No. 704,333. Patented July 8, 1902.

C. HURST.

SELF WINDING CLOCK.

(Application filed Mar. 27, 1902.)

(No Model.)

Fig. 1.

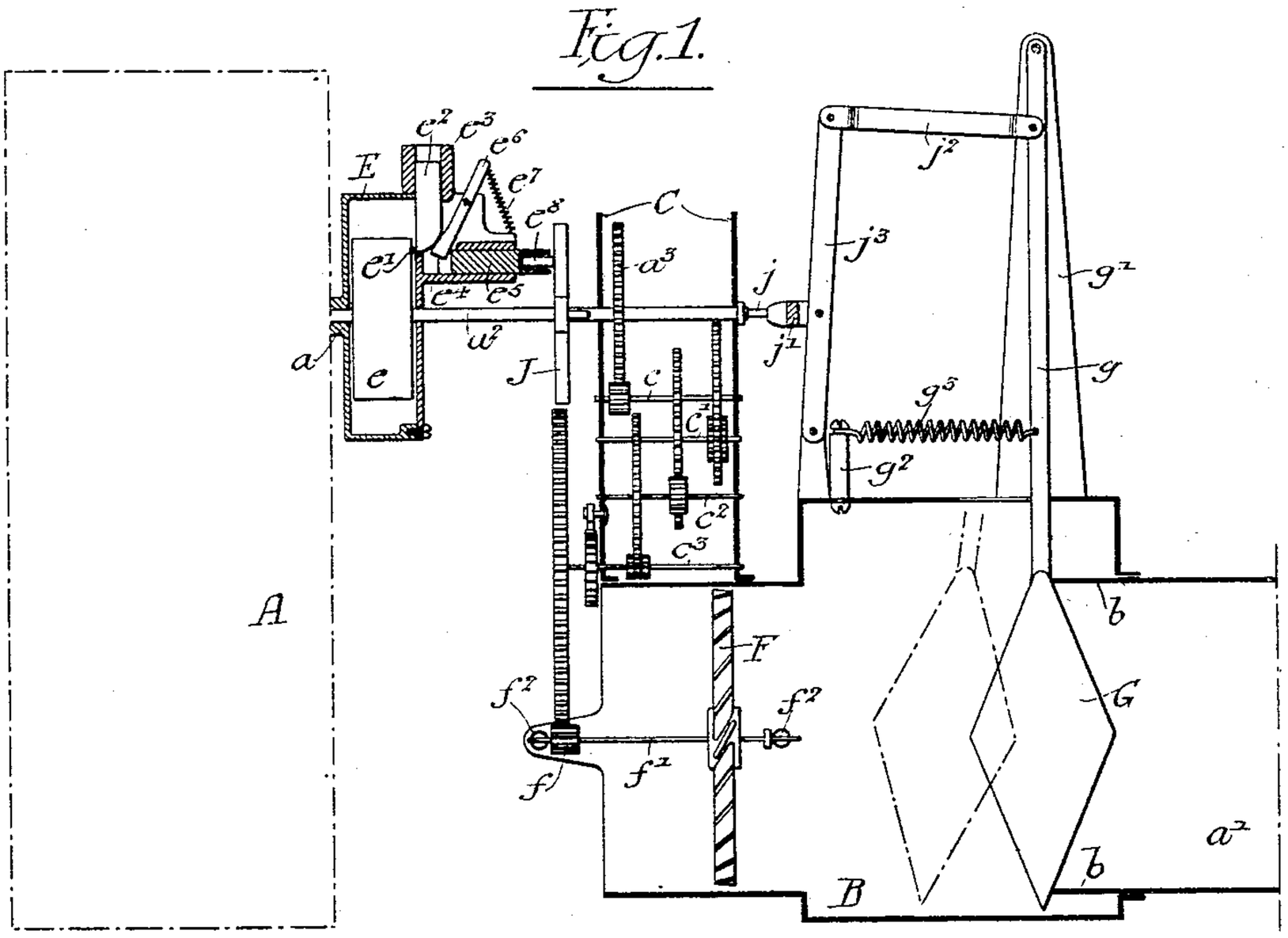


Fig. 2.

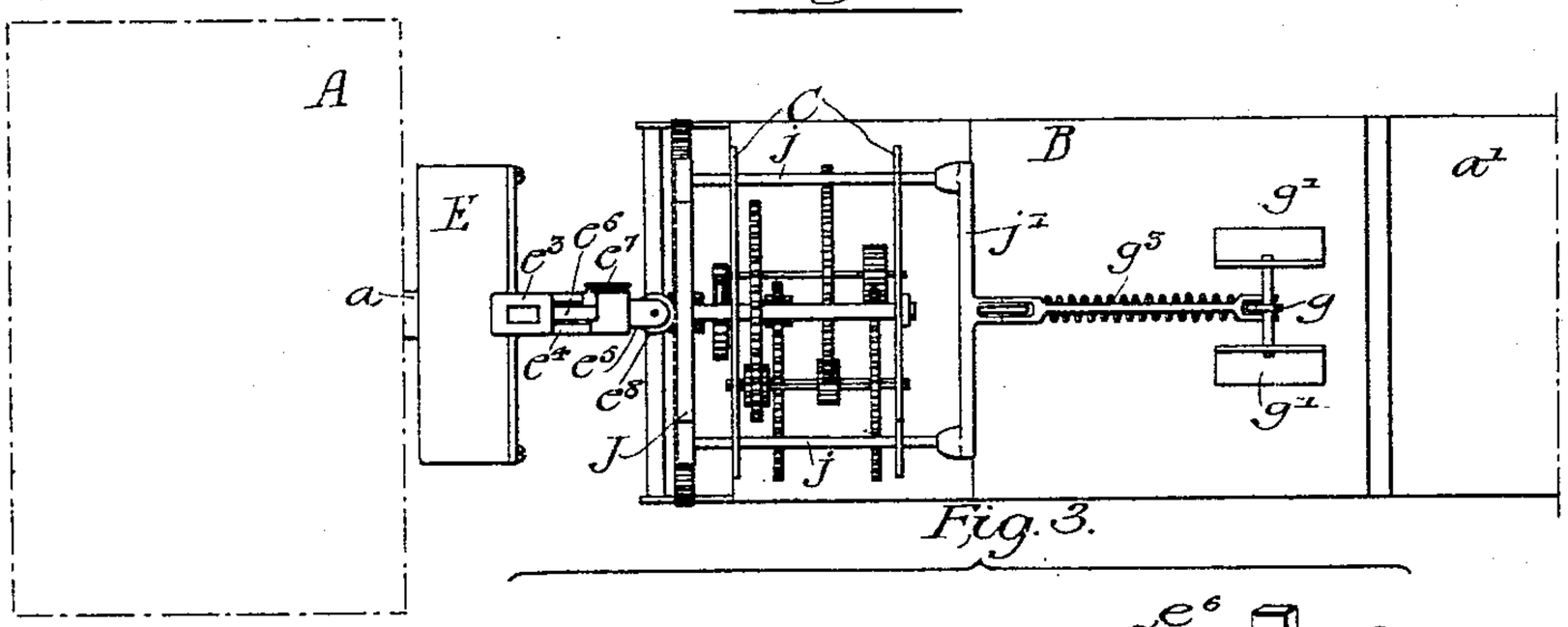
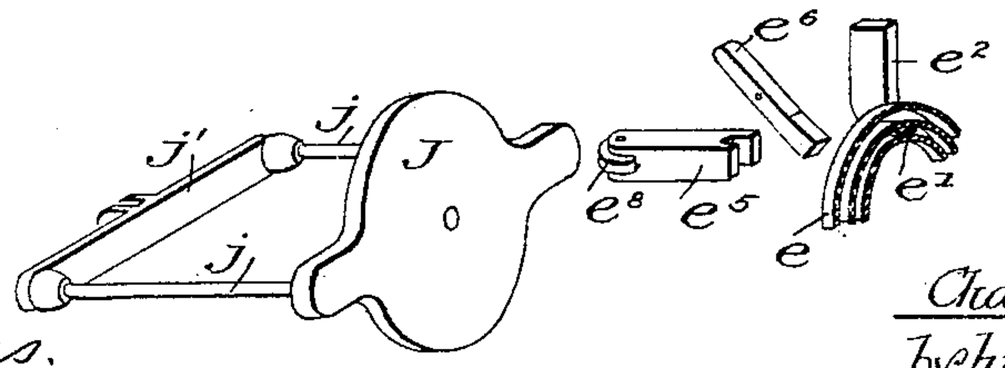


Fig. 3.



Witnesses:-

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UNITED STATES PATENT OFFICE.

CHARLES HURST, OF PHILADELPHIA, PENNSYLVANIA.

SELF-WINDING CLOCK.

SPECIFICATION forming part of Letters Patent No. 704,333, dated July 8, 1902.

Application filed March 27, 1902. Serial No. 100,229. (No model.)

To all whom it may concern:

Be it known that I, CHARLES HURST, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Pneumatic Self-Winding Clocks, of which the following is a specification.

My invention relates to certain improvements in clocks, and more particularly to an improved mechanism for automatically winding a clock to any desired degree whenever it has run down.

The object of my invention is to provide a device operated by a current of air for winding up the spring of a clock, the same including mechanism for automatically stopping the flow of said air when the spring has been wound to a certain point and which will again permit the flow of air to operate said mechanism when the spring has unwound by the operation of the clock to a predetermined point. This object I attain as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional elevation of the mechanism included in the preferred form of my improved device. Fig. 2 is a plan view of the mechanism shown in Fig. 1. Fig. 3 is a series of detached perspective views illustrating the detail construction of a portion of my improved device.

In the above drawings, A represents a clock of any desired style having its main driving spindle or shaft a extended outside of the clock-casing and directly connected in the present instance to the spring-barrel E.

B is a conduit or casing, preferably connected through the portion a' to a chimney-flue or other pipe in which there is a draft and having supported upon it a framework C for the gearing, hereinafter described.

Journaled both in the clock-casing and in the framework C is a spindle a^2, upon which is loosely carried the spring-barrel E, containing the mainspring e. One end of this spring is fixed to the spindle a^2 and the other end to the barrel E, causing as it unwinds the revolution of this latter and the attached clock mechanism in the well-known manner.

The mechanism for revolving the spindle a^2, and thus winding the spring e, consists of a fan F, supported transversely within the fan casing or conduit B and operatively connected to said spindle by a train of gearing. This includes a gear-wheel a^3 on the spindle a^2, connected through alternate pinions and gear-wheels upon spindles c c' c^2 c^3, supported on the framework C, to a pinion f, fixed to the fan-shaft f', this latter being journaled in two bars or pieces f^2, extending across the fan-casing B.

In order that the fan F may not operate continuously but will be stopped when the clock-spring e has been wound to a certain point, I provide a valve G in the fan-casing B, this latter being constructed with an extended portion b, made so as to form a seat for said valve. By means of a rod or bar g, pivotally carried on two standards g', I suspend the valve within the casing B, there being a slot in the top thereof for the passage of said rod.

The valve G is normally kept away from its seat or in its open position by means of a spring g^3, fastened to any suitable projecting portion g^2 from the fan-casing.

For moving the valve to or from its seat, and thereby stopping or starting the fan, I connect it to the mainspring e in such a manner that when said spring has uncoiled to a certain extent in operating the clock the valve is opened, being afterward shut when the spring has been rewound. The preferred arrangement of connecting mechanism between these two parts consists of a pin e', carried by a bar e^2 and projecting laterally between the convolutions of the spring e at a point near its outer end, which is attached to the barrel E. This pin is in permanent engagement with the bar e^2, which operates in a guide e^3, supported on the barrel E, so that as the spring varies its position in unwinding the pin, and consequently the bar e^2, are moved upward. Also carried by the barrel is a second guide e^4, having a bar e^5, movable at right angles to the bar e^2 and operatively connected to it through a lever e^6. This is pivoted to a projection from the spring-barrel E, having one end constantly held in engagement with the lower end of the bar e^2 by means of a spring e^7. A disk J is loosely carried on the spindle a^2 and is normally in engagement with a roller e^8, carried on the adjacent end of the bar e^5. This disk forms one end of a frame, the other members of

which consist of two side bars j, passing through and supported by the plates of the framework C and joined by an end bar j', to whose center is pivoted a lever j^3, carried by the fan-casing B. To the upper end of this lever is pivoted one end of a connecting-rod j^2, of which the second end is attached to the suspending-bar g of the valve G.

In use my improved device is usually placed on a mantelpiece or other support and the end a' of the fan-casing connected to the interior of the flue or chimney, which almost invariably passes through the wall immediately behind the said mantel. Assuming that the spring e of the clock is unwound and that the valve G is held in its open position by the spring g', the draft in the flue connected to the fan-casing draws a current of air into the latter and turns the fan, with its spindle and the pinion f, through the train of gearing. This action turns the spindle a^2 and winds up the clock-spring, thus drawing inwardly the pin e'. When this winding has continued to a predetermined extent, the bar e^2 moves the bar e^5 outwardly through the lever e^6, and since its roller e^8 bears upon the disk J this latter, with the side members of the frame to which it is attached, will be moved away from the clock parallel to the spindle a^2. Such action being transmitted to the connecting-rod j^2 swings the valve-rod g on its pivot, thereby moving the valve G onto its seat and preventing further flow of the air or other motive fluid through the fan-casing. The fan thus stopped remains idle until by the operation of the clock spring e moves outward in its barrel, so as to permit the bar e^5 to be moved toward the clock under the influence of the spring g', transmitted through the valve-rod j^2, the side members j, and the disk J. Such action unseats the valve G, again permitting the fan to revolve and wind up the spring e under the influence of the current of air flowing through the fan-casing.

It will be noted that the spring-barrel E, together with the bar e^5 and the mechanism connecting this latter to the spring e, revolve as a unit around the spindle a^2 as the clock operates upon the disk J when the spring has unwound far enough to cause it to actuate the valve G.

I claim as my invention—

1. The combination of a clock, a fluid-motor having means connecting it to the operating mechanism of said clock, together with means for governing the supply of motive fluid to the fan actuated by said motor through the operating mechanism of the clock, substantially as described.

2. The combination of a clock, a fan connected to the driving mechanism thereof, a valve controlling the flow of fluid to said fan, said valve being operated by the motor through the driving mechanism of the clock, substantially as described.

3. The combination of a clock having a mainspring, a fan having gearing connecting it to the same, a valve governing the flow of fluid to said fan and mechanism between the valve and the spring whereby changes in the position of the spring varies the position of the valve, substantially as described.

4. The combination of a clock having a mainspring, with a supporting-spindle, a fan for winding said spring, a valve controlling the flow of fluid to the fan, and means for connecting the valve and the spring, the same including mechanism revoluble around said spindle, whereby variations in the distance of a portion of said spring from the spindle are made to operate said valve, substantially as described.

5. The combination of a clock having a mainspring with a spindle, a fan geared to said spindle for winding the spring, a valve controlling the flow of fluid through the fan, a device primarily operated by the fan and revoluble with one end of said spring, together with mechanism for operating the valve, the same being in engagement with said device, substantially as described.

6. The combination of a clock having a spring, a spring-barrel and a spindle connected respectively to the ends of said spring, a fan having gearing operatively connected to the spindle, a piece revoluble with the gear-wheel, having means connecting it to a movable portion of the spring, a valve controlling the supply of fluid to the fan, means for movably suspending the said valve, and a framework connected to the suspending means of the valve, the same being in operative engagement with the piece moved by the spring, substantially as described.

7. The combination of a clock having a spring, a gear-wheel and a spindle connected respectively to the ends thereof, a fan-casing, a fan and a valve therein, gearing connecting the spring-spindle and the fan, means for normally retaining the valve in an open position, levers for operating the valve, a plate connected to said levers, and a device having means connecting it with the spring constructed to act on said plate whereby variations in the position of a portion of said spring move the plate and through said levers operate the valve, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES HURST.

Witnesses:

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WILLIAM E. BRADLEY.