J. D. CUSTER.

Clock Movement for Fog Signals.

No. 21,656. Patented Oct. 5, 1858.

Fig. 1

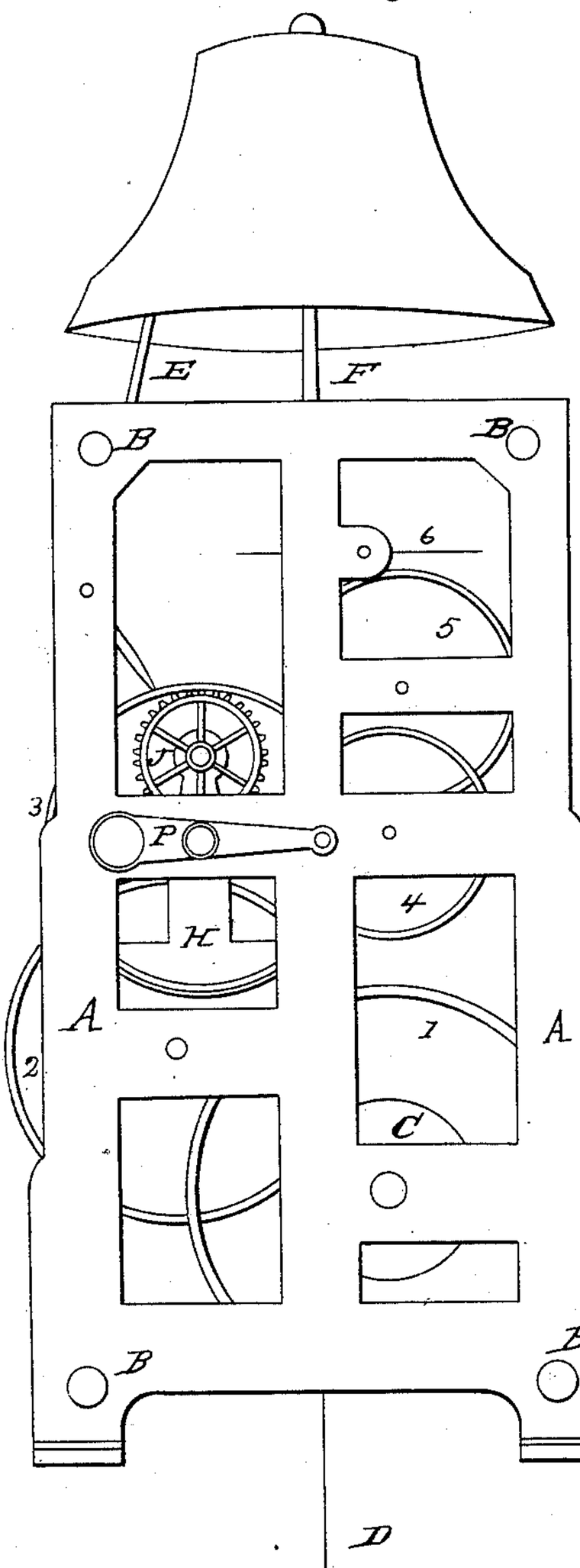
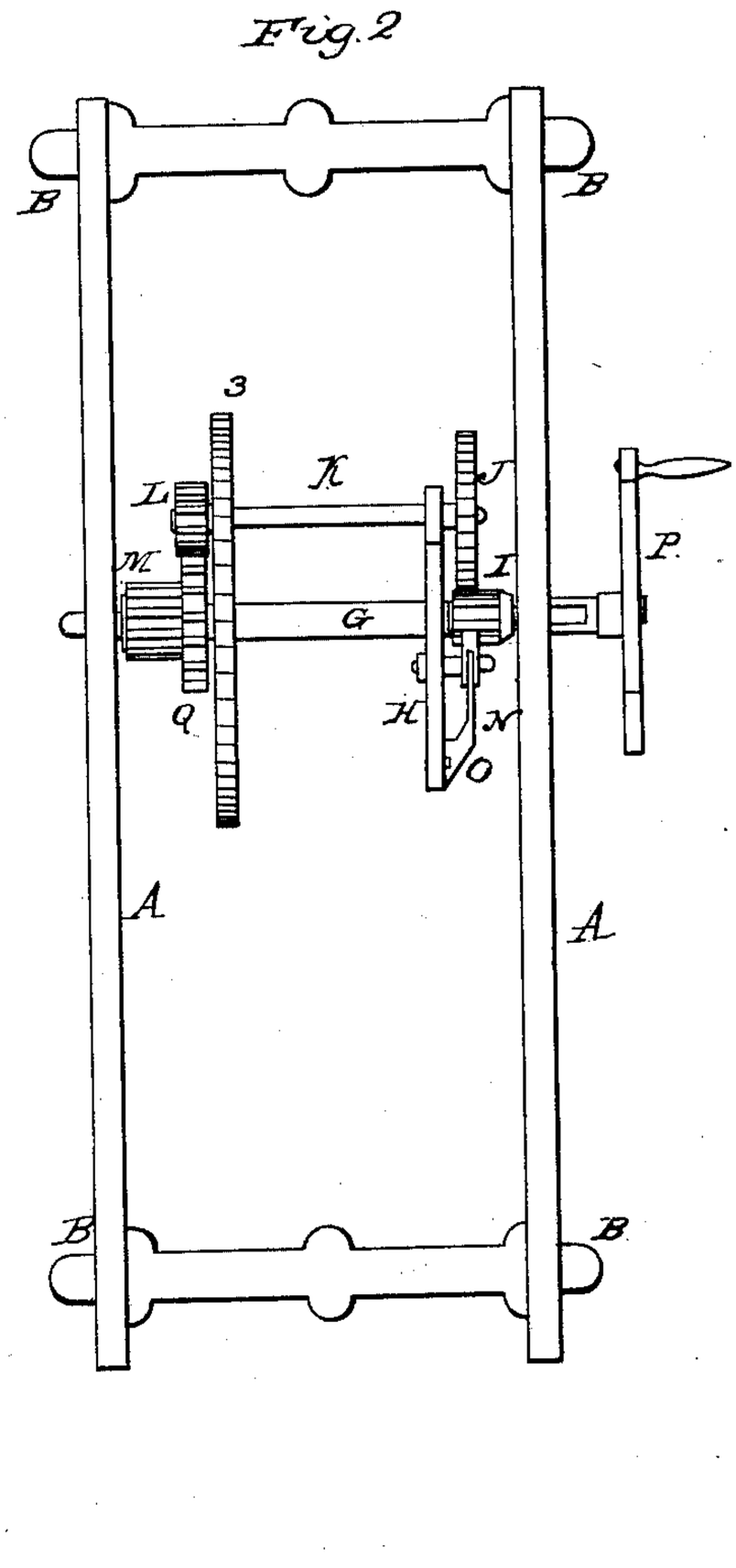


Fig. 2



UNITED STATES PATENT OFFICE.

J. D. CUSTER, OF NORRISTOWN, PENNSYLVANIA.

IMPROVEMENT IN FOG-SIGNAL MACHINES.

Specification forming part of Letters Patent No. **21,656**, dated October 5, 1858.

To all whom it may concern:

Be it known that I, J. D. CUSTER, of Norristown, in the county of Montgomery and State of Pennsylvania, have invented a new and Improved Retaining-Power for Going in Time of Winding; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in furnishing fog-signal machines, magnetic-telegraph registering-machines, &c., with a spur-wheel and pinion retaining-power on the reaction principle, (described in Reid on watch-making, page 275,) which shall be convenient to graduate so as to keep the proper balance of power in time of winding, so that the machine shall not loose or gain; and which retaining-power shall be convenient to oil, and as durable as any other parts of the machine, the spur-wheels and pinions all being on the outside, where they can be made as strong as desired.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

I place my retaining-power on the first, second, or third wheel. In large fog-signal machines I place it on the third wheel and its shaft, as shown in the accompanying drawings, Figs. 1 and 2, where about six and one-half turns of the winding-key P to one turn of the pinion M will make it about right for one person to wind up a large weight with ease; and in small machines—such as magnetic-telegraph registering-machines—I dispense with the first and second wheels, (shown in the accompanying drawings, Fig. 1,) and make the third wheel the first wheel, as shown in Fig. 2, by fastening the wheel 3 on its shaft G over near the balance-piece H, so as to get room to make the pinion M the barrel for the cord to wind on. In this case the pinion M is dispensed with and a suitable barrel put in its stead, firmly fastened to the wheel Q, so as to go round with it, and so that the barrel will clear the pinion L and run loose on the shaft G, as the pinion M and its wheel Q now do, so that it may be set back in time of winding. In Fig. 1 the wheels are all shown without arms or teeth, excepting wheel J, as all the rest are made as usual, and need no description; but it may be best to give the numbers of teeth in each wheel and pinion. Wheel 1, Fig. 1, has fifty teeth, and engages a pinion of ten teeth. Wheel 2 has fifty teeth, and engages a pinion, M, of nine teeth, with the wheel Q attached to it, as shown in Fig. 2. Wheel 3 has forty-eight teeth, and engages a pinion of eight teeth. Wheel 4 has forty-eight teeth, and engages a pinion of fifteen teeth, and wheel 5 has sixty-four teeth, and engages a pinion of seven teeth, which carries a fan, 6, as shown in Fig. 1. The teeth of all said wheels and pinions may be varied in number at pleasure; but the pinion I, wheel J, pinion L, and wheel Q cannot be varied much in regard to the relative numbers of teeth in each without destroying the proper balance of power in time of winding.

To secure the proper balance of power in time of winding, the winding-key P must make from six to seven revolutions to one of wheel Q and pinion M, according to the amount of friction which takes place, by pinion I rubbing on the end of shaft G, the friction of click N, and the friction of shaft K on its two bearings; and in small machines the friction of said parts may be so great as to require eight turns of the key to one turn of pinion M to keep up the proper balance of power. The pinion M is set back in time of winding, and also rubs hard on the end of shaft G; but it is evident that whatever friction takes place here is much more than compensated for by the reaction of shaft K on wheel 3 in the effort it makes on wheel Q to overcome said friction. From pinion M down to the weight (if the pitch of the pinion-teeth is equal to the wheel-teeth they engage in winding up) the friction will be about the same in winding up as when running down, and the weight will also be as heavy when going up as when running down, which is the principle on which this retaining power is founded. Winding very slow will cause this retaining power to lose, and winding fast causes it to gain slightly, so that a proper medium rate must be adopted in winding. Wheel 3 is firmly keyed on shaft G, and it has a boss cast on one arm of it, (not shown in the drawings,) in which the fulcrum-shaft K works freely. In large fog-signal machines the lifting-pins are attached to the rim of this wheel 3 to lift the hammer. They are made as usual and of any number desired, and need no de-

scription. Balance-piece H is firmly keyed on the other end of shaft G, so that the hole in the small end of it is in line with the hole in the arm of wheel 3, so that the fulcrum-shaft K shall work in it parallel with shaft G. The large end of this balance-piece H, at H, is made heavy enough to balance wheel J, fulcrum-shaft K, and pinion L; and click N and click-spring O are attached to it, as shown in Fig. 2 of the drawings. The winding-key P is also balanced, so that it may be left on or taken off at pleasure without disturbing the regularity of the machine. This key has a dovetail key riveted in the eye of it, which slides in a corresponding key-seat cut on the end of pinion I. Pinion I has eight teeth, and it runs loosely on the end of shaft G. It is kept from running back when not winding by click N. Wheel J has a dovetail key riveted in the eye of it, fitting in a seat cut in the end of shaft K, and kept on by a pin, as shown in Fig. 2; or it may have a square hole in it and be fitted on shaft K by squaring the end of it to suit, &c. This wheel J has twenty-six teeth in it, which is right for large fog-signal machines; but for small magnetic-telegraph registering-machines, &c., it will require from twenty-eight to thirty-two teeth in this wheel to get up the proper balance of power in time of winding, according to the amount of friction, as above stated. Pinion L is firmly keyed on the end of shaft K, and it has eight teeth in it. Wheel Q has sixteen teeth in it, and it is cast on pinion M or firmly fastened to it. Pinion M has two teeth in it; but they may be varied, as above stated. Shaft G has its bearing in plate A, near M, and in pinion I, and pinion I has its bearing in plate A, near I, as shown in the drawings, Fig. 2.

I control and regulate my fog-signal machines, magnetic-telegraph registering-machines, &c., by a fan or an escapement-wheel, verge, &c., to the proper rate of speed, and I graduate the retaining-power by the number of teeth in pinion I and wheel J up to the proper balance of power, or a little above it, and then graduate and regulate it down to the proper rate by causing the click-spring O to press more or less on the click N, or by attaching an additional graduating-spring to the balance-piece H, so as to act as a brake on pinion I in time of winding to reduce the retaining-power down to the proper rate, so that the machine shall run the same in time of winding as when not winding. Thus I put my retaining-power under the control of an unfailing regulator, which can be readily managed by the keeper or operator. This retaining-power attachment is entirely neutral when not winding; but when winding it serves to propel the machine and give the proper leverage to the winding-key, so that one person can wind up the largest weight with ease, while the ponderous hammer continues its regular blows on the pealing-bell to the infinite joy of the bewildered mariner.

The drunken fusee described in Reid, as above alluded to, is there admitted to have been almost useless, as it would cut and soon wear out. This was not the fault of the principle. The retaining pinions and wheels were all contained inside the small fusee, where they were necessarily so contracted as to be too small to be durable; and they were also of such inferior arrangement, having no balance piece and a mere pin for a fulcrum-shaft, as to make it impossible to graduate them to run the same while winding as when not winding. The priciple seems to be all that is good in this ancient retaining-power, and that I believe is all which I have adopted of it, as my retaining-power will show when compared with it.

I disclaim the ancient retaining-power alluded to, (called the "drunken fusee,") and all its internal gearing, as it is old and well known.

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

The application to fog-signal machines, magnetic-telegraph registering-machines, &c., of my improved retaining-power, including pinion I, wheel J, shaft K, pinion L, wheel Q, click-spring O, and balance-piece H, when arranged and combined, as above described, to form an adjustable and durable retaining-power, substantially as set forth.

J. D. CUSTER.

Witnesses:
WM. ROSSITER,
PETER SUPLEE,
F. SULLIVAN.