(No Model.)

A. BANNATYNE.

ALARM CLOCK.

No. 588,809. Patented Aug. 24, 1897.

Fig. 1.

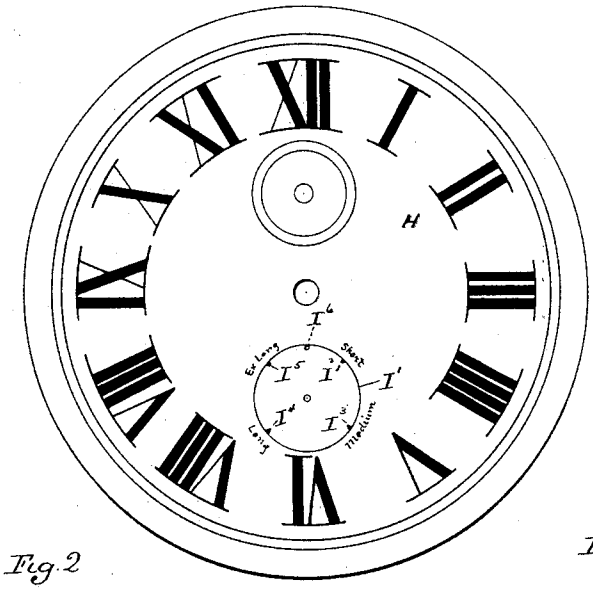


Fig. 2

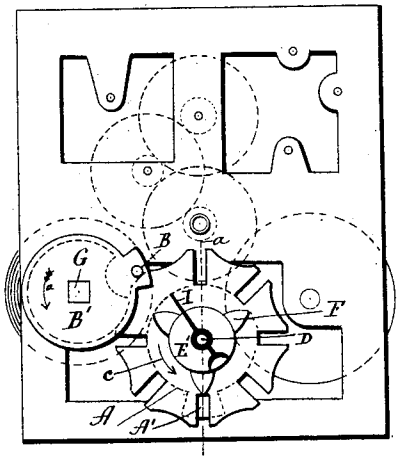


Fig. 7

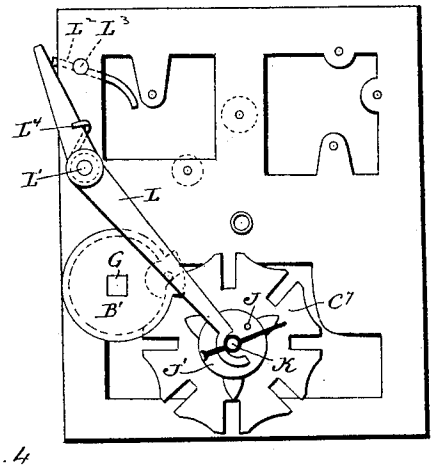


Fig. 3

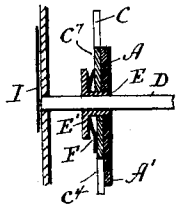


Fig. 4

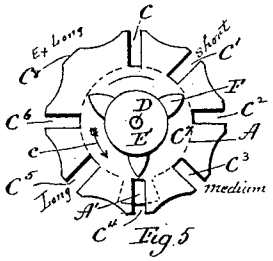


Fig. 6

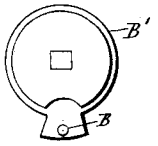
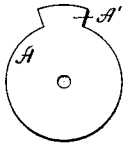


Fig. 5



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UNITED STATES PATENT OFFICE.

ARCHIBALD BANNATYNE, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE WATERBURY CLOCK COMPANY, OF SAME PLACE.

ALARM-CLOCK.

SPECIFICATION forming part of Letters Patent No. 588,809, dated August 24, 1897.

Application filed September 30, 1895. Serial No. 564,094. (No model.)

To all whom it may concern:

Be it known that I, ARCHIBALD BANNATYNE, of Waterbury, in the county of New Haven and State of Connecticut, have invented a new Improvement in Alarm-Clocks; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a face view of such a dial as may be used with a clock containing my improved alarm mechanism; Fig. 2, a partial view, in front elevation, of a clock-movement containing one form of my improved alarm mechanism; Fig. 3, a partial sectional view thereof on the line *a b* of Fig. 2; Fig. 4, a detached view, in front elevation, of some members of the said mechanism, including the alarm-setting arbor and the adjustable alarm-regulating stop; Fig. 5, a detached view of the adjustable alarm-regulating stop; Fig. 6, a detached view, in inside elevation, of the alarm-train stop of the mechanism shown in the preceding figures; Fig. 7, a view in front elevation of one of the modified forms which my invention may assume.

My invention relates to an improvement in alarm-clocks, the object being to produce a simple, compact, convenient, and effective alarm mechanism adapted to regulate the duration of the alarm in such a manner that after the alarm mechanism has once been set it will, without further attention, always sound the alarm for the same length of time until the mechanism is reset.

With these ends in view my invention consists in certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In carrying out my invention, as shown in Figs. 1 to 6, inclusive, of the drawings, I employ a manually adjustable or shiftable alarm-regulating stop, consisting of a disk-shaped body portion A and a radial stop-finger A′, which is set so as to block the full entrance of the actuating-pin B of the male alarm-train stop B′ into one of the seven radial slots C C′ C^2 C^3 C^4 C^5 C^6 of the female stop C^7, which has a double stop-tooth C^8. A detailed description of the construction and operation of the said male and female stops B′ and C^7 is thought to be unnecessary, inasmuch as they are of well-known construction and together constitute what is known to horology as the "Geneva" stop.

The said alarm-regulating stop A bears directly against the inner face of the said female stop C^7 and is mounted upon and rigidly connected with the alarm-setting arbor D by being secured to the inner end of the hub E of a collar E′, fixed to the said arbor. The said collar E′ holds in place a spring F, bearing against the outer face of the said female stop C^7, and frictionally couples the same to the said alarm-setting arbor D.

The male stop B′, forming the alarm-train stop of the particular mechanism being described, is mounted upon the alarm-spring arbor G and rotates therewith. The alarm-train is released or let off in the usual manner by the action of the time-movement, and as soon as it starts running the male stop begins to rotate with the alarm-spring arbor, which is reversely rotated, so to speak, during the unwinding of the alarm-spring.

At every unwinding revolution of the male stop its pin is entered into one of the radial slots of the female stop. If the said pin finds no obstruction in the slot which it enters, it travels well into the same and rotates the female stop for a short distance before the pin is disengaged therefrom. If, however, the slot of the female stop entered by the pin is partially blocked by the stop-arm of the alarm-regulating stop, the pin of the male stop engages with the said arm, which immediately blocks the further rotation of the male stop, and hence arrests the unwinding of the spring and the actuation of the alarm-train, as will be described later on.

The forward end of the alarm-setting arbor D projects through the dial H, its projecting end being furnished with an indicator in the form of a pointer I, which sweeps a small circle I′, placed upon the front of the said dial H and containing four setting-points I^2, I^3, I^4, and I^5, equidistant from each other and also designated "Short," "Medium," "Long," and "Extra long." The said pointer,

it will be understood, is fixed to the arbor in such right relation to the alarm-regulating stop A, mounted thereon, that when the arbor is turned to bring the indicator into registration with any one of the said setting-points the stop will be brought into right position to cause an action of the mechanism corresponding to the lettering at such point. Thus when the pointer is set to register with the setting-point I^2 for producing a "short" alarm the stop-arm A′ of the alarm-regulating stop will be registered with the slot C′, which is the second slot counting rearward from the double stop-tooth C^8, which may be considered the unit of position and direction.

I may here remark that I speak of the slot C′ as being "rearward" of the double stop-tooth C^8 because it is in rear of that tooth when the female stop is rotating during the action of the alarm mechanism. Arrows *c* in Figs. 2 and 4 show the direction in which the female stop rotates when the alarm-spring is unwinding and therefore when the alarm is being sounded.

When the pointer I is set to register with the setting-point I^3 for the "medium" period of sounding the alarm, the stop-arm A′ of the alarm-regulating stop will be brought into position to partially close the slot C^3, which is the fourth slot counting rearward from the double stop-tooth C^8 of the female stop C^7. When the pointer I is set to register with the setting-point I^4 for a "long" sounding of the alarm, the stop-arm A′ of the alarm-regulating stop will be brought into position to partially close the slot C^5, which is the sixth slot counting rearward from the double stop-tooth C^8 of the female stop C^7. When the pointer I is set to register with the setting-point I^5 for the "extra long" sounding of the alarm, the stop-arm A′ of the alarm-regulating stop will be retired under the central portion of the double stop-tooth C^8, which will itself act as a stop for stopping the female stop after the same has made one complete revolution, during which time the alarm will be continuously sounded.

I now wish to call attention to the fact that the stop-tooth C^8 and the slots C′, C^3, and C^5 of the female stop quarter the same in the same manner that the setting-points I^2, I^3, I^4, and I^5 quarter the circle I′ upon the dial. To complete the identification of the setting-points with the slots particularly mentioned, I have placed the words "Short," "Medium," "Long," and "Extra long" upon Fig. 4 in correspondence with the arrangement of those words upon Fig. 1.

Centrally between the setting-points I^2 and I^5, I place in the circle I′ the character "0," adjacent to which I place the words "Cut off." When the pointer I is turned to register with the character "0," the stop-arm A′ of the alarm-regulating stop is brought into position to partially close that one of the seven slots in the female stop which but for the said arm would be next entered by the pin B of the male stop B′ as the same is rotated in the unwinding of the alarm-spring. The particular one of the seven slots which the pin will enter when the pointer is set to register with the character "0" will depend entirely upon the position of the female stop at the time, for it is to be understood that the use of the alarm-regulating stop in this way is to interfere with the sounding of the alarm and stop the same after it has once been automatically started in the normal operation of the clock.

In the use of my alarm mechanism the alarm-spring is fully wound. The alarm-setting arbor is then turned, by means of its key, to register the pointer I with any one of the four alarm-setting-points, according as it is desired to have the mechanism sound a short, medium, long, or extra-long alarm. Then a short or a medium or a long or an extra-long alarm will be sounded by the clock and without further interference on the part of its user than winding the alarm-spring until the alarm mechanism is reset. Preferably, of course, the alarm-spring will be wound every time the clock is wound, whereby it will always be under full tension for running the alarm-train, so that a "snappy" action of the alarm will be secured. The length of time during which the alarm will be sounded will of course depend upon the construction of the female stop, which may be varied, as desired, to give the desired range of adjustment and the desired action under adjustment. Let it be supposed, for instance, that it is desired to set the alarm so that it will sound a short alarm every morning at seven o'clock so long as the clock is kept running and the alarm-spring is kept wound. With this end in view the alarm mechanism is set in the usual manner to be let off by the time mechanism at seven o'clock every morning. The alarm-spring arbor is also turned so that the stop-arm of the alarm-regulating stop will register with and partially block the radial slot C′ of the female stop, the said slot being the second slot counting rearward from the double stop-tooth C^8 of the female stop. Now when the alarm-train is let off at seven o'clock in the morning by the action of the time mechanism of the clock the male stop will make two complete rotations, moving the female stop two "points," so to speak, and being arrested at the end of its second rotation by the engagement of its pin with the end of the stop-arm of the alarm-regulating stop, which stands in the way of its entrance into the slot C′ and blocks the further rotation of the male stop. The alarm therefore will be sounded only for the short time which is required for the male stop to make two rotations. It will be a snappy alarm, because during those rotations of the stop the alarm-spring will be at its highest tension. When the clock is again wound, the alarm-spring is again wound to its highest tension, so that the next morning the full tension of the spring will also be present for giving "snap" to the alarm; but

the alarm-setting arbor is not disturbed until such time as it is desired to reset the alarm, so as to have it sound for a longer period.

I particularly wish to have it noted that the full tension of the alarm-spring is employed for sounding the alarm even for the shortest period for which it may be set, whereas in prior alarm mechanisms only a low tension of the alarm-spring has been available for sounding a short alarm.

In the modified construction shown by Fig. 7 the adjustable alarm-regulating stop consists of a stop-pin J, mounted in a stop-collar J′, secured to the alarm-setting arbor K and rotating therewith, the said collar and hence the pin being fixed to the said arbor with reference to the position thereupon of the pointer, which is not shown. The said pin is arranged to coact with the lower end of an alarm-train stop, consisting, in this case, of a stop-lever L, hung upon a horizontal stud L′ and having its upper end arranged to be engaged with a stop-wire L^2, mounted in the verge-shaft L^3 of the alarm-train. A spring L^4, connected with the said stop-lever, exerts a constant effort to throw its hooked lower end into the path of the stop-pin J and maintain its upper end out of engagement with the stop-wire L^2.

Under the modified construction above described the unwinding rotation of the female stop and hence the alarm-setting arbor and the collar J′, carrying the stop-pin J, engages the said pin with the stop-lever and swings the same on its pivot, so as to engage its upper end with the stop-wire L^2, which in turn rocks the verge-arbor L^3, so as to stop the alarm-train.

It will readily be understood that the duration of the alarm will be long or short, according to the time which elapses after the alarm-train is released before the stop-pin engages with the stop-lever, and that will of course depend upon the relation which the stop-pin has at the starting of the alarm-train to the said lever due to setting the stop-pin by manually turning the alarm-spring arbor in one way or the other independent of the female stop, which is frictionally connected with the said arbor and turns therewith normally and at all times, except when the arbor is being turned in one direction or the other for setting the alarm.

It is apparent that in carrying out my invention some changes from the construction herein shown and described may be made, and I would therefore have it understood that I do not limit myself to such construction, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In an alarm mechanism, the combination with an alarm-spring and an alarm-spring arbor, of an alarm-setting arbor, an indicating-pointer attached thereto in position to be registered with designations of alarms of different duration, means for driving the alarm-setting arbor from the alarm-spring arbor, the alarm-setting arbor being adapted to be turned, independently of the said means, for setting the indicating-pointer, an adjustable alarm-regulating stop mounted upon the alarm-setting arbor, and adapted to be set for regulating the rotation of the alarm-spring arbor, and hence the duration of the alarm.

2. In an alarm mechanism, the combination with the alarm-spring and the alarm-spring arbor, of an alarm-setting arbor, an indicator connected therewith, a male stop secured to the alarm-spring arbor, a female stop frictionally secured to the alarm-setting arbor, and an adjustable alarm-regulating stop fixed to the alarm-setting arbor, and adapted to block the coaction of the said male stop with the said female stop, the alarm-setting arbor being rotatable independently of the female stop for setting the alarm-regulating stop in accordance with the duration of alarm desired.

3. In an alarm mechanism, the combination with the male and female members of a Geneva stop, of an adjustable alarm-regulating stop adjustable with reference to the said female stop, and having a stop-arm which is used to block the slots of the female stop to the entrance thereinto of the pin of the male stop, substantially as described.

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

ARCHIBALD BANNATYNE.

Witnesses:
CLIFFORD H. HALL,
GEORGE W. WATSON.