric contact 47 and 48, respectively, which contacts project into the path of the upper end portion 35 of the member 32 and are adapted to be engaged thereby. The non-conducting plate 36 is provided with a pair of stops 49, also projecting into the path of the upper end 35 of the pivoted member, and thus serving to limit the movement of the pivoted member 32 if one of the contacts 47 and 48 should become bent or otherwise injured.

The terminal plates 41 by which the contact 47 is carried is connected with the circuit 50, which is connected with an electric bell 51 and a battery 52, the circuit from the battery being completed by connection with a suitable ground 53. The circuit 50 has a shunt 54 in line with a lamp 55 suitably located relative to the apparatus, whereby the bell 51 and lamp 55 may be so located as to indicate to the operator at different places any failure of the mechanism to operate properly. The terminal plate 42 by which the contact 48 is carried is similarly connected with the circuit 57, which is connected in circuit with a solenoid 58 and the battery 52 to the ground 53, as in the case of the circuit 50. The solenoid 58 controls the movement of a marker 60 which contacts with a register-sheet 61 operated by any suitable form of feed mechanism, whereby a permanent record of the operation of the mechanism may be obtained.

In the operation of the above-described mechanism, the disk 25 will be constantly rotated by rotation of the idler-roll, and upon failure of the idler-roll to rotate from any cause, the disk 25 will be immediately brought to rest. As the disk rotates under the influence of the idler-roll through the connection above described, currents are set up in the liquid by reason of the rotation of the disk therein, and the lower portions 33 and 34, lying in close proximity to the disk, are influenced by the currents thus set up in the liquid to such an extent as to swing the upper portion of the member 32 from its normal at rest position, as shown in Fig. 3, into engagement with the contact 48 and hold it in engagement therewith so long as the idler-roll continues to turn and the disk connected therewith is rotated. Any suitable liquid may be employed in the liquid container, but it is usually preferable to employ a medium grade of oil where the speed of rotation of the roll, and consequently of the disk operatively connected thereto, is comparatively slow, in order that the member 32 may be more effectively in-

fluenced by the rotation of the disk through the currents set up in the liquid. It will be understood that there is sufficient clearance between the portions 33 and 34 of the member 32 and the disk to permit the member 32 to resume its at rest position almost immediately after the disk has ceased rotating. The register-sheet 61 is adapted to be fed in any suitable manner during the operation of the machine, and so long as the member 32 continues to engage the contact 48, the solenoid will be energized to hold the marker in the position it occupies in making that portion of the mark designated by the reference character *a* on Fig. 4. The arm 32, being at the time out of engagement with the contact 47, the circuit 50 is open and the lamp 55 and bell 51 will not be operated. Whenever in the illustrative embodiment of the invention described herewith, the paper passing over the idler-roll 6 becomes broken, or for any other reason fails to turn the idler-roll 6, the disk 25 will no longer be rotated, and the arm 32 being no longer influenced by currents set up in the liquid, will drop back to its normal position of rest, as shown in Fig. 3, whereupon the circuit 57 will be broken and the arm 32 will engage the contact 47 to close the circuit 50, thus causing the bell 51 to be sounded and sending current through the lamp 55 to indicate both by the bell and lamp that the mechanism has ceased to operate satisfactorily. At the same time, the circuit 57 being opened, the solenoid 58 is no longer energized and the marker is moved by suitable means from the position it occupied in making the mark *a* upon the record sheet into such position as to make the mark *b* thus indicating upon the record sheet the cessation of proper operation and also making a permanent record of the same. It is to be understood that a suitable switch may be placed in the circuit 50, if desired, so that the circuit may be opened when the machine is not in use, to prevent constant ringing of the bell when the machine is not in use.

While the illustrated embodiment of the invention has been shown and described with considerable particularity in order to make clear to those skilled in the art the precise details of construction which may be employed in its use, it is to be understood that the invention is not limited to the precise details of construction illustrated or described, or any of them, except in so far as they may be included in the following claims.

What I claim is:

1. In a device of the character described, contacts each arranged in an electric circuit, a liquid chamber, a pivoted member having a portion immersed in the liquid contained in said chamber, and means for setting up currents in the liquid whereby the pivoted member is moved into engagement with one of said contacts.

2. In a device of the class described, a liquid chamber, means in said chamber for setting up currents in the liquid, and a pivoted member having a portion immersed in the liquid and actuatable by the currents set up therein to open or close an electric circuit.

3. In a device of the class described, a liquid chamber, a member partially immersed in the liquid within the chamber and rotatable therein, and a member supported from said chamber and movable in response to currents set up in the liquid for opening or closing an electric circuit.

4. In a device of the class described, a liquid chamber enclosed by a casing, a disk rotatably supported by the casing and having a portion thereof immersed in the liquid within the chamber, and means responsive to currents set up in the liquid by rotation of said disk for opening or closing an electric circuit.

5. In a device of the class described, a casing, a disk rotatably mounted in said casing, a pivoted member having a portion extending in proximity to said disk, and means for actuating the pivoted member through rotation of said disk to open or close an electric circuit.

6. In a device of the class described, a liquid chamber, a member having a portion immersed in the liquid in said chamber and movable in response to currents set up therein, and means separate from said member operable to set up currents in the liquid.

7. In a device of the class described, a liquid chamber, a casing partially enclosing said chamber, a disk rotatably mounted in said casing and partially immersed in the liquid, a member pivotally supported intermediate its ends from said casing and having a portion arranged in proximity to said disk, electrical contacts located in the path of movement of said pivoted member and engageable thereby upon movement of said member in response to currents set up in the liquid upon rotation of said disk.

In testimony whereof I have affixed my signature.

DANIEL S. HOLT.