G. H. CROSBY.

Registering Steam-Gages.

No. 148,673. Patented March 17, 1874.

Fig. 1,

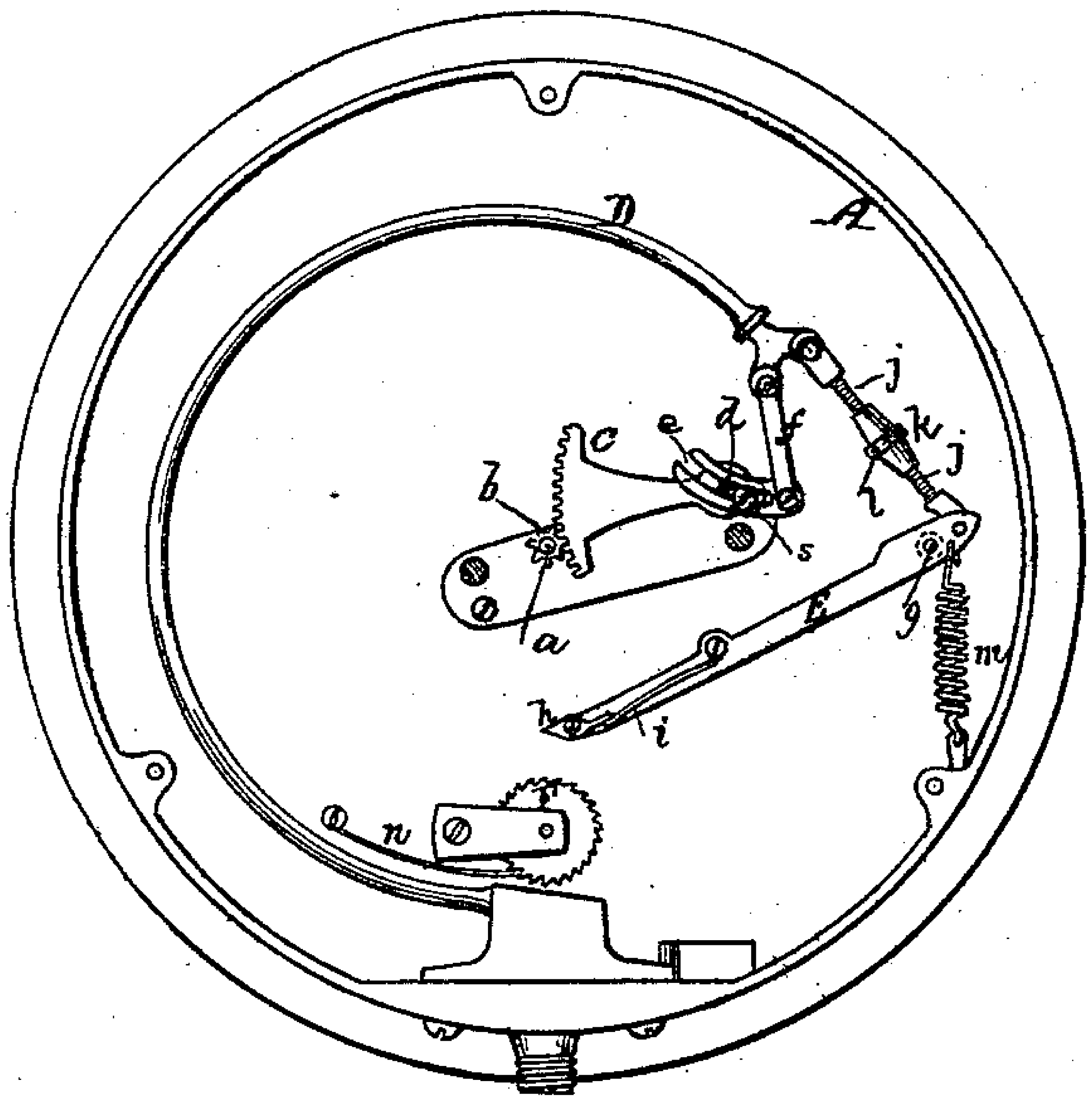


Fig. 2.

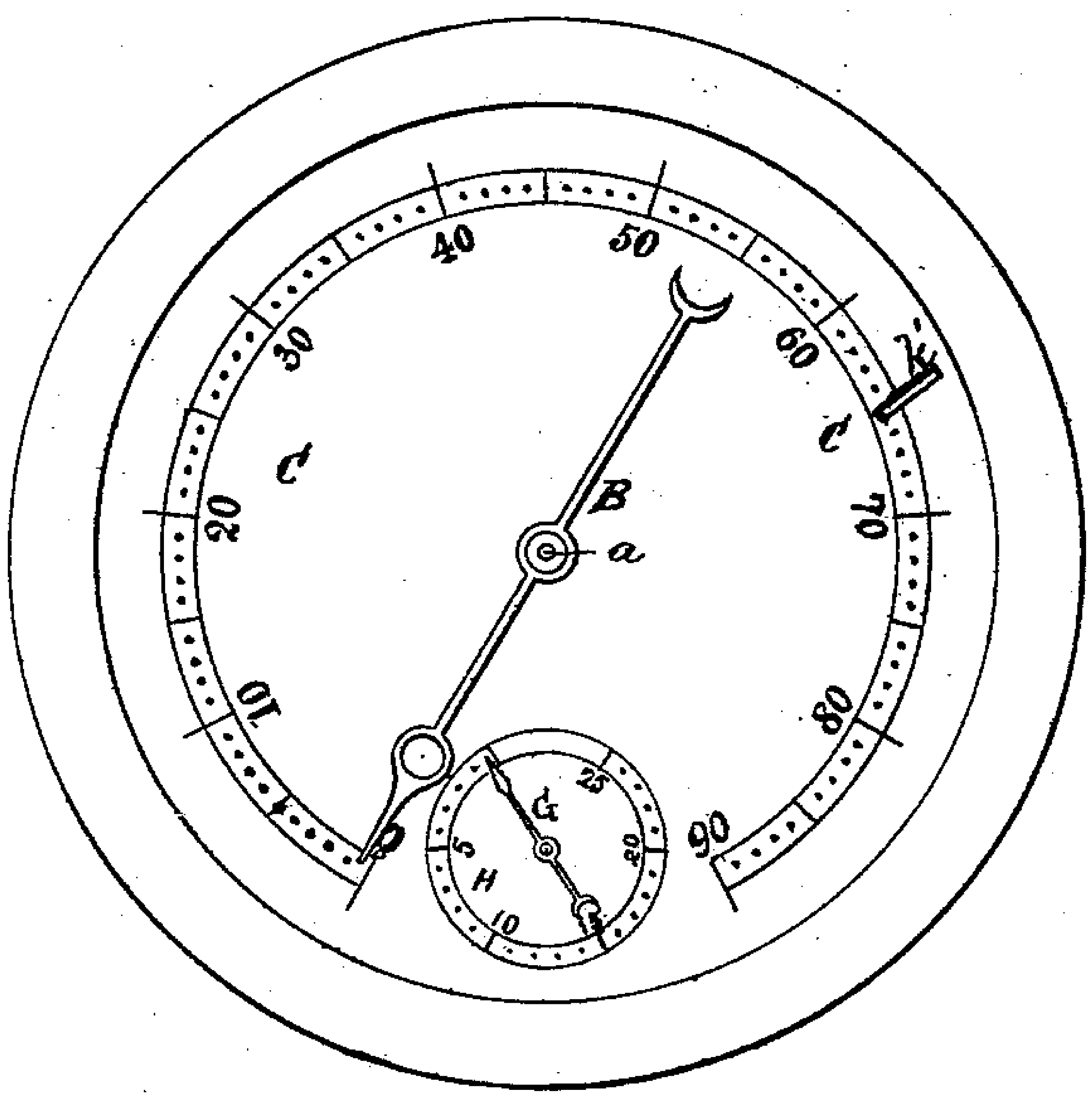
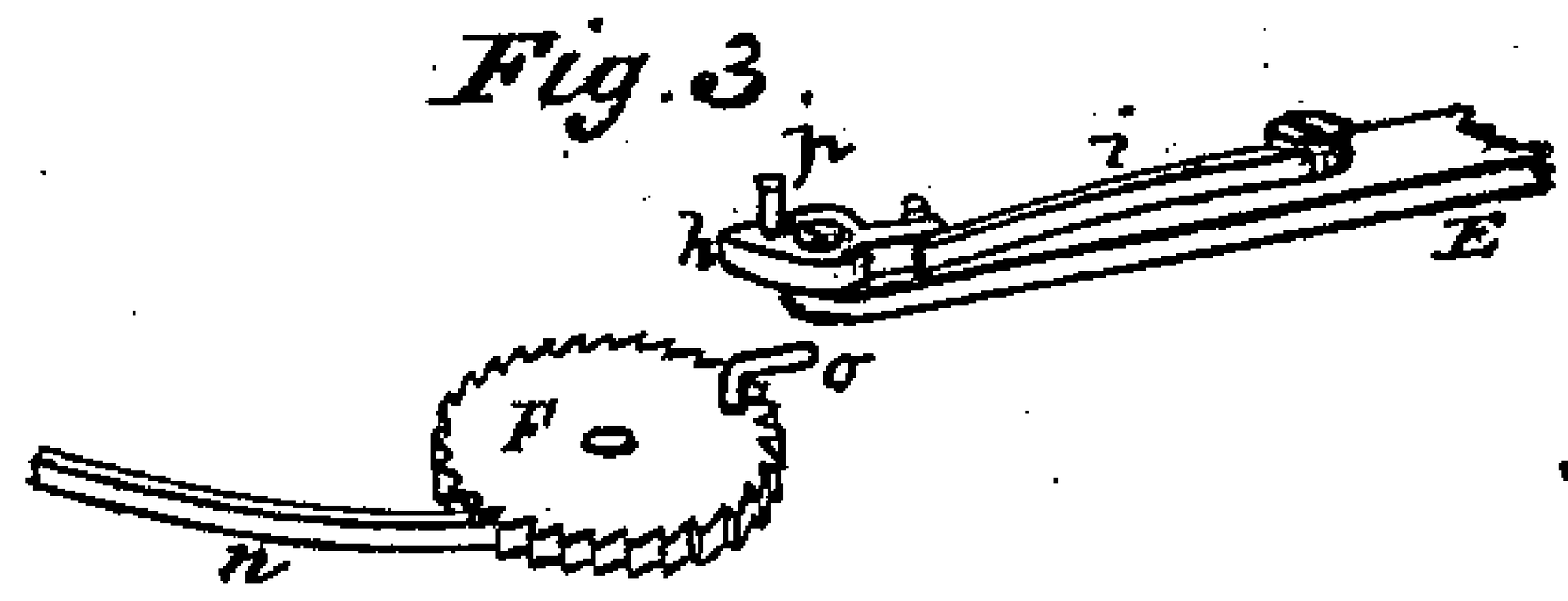


Fig. 3.



Witnesses.

John Bulkley

John Williams

Inventor.

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AM. PHOTO-LITHOGRAPHIC Co. N.Y. (OSBORNE'S PROCESS.)

UNITED STATES PATENT OFFICE.

GEORGE H. CROSBY, EAST SOMERVILLE, MASSACHUSETTS.

IMPROVEMENT IN REGISTERING STEAM-GAGES.

Specification forming part of Letters Patent No. **148,673**, dated March 17, 1874; application filed January 28, 1873.

To all whom it may concern:

Be it known that I, GEORGE H. CROSBY, of East Somerville, Middlesex county, Massachusetts, have invented certain new and useful Improvements in Registering Steam-Gages, of which the following is a specification:

This invention relates to steam-gages in which excess of steam-pressure over the pressure prescribed is registered automatically, and it has for its principal object the simplifying of the recording mechanism, or mechanism by which the movement of the Bourdon tube is connected to the recording-index, and rendering the same more sensitive and quick to respond to the movements of the tube.

The nature of my invention, and the manner in which the same is or may be carried into effect, can best be explained by reference to the accompanying drawing, in which—

Figure 1 represents a top view or plan of the gage with the dial-plate removed, and a part of the central bridge taken away. Fig. 2 is a like view of the same with the dial-plate in place. Fig. 3 is a view of a modification to be hereinafter referred to.

A is the cylindrical case, and B is the pressure-indicating index, mounted on a shaft, *a*, in the center of the case, and arranged to play over the face of the dial *c*, in the usual manner. The shaft *a*, which is arranged to revolve in suitable bearings, carries a pinion, *b*, which engages with a toothed sector, *c*, fixed to a shaft, *d*, mounted in bearings in which it can revolve, and connected with the free end of the Bourdon tube D by means of a slotted yoke, *e*, and link *f*, as shown. Thus far the mechanism described does not essentially differ, with the exception of the slotted yoke, which will be hereinafter referred to, from that of an ordinary steam-gage.

The recording or registering mechanism, in which my invention is principally comprised, is organized and arranged as follows: Upon a post or standard, *g*, is mounted a lever, E, which I term the registering-lever, as it is designed to actuate the registering-wheel F. For this purpose it carries at the end of its longer arm a click or pawl, *h*, held in place by a spring, *i*, which pawl is so placed that it will slightly overlap that tooth of the wheel which is nearest the end of the lever when the latter is in line with the axis of the wheel. When the lever is thrown out toward the periphery of the case beyond this tooth, the latter will ride over the pawl *h*, the spring *i* yielding to permit this; but when the lever returns, the pawl engages the tooth, and rotates the wheel until it disengages therefrom.

The movement of the registering-lever is effected by means of a connecting-rod, *j*, pivoted as one end to the shorter arm of the lever, and at the other end to the head of the Bourdon tube, as shown. For the purpose of adjusting the throw of the lever so that it may engage sooner or later with the registering-wheel, according to the degree of pressure prescribed, I make the rod *j* in two parts, united by an internally screw-threaded coupling nut or sleeve, *k*, by means of which the length of the rod may in effect be increased or decreased at pleasure; and, in order to make the adjustment more quickly and easily, I screw-thread the contiguous ends of the two parts of the divided rod, the one having a right-hand screw, and the other a left-hand screw, and correspondingly thread the coupling nut or sleeve. It will thus be seen that by rotating the sleeve in one direction the two parts of the divided rod will be moved away from each other, thus increasing the working length of the rod, in which case the click end of the lever, in its normal position, will be brought nearer the center of the case, and further from the registering-wheel, requiring more movement of the Bourdon tube, and consequently a greater steam-pressure, to carry it outward to the registering wheel. On the contrary, by revolving the sleeve in the other direction, and thus shortening the connecting-rod, the click end of the lever will, in its normal position, be brought nearer the registering-wheel, and consequently less steam pressure will be required to bring it into engagement with the wheel. In this manner the registering-lever can be accurately and readily set to effect the registration at any desired pressure. In order to effect the adjustment without taking off the dial-plate, a slot, *k'*, is formed in the latter over the sleeve, and through this slot a wire or pin can be inserted into one of the holes *l* in the periphery of a hub or enlarged part of the sleeve, and can thus be used to rotate the

sleeve for the purpose of effecting the desired adjustment of the lever.

In the drawings, a light spring, *m*, is shown attached at one end to the case, and at the other end to the shorter arm of the registering-lever. This auxiliary spring pulls outwardly on the shorter arm, and tends to draw the longer arm away from the registering-wheel and toward the center of the cases. In a low-pressure gage this spring will be found useful; but in a high-pressure gage, when the Bourdon tube is stiffer, it will not be necessary.

I prefer, on many accounts, the means herein described of varying the working length of the rod J; but it will be understood that other means, such as will readily suggest themselves, may be employed for the purpose, all that is required being that the working length of the rod—that is to say, the distance between its two points of attachment—should be variable at pleasure. The registering-wheel is fixed on a shaft arranged to revolve in suitable bearings, and carrying on its outer end an index, G, arranged to move over a smaller dial, H, on the main dial-plate. A detent, *n*, prevents the wheel from revolving in a direction opposite to that in which it is moved by the registering-lever.

For the purpose of preventing the wheel from making a full revolution, in which case the index could again be brought back to the zero-point, I form on the wheel, as seen in Fig. 3, a projecting finger, *o*, so located that before the wheel can make a full revolution, it (the finger) will be brought in contact with a stud or projection, *p*, on the click or pawl *h*. The tail of the pawl will thus be thrown out or back from under the spring *i*, and the pawl will be turned down in such manner as not to be capable of further engaging with the ratchet-teeth of the registering-wheel, which will then remain at rest.

The slotted yoke *e* is used to adjust the pressure-index, and by moving it out or in the index will have a correspondingly less or greater movement with the same degree of pressure in the tube D. This is a well-known means of adjusting the pressure-index, and is not broadly claimed by me. But heretofore the slot in the yoke has been straight, which, each time the yoke is adjusted, has caused the distance between the ends of the yoke and the head or tip of the tube D to vary, so as to require the employment of a new link of a length to correspond with the distance between these two points under the new adjustment. I remedy this difficulty by making the slot curved, striking it with a radius equal to the distance between the shaft *d* and the point where the link *f* is attached to the head or tip of the Bourdon tube. In this way the same link may be used no matter what change is made in the adjustment of the yoke. A clamp-screw, *s*, passing through the slot into the hub or sector C, serves to bind the yoke to the sector in any desired position.

It will be understood that the arrangement of registering-lever and Bourdon tube above described is applicable for registering minimum and maximum pressures. Should it be desired to register both pressures, a minimum-pressure registering-wheel and index can be added, located with relation to the registering-lever in the usual manner.

What I claim, and desire to secure by Letters Patent, is—

1. In combination with the Bourdon tube and the registering-lever, a rod, or its equivalent, connecting said parts, and capable of being adjusted to increase or decrease the distance between the points where it is connected or attached to the same, substantially as shown and set forth.

2. The divided connecting-rod and screw-threaded coupling-sleeve, in combination with the registering-lever and Bourdon tube, said parts being constructed and arranged for joint operation substantially as set forth.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

GEO. H. CROSBY.

Witnesses:
M. BAILEY,
EDM. F. BROWN.