E. S. COLE.

RECORDING DEVICE.

APPLICATION FILED MAY 8, 1909.

993,437. Patented May 30, 1911.

Fig. 1.

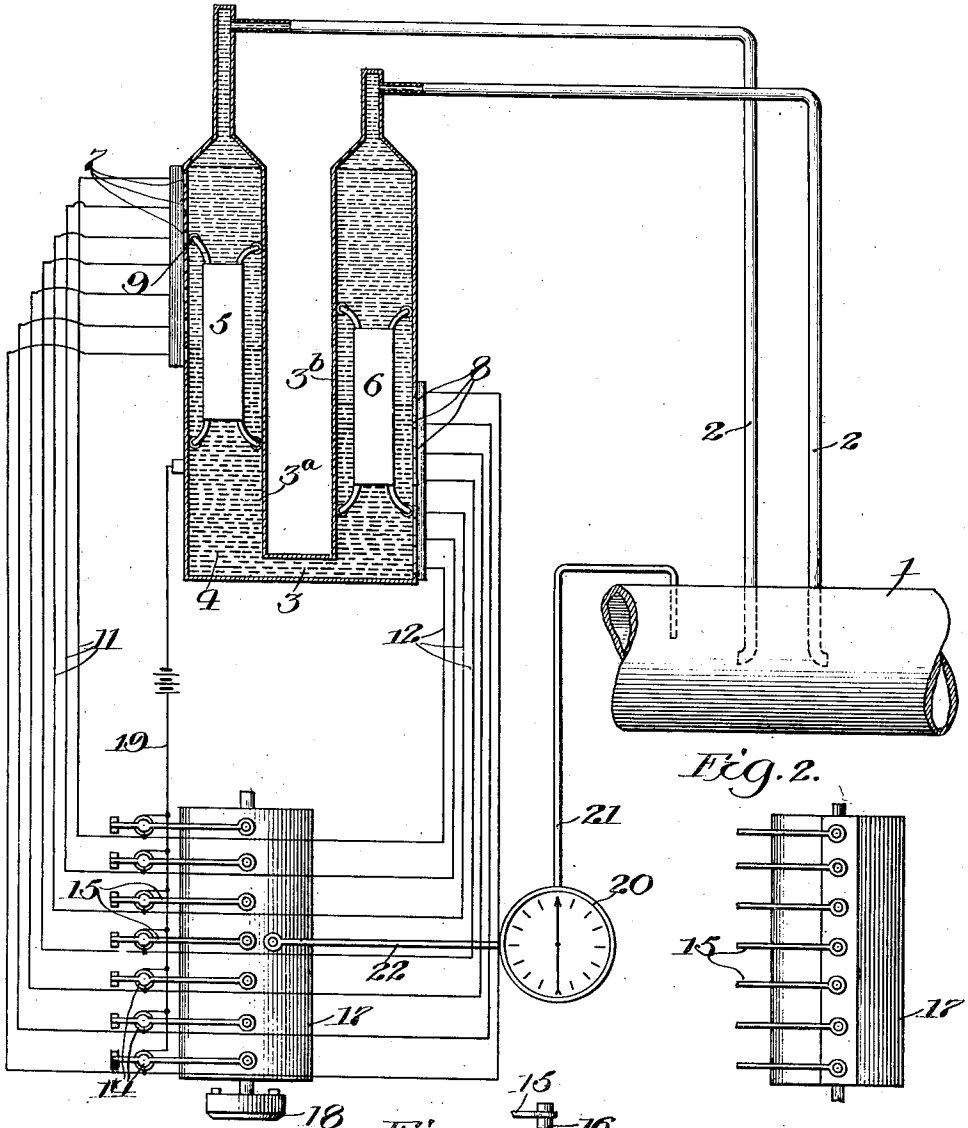
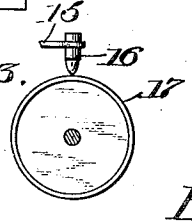


Fig. 2.

Fig. 3.



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EDWARD S. COLE, OF NEW YORK, N. Y.

RECORDING DEVICE.

993,437. Specification of Letters Patent. Patented May 30, 1911.

Application filed May 8, 1909. Serial No. 494,752.

To all whom it may concern:

Be it known that I, EDWARD S. COLE, citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Recording Devices, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to recording devices for recording the velocity and static pressure of a flowing stream.

The principal object of this invention is to provide a simple, practical and efficient construction of recording device of the kind specified, and especially to secure accuracy in the record made by the same.

To some extent, my invention is an improvement on the device shown and claimed in Letters Patent issued to me March 3, 1908, for recording device, No. 880,720.

In the accompanying drawing,—Figure 1 is a view of a recording device embodying my present invention, associated with a pipe in which is the flowing stream whose velocity is to be measured and recorded. Fig. 2 is a view of the recording devices of the same, and Fig. 3 is an end view of the arrangement shown in Fig. 2.

In the drawing, I show a pipe 1, which is understood to be the pipe in which flows the stream of liquid, or other fluid, whose velocity is to be recorded. Tubes or pipes 2, 2, extend from the conduit 1 to the U-tube 3, having the vertically disposed arms 3^a and 3^b, the pipes 2, 2, being connected to the tops of the arms 3^a and 3^b. In this U-tube 3 is a heavy liquid 4, and in the arms are two floats 5 and 6, which are supported in the heavy liquid 4. The fluid from the conduit 1, extends, of course, into the tubes 2, 2, and upper parts of the arms 3^a and 3^b, and by reason of the flow of the fluid in said conduit, the heavy liquid is depressed in the arm 3^b, and caused to rise in the arm 3^a, as shown in Fig. 1, and the floats 5 and 6 are caused to rise and fall correspondingly. The liquid 4 need not be heavier than water, although preferably so, I having secured good results with carbon tetrachlorid. This liquid should be non-conducting, or at least of very high resistance, so as not to short-circuit contacts which it covers. The sides of the arms 3^a and 3^b are provided with contacts 7, 7, and 8, 8, respectively, and the floats 5 and 6 are provided with contact wheels 9, 9, and 10, 10, by which contact is made with the contacts 7, 7, and 8, 8. From the contacts 7, 7, and 8, 8, there are extended conductors 11, 11, and 12, 12, respectively, which lead to electro-magnets 14, 14. The latter are arranged in a row, and provided with armatures 15, 15, carrying pencils 16, 16, arranged to act upon paper placed upon a drum 17, which is rotated by clockwork 18. The magnets 14, 14, are connected by a conductor 19 with the U-tube 3, and the floats 5 and 6, by virtue of their contact wheels 9, 9, and 10, 10, establish circuits between said U-tube and the contacts 7, 7, and 8, 8, to close the circuits through the magnets 14, 14, as the said floats rise and fall. The contacts 7, 7, are connected with the magnets 14, 14, in corresponding order,—that is, the uppermost contacts 7 are connected with the uppermost magnets 14, and so on; but the contacts 8, 8, are connected with said magnets in reverse order,—the uppermost contacts 8, being connected with the lowermost magnets 14, and so on. The magnets 14, 14, are preferably located at increasing distances apart downwardly, as best shown in Fig. 2, whereby the decreasing extent of movement on the part of the heavy liquid for corresponding increments in pressure for increasing velocity flow are compensated for.

The movement of the two floats, it will be seen, causes the electro-magnets 14, 14, to be actuated to form a record on the paper carried by the drum 17. By having two floats, each is a check on the other to compensate for any inaccuracy or irregularity in the movement of either float, and if two records made by the two floats are different, I find that the mean between the two is a strictly accurate reading. Thus, the device gives me an accuracy not heretofore attained. I show in the drawings also a pressure gage 20, having a tube connection 21 with the pipe or conduit 1, to indicate pressure, and also having an arm 22, by which a record is made of this static pressure.

It will be understood that changes and modifications may be made without departing from the spirit of the invention.

What I claim is:

1. A device of the class specified comprising recording devices and a plurality of

sets of cumulatively operating mechanisms, all operated by the same flowing stream for actuating said recording devices.

2. A device of the class specified comprising a series of recording devices, a series of electro-magnetic devices for actuating said recording devices, and a plurality of mechanisms for each electro-magnetic device, each actuated by the same flowing stream for closing the circuits of said electro-magnetic devices.

3. A device of the class specified comprising a U-tube, a pair of floats, one in each side of said U-tube, contacts with circuit connections adapted to be closed by said floats, and a series of electro-magnetically operated recording devices actuated by said circuit connections.

4. A device of the class specified comprising a U-tube having a plurality of floats, one in each side or leg of the tube, contact and circuit connections adapted to be closed by the floats, electro-magnets included in said circuit connections and adapted to be actuated by either float, and recording devices actuated by said electro-magnets.

5. A device of the class specified comprising a U-tube, a pair of floats, one on each side of said tube, contacts along the sides of the tubes adapted to have contact made with them by said floats, electrical circuit wires extending from said contacts, electro-magnets to which the corresponding wires of both sets of contacts are connected, recording pencils operated by said electro-magnets, and a rotary drum with clock-work for rotating it, adapted to carry a record sheet to have the record formed by said pencils.

In witness whereof, I hereunto subscribe my name this 8th day of April A. D., 1909.

EDWARD S. COLE.

Witnesses:
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