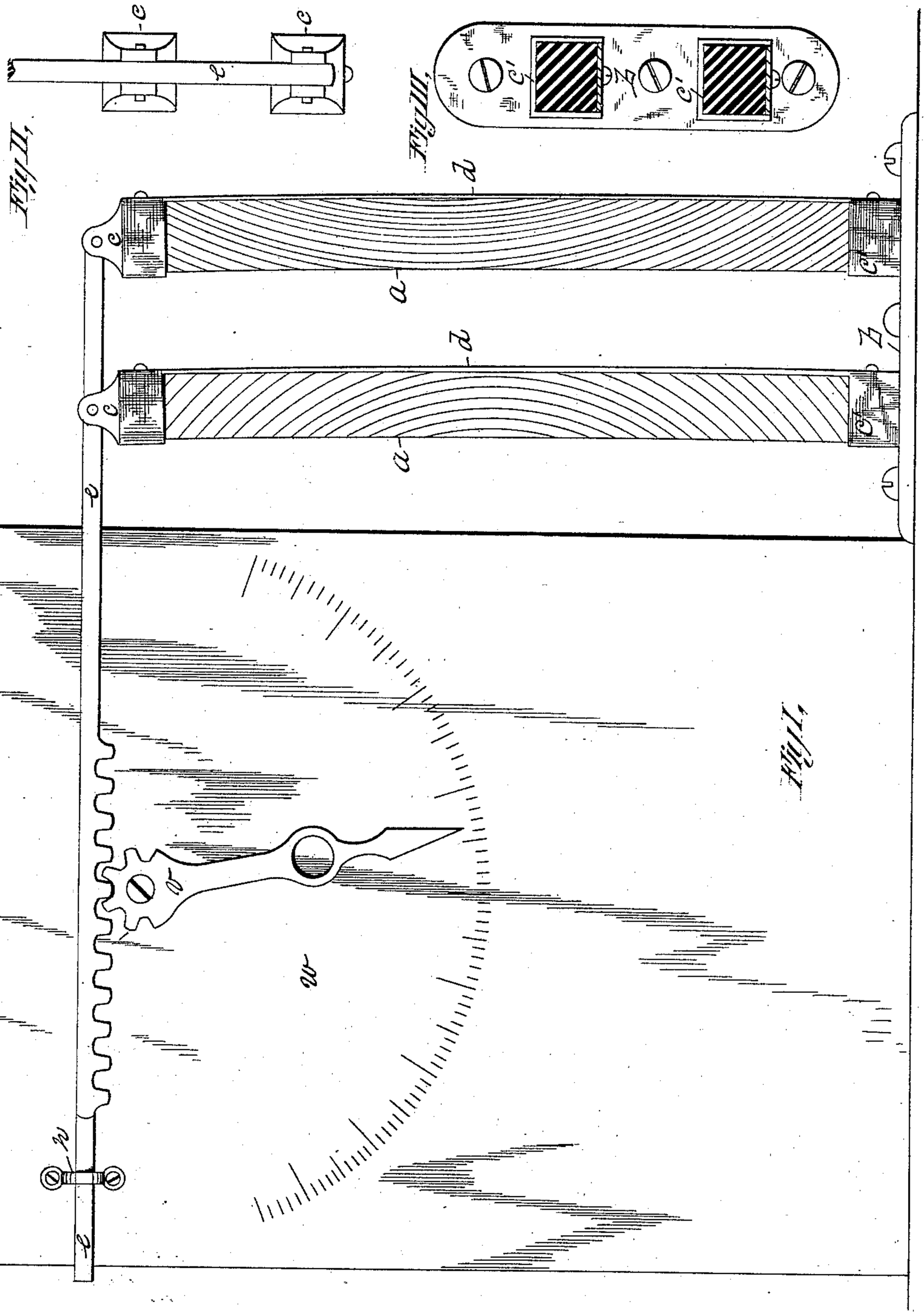
(No Model.)

G. A. AYERS.

HYGROMETER.

No. 277,533. Patented May 15, 1883.



Witnesses,
R. F. Hyde
Wm H Chapin.

Inventor;
George A Ayers
By Henry A Chapin
Atty

UNITED STATES PATENT OFFICE.

GEORGE A. AYERS, OF HOLYOKE, MASSACHUSETTS.

HYGROMETER.

SPECIFICATION forming part of Letters Patent No. 277,533, dated May 15, 1883.

Application filed September 4, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. AYERS, a citizen of the United States, residing at Holyoke, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Hygrometers, of which the following is a specification.

This invention relates to improvements in hygrometers, and particularly to instruments of this class which are capable of developing a certain amount of dynamic force under the influence of the varying conditions of the atmosphere relative to dryness and moisture; and it consists in the construction of a hygrometer from a strip of wood or other similar moisture-absorbing material, combined with suitable end supports, and means for uniting the latter, the object being to provide an instrument of this class which, under atmospheric influence, is capable of moving with sufficient power to operate any desirable indicator, and to act as a regulator of the movements of certain kinds of textile machinery, and to open and close steam and water valves by direct force, independent of gravity aids.

In the drawings forming part of this specification, Figure 1 is a side elevation of a hygrometer constructed according to my invention. Figs. 2 and 3 are detail views.

In the drawings, *b* is a metallic base provided with square sockets *c' c'*. *a a* are hygrometric strips or posts. *c c* are square caps. *d d* are metallic strips. *e* is a connecting-rod. *n* is a support. *v* is a dial-hand. *w* is a dial-plate.

Two of posts *a* are shown in the drawings, connected to act together; but a single post only is required, except in cases where the dynamic force exerted by one might be inadequate for the purpose for which it is intended. Each of said posts is in the form of a wooden strip cut from a suitable piece, transversely to the grain thereof, as illustrated in Fig. 1, and the strip so cut is secured against end motion by having its upper end covered with a cap, *c*, and its lower end enter a socket, *c'*, on a suitable base, *b*, a metallic strap, *d*, being secured to said cap and to said socket, and covering one side of said post, to which it is closely secured by cement or other suitable means. Any other material than metal may be substituted for that in strap *d*, which is flexible, has sufficient tensile strength, and is unaffected by more or less humidity in the atmosphere. Said posts *a* may also be made from other fibrous material than wood, provided it be capable of proper action by the increase or decrease of moisture in the atmosphere. Said posts *a* are secured to the base *b* by inserting one end thereof in the sockets *c'*, placing the caps *c* over their opposite ends, and firmly securing the strip *d* to said socket and cap, as aforesaid, and the base *b* is suitably secured to the instrument. A dial-plate, *w*, is likewise secured in an upright position, as shown, on which is pivoted a hand, *v*, provided with a series of gear-teeth at one end. The caps *c c* are adapted to be connected by suitable means, as shown, with the connecting-rod *e*, whereby the latter may receive a free horizontal movement from posts *a*, and the end of said rod is supported on the face of plate *w* by the loop-support *n*, and its lower edge is provided with rack-teeth to engage with those on the hand *v*.

The operation of my improvements is as follows: The posts *a* will stand about vertical when the condition of the atmosphere as to moisture is about normal. Their position as shown in Fig. 1—that is, with their upper ends inclined toward the dial-plate *w*—is that which indicates a dry atmosphere, and a consequent shrinking of the material of which said posts are made, and said shrinkage is greatest upon the exposed sides of the latter; hence they incline in a direction from that side which is covered by the strap *d*. The change of the atmosphere to a moist condition reverses the positions of the capped ends of said posts, causing them to incline from the plate *w*, owing to the absorption of moisture by their exposed sides.

The aforesaid movements of the free ends of posts *a* are communicated to the hand *v* through the engagement of the rack-teeth on rod *e* with those on said hand, and the hygrometric condition of the atmosphere is indicated by the position of the free end of said hand relative to the graduation-marks on plate *w*, which may be properly figured or lettered. The movements of the free end of said post *a*, under atmospheric variations, as above described, are so great that by extending a rod from the cap

c upward only a short distance its extreme end will vibrate to such a degree as indicate plainly the hygrometric changes in the atmosphere, and therefore the devices herein shown for indicating the movements of the posts *a* may be dispensed with, if desired.

It will be seen that the action of posts *a* must be quite forcible in both of said directions, and hence they may be employed in various places for regulating textile machinery, as described in another application for a patent filed by me simultaneously with this one, and for opening and closing valves for admitting steam into a room or other place, and for many other purposes where hygrometric force is desirable.

What I claim as my invention is—

1. A hygrometer consisting of one or more posts, *a*, of moisture-absorbing material, each of which is provided with end-retaining caps, which are secured together by a metallic strip which covers one side of said posts, in combination with appliances, substantially as described, for indicating the degree of movement of said post or posts, all as set forth.

2. A hygrometric element capable of forcible movement by atmospheric influences, consisting of a post of moisture-absorbing material, substantially as described, each end of which is provided with an end-retaining cap, and of a cap-uniting strip, substantially as described, covering one side of said post, combined and operating substantially as set forth.

GEO. A. AYERS.

Witnesses:
H. A. CHAPIN,
R. F. HYDE.