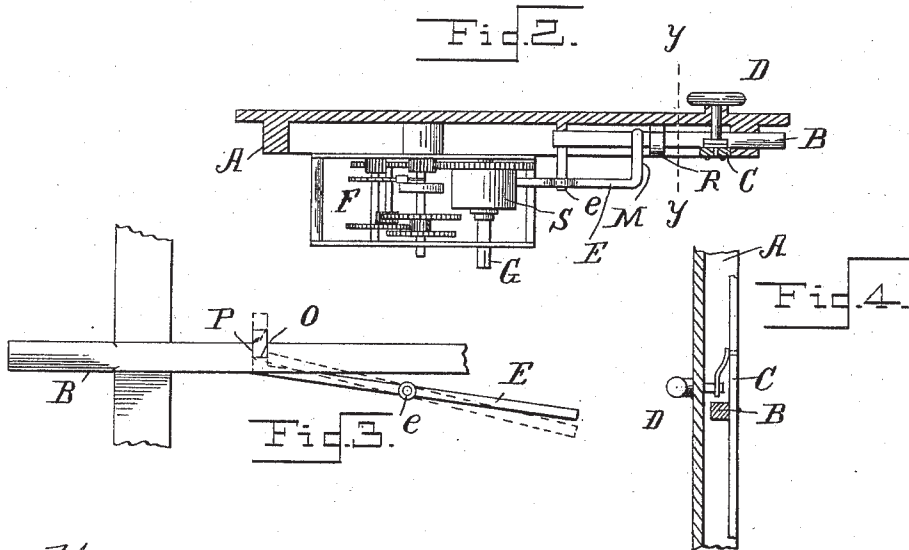
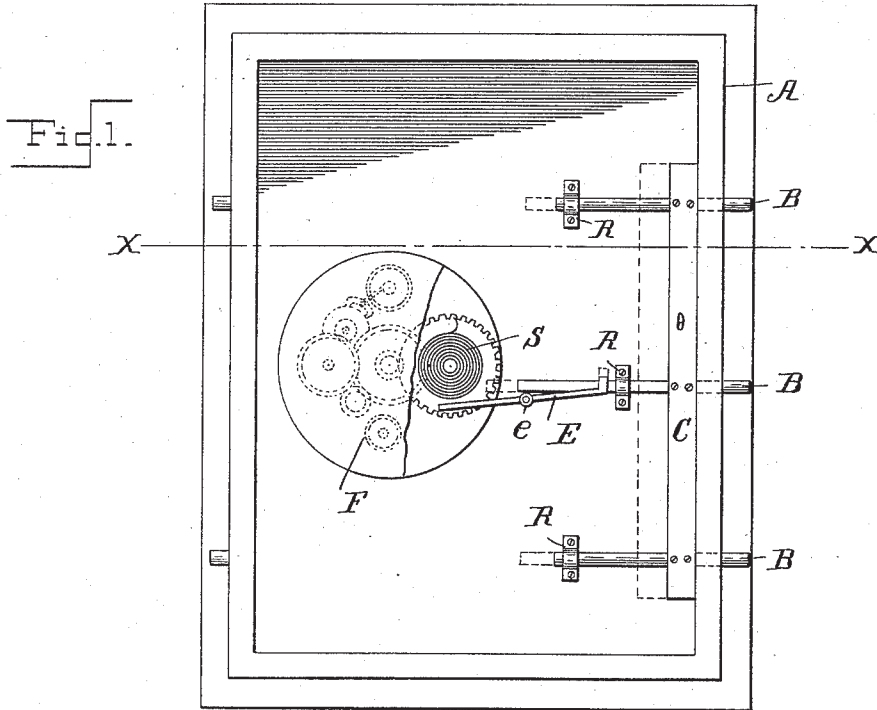


W. G. SPIEGEL.
TIME LOCK.

No. 474,871.

Patented May 17, 1892.



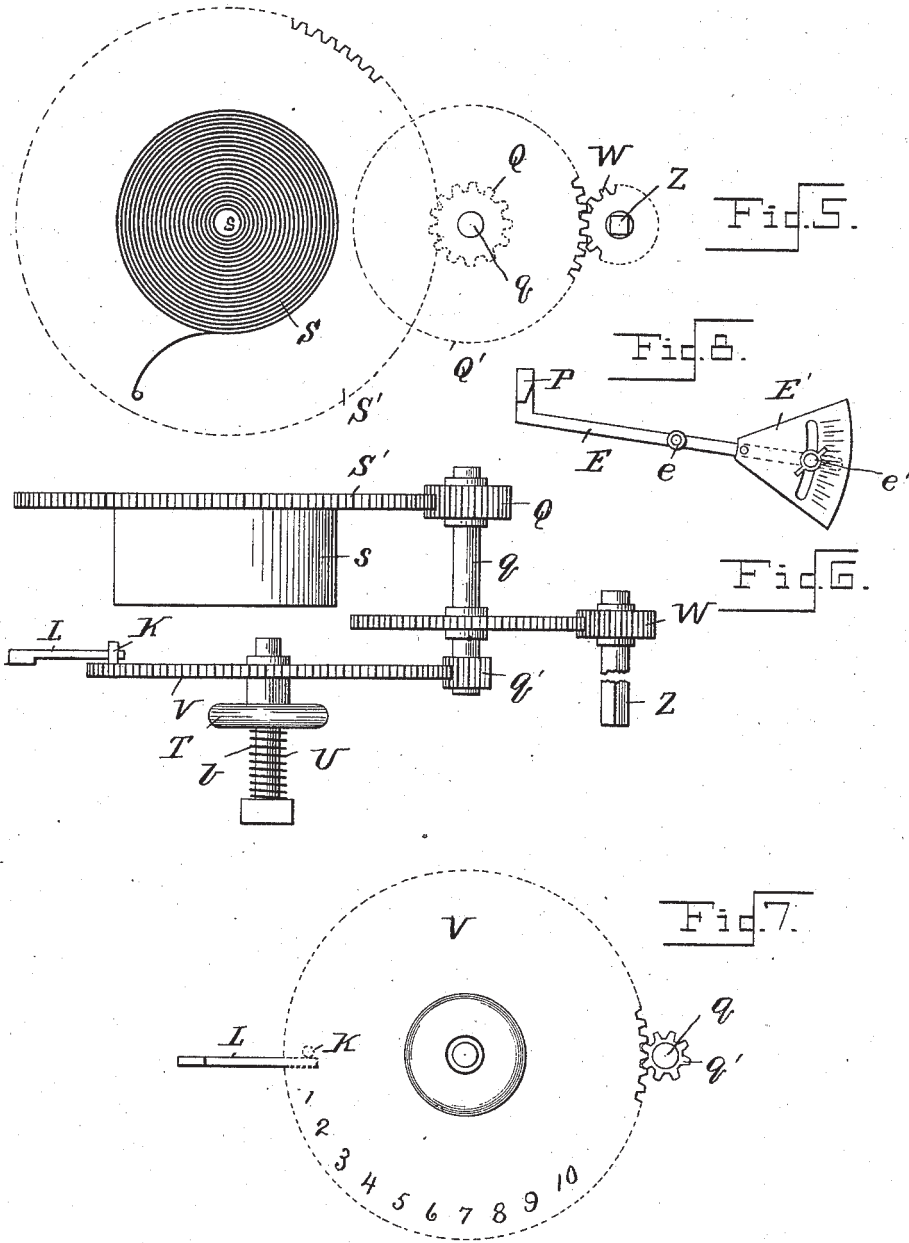
Witnesses
W. A. Courtland
J. Finley

Inventor
William G. Spiegel
 by *A. P. Smith*
 his Atty.

W. G. SPIEGEL.
TIME LOCK.

No. 474,871.

Patented May 17, 1892.



Witnesses
W. H. Courtland
J. Finley

Inventor
William G. Spiegel
by A. P. Smith
his Atty.

UNITED STATES PATENT OFFICE.

WILLIAM G. SPIEGEL, OF NEW YORK, N. Y., ASSIGNOR TO LEROY W. BALDWIN, OF SAME PLACE.

TIME-LOCK.

SPECIFICATION forming part of Letters Patent No. 474,871, dated May 17, 1892.

Application filed June 16, 1891. Serial No. 396,430. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. SPIEGEL, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Time-Locks, (Case No. 3;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of mechanism by which a clock-train controls the detents on a system of locks and bolts, so that the lock cannot be opened until a predetermined period of time has elapsed.

In the drawings, Figure 1 represents the inner side of a safe-door with the time-lock mechanism in place, a portion of the casing about the clock-train being broken away. Fig. 2 is a horizontal section on line *x x* of Fig. 1. Fig. 3 is a detail of the detent mechanism. Fig. 4 is a section on line *y y* of Fig. 2. Figs. 5, 6, and 7 are views of the setting mechanism. Fig. 8 is a modification.

The employment of clock-trains in connection with locks and bolts, whereby a time-lock is formed, has been in vogue for many years on large bank-vaults and in all cases where the importance of the valuables to be secured warrants the expenditure of the large amount of money demanded for such time-locks, as heretofore made. A clock-train which can be gotten into a small space and that will keep accurate time is necessarily a delicate piece of mechanism and unable to do any mechanical work, such as the lifting of detents or otherwise positively actuating a bolt-releasing mechanism. If able to do this work when first put into operation, it soon wears so as to become uncertain and untrustworthy in its action. To avoid these difficulties and to construct a time-lock which shall be at once cheap in construction and certain in operation, it is necessary to relieve the clock-train of all work except that of keeping time and to take the power for operating the detent direct from the spring or weight which drives the clock-work instead of transmitting said power through the clock-train, thereby

wearing it out and interfering with the accuracy of its movements.

Various forms of mechanism might be employed to transmit the power from the spring. In the form illustrated in the drawings, A represents the inner side of a safe-door.

B B B are the bolts, operated in unison by the cross-piece C and the handle D in the usual manner. One (or more) of the bolts B has a notch O cut in it, into which the detent P drops when the bolts are projected into the position shown in full lines, Fig. 1. The detent P is on the overhanging portion M of the lever E. This lever E is pivoted at *c* and has its other end prolonged sufficiently to form a tangent to the mainspring S of the clock-train F when the said spring is sufficiently expanded by the running down of the clock-train. The result of such expansion will evidently be to force down the end of the lever and lift the detent P out of the notch O, so as to release the bolts B and enable them to be withdrawn by the handle D into the position shown in dotted lines, so that the door opens.

In the construction shown in Figs. 1 to 4 the detent is not operated until the clock-train and spring are nearly run down, so that to regulate the period for which the lock is set it is evidently necessary to regulate the extent to which the spring S is wound up. If it is a seventy-five-hour spring and is wound up tight, the lock will not open until seventy-five hours have elapsed. If it is only wound up a fifth of the way, it will open the lock in fifteen hours, and so on. A setting mechanism to enable this to be regulated is illustrated in Figs. 5, 6, and 7.

Another method of regulation which may be used in conjunction with that shown in Figs. 5 and 6 or independently may be carried out by rendering the operating mechanism adjustable, which conveys motion from the spring to the detent. Such a species of adjustment is shown in Fig. 8. The lever E has an adjustable part E' pivoted to it and held in position by the set-screw *e'*. By the aid of said set-screw and the scale marked on the adjustable section it is possible to so adjust the contact of the spring with the lever that, start-

ing with said spring wound up tight, the clock-work will run a certain number of hours before striking the adjustable piece E', and consequently operating the detent. By varying the position of the sector E' the number of hours which must elapse before such contact and withdrawal of the detents can be varied at will.

In the winding-gear illustrated in Figs. 5 and 6, S is the mainspring, s the shaft by which it is wound up, and S' a gear-wheel on said shaft. Q is a pinion meshing with said gear-wheel. Q' is a second gear-wheel mounted on the same shaft q with the pinion Q. The winding-shaft Z has a pinion W, which meshes with the gear Q'. On the shaft q is a second pinion q'. The adjustable gear and dial wheel V is loosely mounted on the stud v and held in mesh with pinion q' by spring U. It may be temporarily withdrawn out of mesh at any time by sliding it along stud v by the handle or knob T. On the face of the dial-wheel are the figures "1, 2, 3," &c., and the stop K. This stop coacts with the projection L on the clock-frame.

If the gearing S' Q q' V is so proportioned that the dial turns one figure for every portion of a revolution of the shaft s, which corresponds to an hour's movement of the clock-train, it is evident that by pulling said dial V out of mesh with the pinion q' and setting any figure opposite the projection L and then allowing the spring U to force it back into mesh again the adjustable stop will be set so that the clock-train can only be wound up for a number of hours corresponding to the said figure. The mainspring will therefore return to complete expansion, which is sufficient to raise the detent at the expiration of that period, and the safe can then be opened, but not till then.

Two or three clock-springs might be arranged to operate on one lock to further insure certainty of action in the manner well known to time-lock makers, and other forms of adjustable stop actions for the winding-gear might be devised without departing from the principle of operation herein described and illustrated.

The method of operation of my invention is clear. If the adjustment shown in Fig. 7 is used, the movable section is set at the point

corresponding to the number of hours which are to elapse before the safe is to be opened. The mainspring of the clock-train is then wound up tight and the safe-door shut. Then the bolts are projected into their sockets and the detent falls. The safe is then locked until the mainspring has unwound and expanded sufficiently to touch the part E' of the lever E and lift the detent.

When the adjustable winding mechanism is used, the dial is set for the number of hours and the mechanism wound up until the stop acts to check further winding. The safe is then shut and the clock will take the predetermined number of hours to run down. The detent will not be lifted until the clock has run down, so that the opening of the safe at the desired time can be effected; but in the meantime it is securely locked.

Having therefore described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. The combination of the mainspring of a clock-train, a winding apparatus connected therewith, and an adjustable stop on said winding attachment, substantially as described.

2. The combination of the mainspring of a clock-train, a train of gear-wheels for winding said mainspring, an idle gear-wheel which may be temporarily drawn from mesh with said train of gearing and adjusted at will, a stop on said gear-wheel, and a projection from the clock-frame co-acting with said stop, substantially as described.

3. The combination, with a receptacle, a door for said receptacle, and a lock on said door, of a clock-train and spiral mainspring for operating said clock-train, a detent for said lock, a lever which is connected to said detent, and an adjustable extension on said lever, which presents a contact to the mainspring which is under control of the operator, whereby the point of expansion of the spring at which the detent will be withdrawn is under control, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM G. SPIEGEL.

Witnesses:

WARREN W. FOSTER,
A. P. SMITH.