

(No Model.)

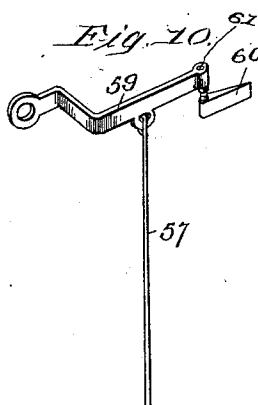
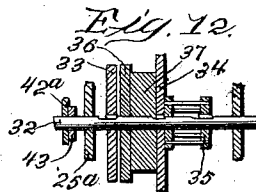
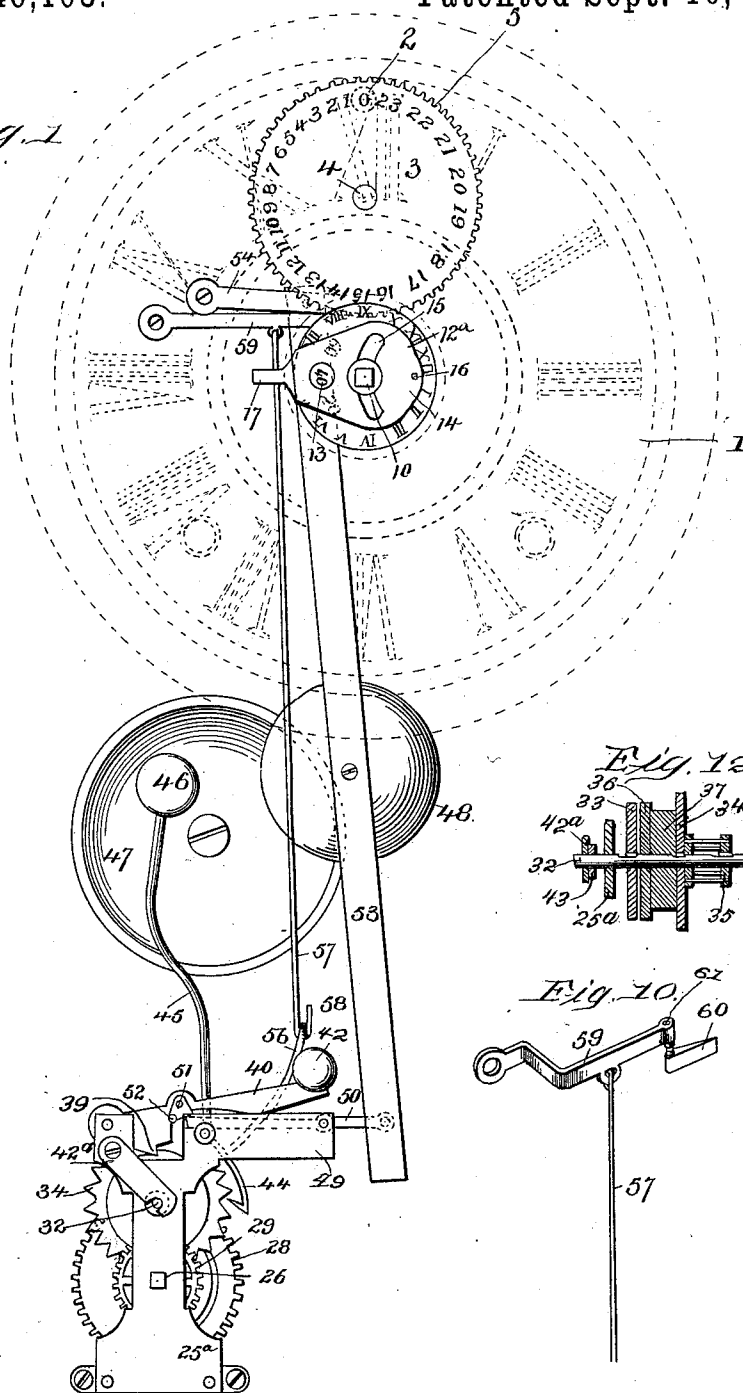
2 Sheets—Sheet 1.

E. E. KATZ.
ALARM CLOCK.

No. 546,103.

Patented Sept. 10, 1895.

Fig. 1



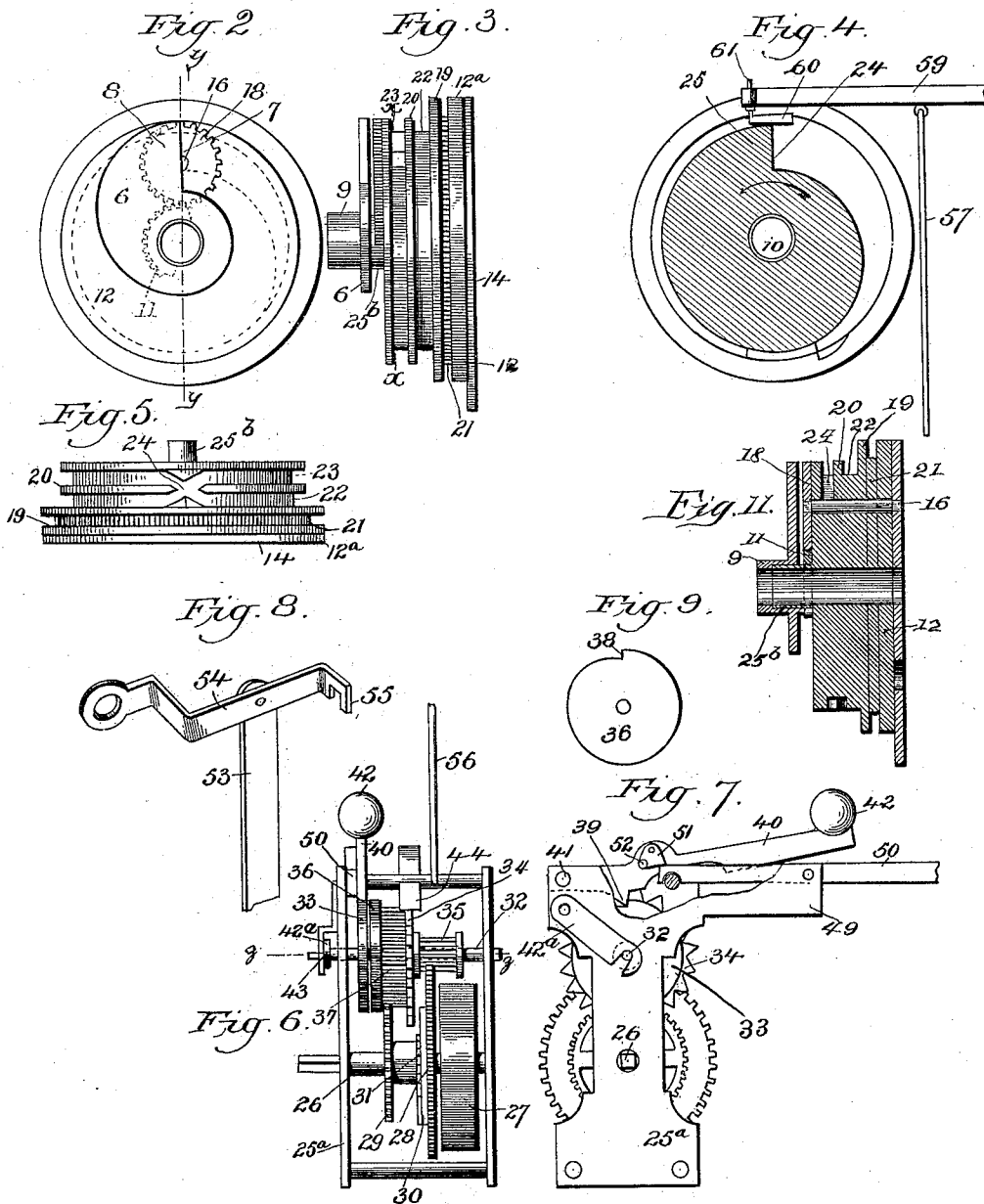
Witnesses
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

EDMUND E. KATZ, OF SAN BERNARDINO, CALIFORNIA.

ALARM-CLOCK.

SPECIFICATION forming part of Letters Patent No. 546,103, dated September 10, 1895.

Application filed October 25, 1894. Serial No. 526,913. (No model.)

To all whom it may concern:

Be it known that I, EDMUND E. KATZ, a citizen of the United States, residing at San Bernardino, in the county of San Bernardino and State of California, have invented certain new and useful Improvements in Alarm Attachments for Clocks; 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 certain improvements in alarm attachments for clocks, the object of the same being to provide ordinary eight-day clocks with alarm mechanism whereby by a single winding the alarm will strike at the hour for which it is set every twenty-four hours during the period that the said clock is adapted to run, and a second or additional alarm will strike at a set interval after the ringing of the first alarm, so that if the first alarm fails to wake the sleeper the second will do so, or if the first alarm does wake him he will be given time for a second nap after the first alarm has struck. Its object is also to provide means for regulating the length or duration of the alarm, and also means for making the second alarm louder than the first.

With these and other objects in view the invention consists of the construction, arrangement, and combination of parts which will be hereinafter more fully described and claimed.

In the drawings forming a part of this specification, Figure 1 represents a face view of a clock of ordinary construction, with the dial thereof shown in dotted lines and the alarm-controlling mechanism beneath the same in full lines. Fig. 2 is a rear view of the controlling-disks fitting over the hour-hand shaft of the clock. Fig. 3 is a side view of said controlling-disk. Fig. 4 is a section on the line $x x$ of Fig. 3, showing the controlling-disk for the first alarm with its connecting mechanism. Fig. 5 is an edge view of the disks shown in Fig. 2, looking from the under side thereof. Fig. 6 is a side view in detail of the alarm-actuating mechanism. Fig. 7 is a front face view of the same. Fig. 8 is a detail view in perspective, of the pivoted lever which engages the second alarm-controlling disk. Fig.

9 is a detail view of one of the disks for regulating the duration of the alarm. Fig. 10 is a detail perspective of swivel-bar. Fig. 11 is a section taken on the line $y y$ of Fig. 2. Fig. 12 is a section on the line $z z$ of Fig. 6.

Like numerals of reference indicate like parts in the various views.

1 represents the dial of an ordinary eight-day clock suitably secured to the frame thereof, having suitable openings for the insertion of a key for winding the time and alarm mechanisms, and a third opening 2 near the top thereof, through which may be seen the figures on the face of the alarm setting or indicating dial 3. This dial 3 is loosely mounted for rotation beneath the dial 1 upon a pin 4, projecting from a bracket secured to the clock-frame, and has teeth 5 upon its periphery.

6 is the controlling-disk for the second alarm, its periphery describing a cycloid and having a deep notch or drop 7 therein, forming the shoulder 8. This disk has an opening through its center and is formed with a sleeve or collar 9 projecting from its inner side, which is adapted to fit over the hour-hand shaft 10 of the clock and be held thereon by friction. Upon its outer face, and surrounding the opening therein, is secured a segmental rack 11, for a purpose which will appear later.

12 represents the controlling-disk for the first alarm, having upon its outer face a dial 12^a with Roman numerals around the outside and an inner series of numerals 13 extending part way around. Pivotaly secured near the edge and on the front of said disk 12 is a disk 14, having an elongated slot 15 therein, through which the hand-shaft 10 projects and allows said disk a limited movement on its pivotal shaft 16. The said disk 14 has an index finger or pointer 17 thereon and a circular slot through which the numerals 13 on the disk 12 may be seen. The shaft 16 extends through the disk 12 and carries on its inner end a pinion 18, which meshes with the segmental rack 11, before referred to. The disk 12 is made up of the dial-disk 12^a referred to, the disk 19, and the grooved track-disk 20, the same being integrally formed or permanently secured together. Between the disks 19 and 12^a, and of a smaller diameter than said disks, is a pinion 21, with which engages the teeth 5 of

the indicating or setting dial 3, the said disks 19 and 12^a forming guides for said dial-disk. Located beneath the disk 19 is the track-disk 20, formed on its periphery with two grooves 22 and 23, forming tracks or ways which are essentially parallel, except as hereinafter described. The lower groove or track 23 is formed with a deep notch or drop 24, making the shoulder 25 therein, and both tracks are formed at the point 24 into a switch where the said tracks lead into each other, this construction being for a purpose which will hereinafter appear. The disk 12 is further provided with an inwardly-projecting sleeve 25^b, which fits within the sleeve 9 of the disk 6 and over the hand-shaft 10 of the clock, being held therein by friction.

The alarm-actuating mechanism is located beneath the clock mechanism and consists of a frame 25^a, in which is mounted a main or winding shaft 26, to which is secured a strong coil-spring 27. The said shaft has loosely mounted thereon a spur-wheel 28 and has fastened thereto a pinion 29. The wheel 28 has attached to it a spring-actuated pawl 30, engaging with a ratchet 31 on the shaft, by means of which the said wheel moves with said shaft in its forward motion, but remains stationary during its backward movement or when the alarm is being wound. 32 is an auxiliary shaft, mounted in said frame 25^a, parallel to the shaft 26, and having fast thereon the notched disk 33, the notched alarm escapement-wheel 34, and the small elongated pinion 35, engaging with the wheel 28 on the shaft 25. Loosely mounted on said auxiliary shaft and located between the disk 33 and the escapement-wheel 34 is a disk 36, secured to the elongated pinion 37, meshing with pinion 29 on shaft 26 and of larger diameter than pinion 35. It will be seen that a forward rotation of the shaft 26, through the mechanism just described, will rotate the disks 33 and 36 at different speeds, the disk 33, secured to the shaft 32, rotating faster than the disk 36. Both these disks 33 and 36 have a peripheral notch 38 therein, as clearly shown in Fig. 9. Normally engaging one of the disks 33 and 36 is a projection 39 on a lever 40, fulcrumed at one end to a rod 41 in said frame and adapted for movement in a vertical plane. The free end of said lever is weighted, as shown at 42, for holding the same normally in engagement with the disk 33 or 36. It engages one or the other of these disks, according as a short or long ring of the alarm is desired. If a short ring is desired, it is made to engage the disk 33, which rotates at a faster rate, and thereby completes one revolution in less time. If a longer ring is desired, it is made to engage the disk 36. To accommodate the device for these changes, the shaft 32, carrying all the parts connected thereto, is adapted to be drawn out and pushed in, being held in its inner or outer position by means of the pivoted stop 42^a, which has a yoked end which passes around said shaft and above or beneath the lug 43 on

said shaft. At the inner position of the shaft 32 the lever 40 is in engagement with the disk 33, which in revolving produces a short alarm, and at the outer position of said shaft the lever 40 is in engagement with the disk 36, which in revolving produces a long alarm.

The alarm-escapement 44 is mounted in the frame for engagement with the escapement-wheel 34 and carries on its shaft the rod 45, carrying the alarm-striker 46, adapted to strike the bells 47 and 48. The forward movement of the shaft 32 through the escapement-wheel 34 actuates the escapement and causes the striker to vibrate, thereby ringing the alarm. In an extension 49 of the said frame is pivoted a lever 50, its free end engaging a triangular dog 51, pivoted to the side of the lever 40. The said dog has a weighted end 52, which holds the same so that it will be in engagement with lever 50 on the upward movement of the latter, but will move out of the way thereof on the downward movement of the same. The outer end of the lever 50 has pivoted thereto one end of a bar 53, to the under side of which is secured the gong 48. This bar extends upwardly to one side of the disk 12, and at its upper end is pivoted to a bent lever 54, which is in turn pivoted to the clock-frame at one end and terminates in a bifurcated or yoked flange 55. This yoked flange rests upon the edge of the disk 6, and in the rotation of the latter on the hand-shaft 10 a rise-and-fall movement is given to the bar 53 and in passing over the shoulder 8 of said disk a sudden drop is given to said bar.

On the same shaft with the striker-rod 45 and rigidly connected with the latter extends at an angle therefrom the rod 56, secured to the rod 57 by a loop or hook 58 on the latter. The rod 57 extends upward and is pivoted to what I term a "swivel-bar" 59, which is in turn pivoted to the clock-frame. This bar carries at its outer or free end a swivel-piece 60, moving on a vertically-disposed pintle or shaft 61, which fits the grooves or tracks 22 23 of the disk 12. The rotation of said disk causes the swivel-piece 60 to travel along said grooves 22 23, and the same passes from one groove to the other at the switch 24. In the groove 23 it drops after passing the shoulder 25 into the notch 24, thereby dropping the rod 57 and releasing the striker-rod 45. This occurs once, and only once, in every twenty-four hours. The disk 12, being mounted on the shaft 10 of the hour-hand, rotates with said shaft and makes a complete rotation every twelve hours. If but a single groove were employed in the disk 12, in which the swivel 60 moved, the alarm mechanism would be released every twelve hours; but by the employment of two grooves with the switch connecting them it takes two complete rotations of said disk 12, or twenty-four hours, for the swivel 60 to come a second time into engagement with the drop 24. It is understood, then, that the rod 57 must be in its downward position for the alarm-striker 45 to be free to operate, no matter if it is re-

leased at every other point, and that the drop of the rod 57 causes the first alarm to be struck. When this occurs the bar 53 is still in its elevated position and the gong 48 carried thereby is out of range of the striker 46, and therefore in the reciprocation of the striker the gong 47 only is struck. The disks 12 and 6 are adjustable on the hour-hand shaft 10 relatively to one another, and the drop in the disk 6 is so set that it will come into engagement with the lever 54 at such an interval after the first alarm has struck that it is desired the second alarm be struck—say twenty minutes. When the drop 7 is reached the bar 53 falls by gravity, throwing down the outer end of the lever 50 and throwing up the inner end thereof. The lever 50 with this motion engages the dog 51 on lever 40, raises the free end of said lever, and disengages the same from the notch in one of the disks 33 or 36, thereby releasing the alarm mechanism and striking the second alarm. It will be observed that the gong 48 is carried down with the bar 53 into the range of movement of the striker 46, and during the second alarm both gongs 47 and 48 are struck, thereby making a much louder ringing than during the first alarm. After the inner end of the lever 50 has passed out of engagement with the dog 51 on the lever 40, which occurs instantly, the lever 40 falls back into its normal position by gravity, being assisted in this movement by the weight 42 on the end thereof. In this position it bears against one of the disks 33 or 36, and when the latter has made one revolution the dog 39 on said lever drops into the notch in the periphery of the disk and stops the alarm mechanism. If a long alarm is desired, the disk 36 is set in engagement with lever 40. If a short alarm is desired, the disk 33 is set in engagement therewith, the latter disk completing its rotation in a shorter period of time than the former. This is done by the means heretofore described.

When the second alarm has struck, the rod 57 and the bar 53 are both in their downward positions. The rotation of the disk 12, however, gradually raises them. Twelve hours later the swivel 60 is at a point in the groove 22 just opposite the drop 24 in the groove 23. The yoked lever 54 at this time is just approaching again the drop 7 in the disk 6. When it reaches said drop, the bar 53 falls as before, and through the intermediate mechanism described releases the dog 39 on the lever 40 from the notch in the disk 33 or 36. It does not cause the alarm to strike, however, as the rod 57 is still in its elevated position, and by means thereof the striker-rod 45 is incapable of any movement. What it does do is to place the parts in such position that when the rod 57 drops twelve hours later the first alarm will be struck. This operation will be repeated for any number of days for which the clock is adapted to run, whether it be eight or forty, and without additional winding.

The alarm is set by changing the position

of the disk 12 on the hour-hand shaft 10 so that the drop 24 in said disk may be made to come into engagement with the swivel 60 the desired number of hours hence that it is desired the alarm to ring. To do this accurately, I employ the setting-dial 3, whose peripheral teeth 5 engage with the pinion 21 on said disk. This disk has numerals ranging from "0" to "23" thereon, marking off twenty-four regular intervals, which represent hours. When the clock is put together by the manufacturer, the dial 3 is set relatively to the disk 12 so that when the swivel 60 is just at the drop 24 in said disk the zero on the dial 3 just registers with the opening 2 in the clock-face 1. It will be seen, then, that by moving the dial 3 one space to the right or until the numeral 1 registers with the opening 2 the disk 12 will be moved to such a relative position on the hour-hand shaft that the drop 24 will come into engagement with the swivel 60 just one hour later, and so on up to twenty-three hours. Say, for example, it is desired at ten o'clock at night to set the alarm for six o'clock in the morning. This would be eight hours hence, and consequently the dial 3 would be moved until the numeral "8" thereon registered with the opening 2 in the clock-face. If, however, the alarm at ten o'clock in the morning were to be set for six o'clock the following morning, it would be necessary to set the dial 3 so that the numeral "20" would register with the said opening 2, the time for which it was set being twenty hours hence. When thus set and the alarm and clock mechanisms wound, the alarm will strike every morning at six o'clock until the said clock and alarm run down, which in the case of an eight-day movement would not take place for eight days at least, and would continue striking at this hour each day as long as the clock and alarm mechanism, remained wound. The second alarm is set to ring at a desired period after the first alarm by changing the relative positions of the disks 12 and 6 on the shaft 10 so that the drop 7 in the disk 6 will come into engagement with the lever 54 at the desired length of time after the drop 24 of said disk has come into engagement with the swivel 60. This is done by means of the disk 14, having the pinion 18 on the inner end of its pivotal shaft 16, which engages the segmental rack 11 on the disk 6. Moving the pointer one way or another changes the relative position of the disks 12 and 6. This pointer or indicator-disk 14 has only a limited movement sufficient to register from nothing up to ninety minutes, or an hour and a half, and the space in which it moves is divided off and numbered "20," "40," "60," &c., representing the number of minutes after the first alarm has struck that it is desired the second to ring. Say, for example, this is twenty minutes. Then the disk 14 is so moved that the numeral "20" on the face 12" will register with the opening 13 in said disk 14, and the second alarm will therefore ring twenty minutes

later than the first as long as the clock and alarm mechanisms are kept wound.

It will be seen from the foregoing description, taken in connection with the accompanying drawings, that I have devised an alarm mechanism which can be attached to any clock-movement, and which is a most convenient arrangement for all who use alarm-clocks, in that it does not require rewinding and resetting every day; that it provides convenient means for changing the length of the alarm, making the same either long or short as desired; that a second alarm is provided to ring at a short interval after the first, calling the sleeper a second time in case he did not awake at the first stroke, or enabling him to take a second nap without oversleeping himself, and that it provides the second alarm to strike two gongs, thereby making a louder noise than the first.

The invention has been described in its preferred form; but it is obvious that many minor changes may be made therein without departing from the nature or spirit of the invention or sacrificing any of its advantages.

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

1. The combination with a clock, of alarm mechanism therefor adapted to ring a first alarm at a time set once in every twenty-four hours and a second alarm louder than the first at a short fixed period thereafter, mechanism for setting the first alarm to ring at the desired time, and mechanism for setting the second alarm to ring at the desired interval after the first.

2. In alarm mechanism for clocks of the character described, the combination with the hour hand shaft of the clock, of a controlling disk for the first alarm adjustably secured to said shaft and provided with two peripheral grooves or tracks thereon, one of the grooves being provided with a drop therein and the grooves being provided with a switch leading from one to the other, and the first alarm releasing mechanism moving in said grooves, a controlling disk for the second alarm also adjustably mounted on said hour hand shaft and having a drop in its periphery and second alarm releasing mechanism moving on said disk, substantially as and for the purpose described.

3. In alarm mechanism for clocks of the character described, the combination with the hour hand shaft of the clock, of a controlling disk for the first alarm adjustably secured to said shaft and provided with peripheral grooves or tracks thereon, one of said grooves being provided with a drop therein and the grooves being provided with a switch leading from one to the other, the alarm actuating mechanism, the striker rod connected therewith, a rod connected with said striker rod carrying a swiveled follower at its upper end which moves in said grooves whereby upon the drop of said swiveled follower into the drop

of said disk its connecting rod is thrown down and the striker rod is released, a controlling disk for the second alarm also adjustably mounted on said hour hand shaft having a drop in its periphery, a lever having a dog thereon engaging and holding the alarm actuating mechanism a releasing lever therefor actuated by a bar carrying a yoked lever at the upper end thereof which engages the periphery of the disk for controlling the second alarm, substantially as and for the purpose described.

4. In alarm mechanism for clocks, means for regulating the duration of the alarm, consisting of the combination of two notched disks actuated at different speeds, a dog adapted to engage one or the other of said disks, and releasing mechanism for said dog, substantially as described.

5. In alarm mechanism for clocks, the combination of two notched disks rotated at different speeds from the main shaft of said alarm mechanism, a dog adapted to engage one or the other of said disks, means for throwing the said notched disks separately into engagement with said dog and releasing mechanism for said dog, substantially as described.

6. In alarm mechanism for clocks, the combination of two notched disks mounted on the said stop and rotated at different speeds thereon, a dog adapted to engage the notch on one or the other of said disks, means for raising or lowering said shaft in its bearings for bringing one or the other of said disks into engagement with said dog, a clamp for holding the shaft in its raised or lowered position, and releasing mechanism for said dog operated by the clock mechanism, substantially as described.

7. In a double alarm for clocks, the combination with the hour hand shaft of the clock and controlling disks for the first and second alarms mounted on said shaft, of setting mechanism therefor consisting of an indicating dial or disk having peripheral teeth thereon which mesh with a pinion secured to the controlling disk for the first alarm, for adjusting the position of said disk on said shaft and an indicating disk for the second alarm pivoted to the face of the controlling disk for the first alarm, and carrying a pinion at the inner end of its pivotal shaft which meshes with a segmental rack secured to the upper face of the controlling disk for the second alarm, whereby by moving said indicating disk an adjustment of said controlling disks relative to one another is secured, substantially as and for the purpose described.

8. In double alarm mechanism for clocks having suitable controlling and actuating mechanism for each alarm, the combination of a striker rod adapted to be thrown into operation upon the release of the said alarm controlling mechanisms, and two gongs, one of which is carried by the second alarm controlling mechanism and is adapted to be

thrown within the range of movement of said
striker upon the release of the second alarm
controlling mechanism, whereby a single gong
will be struck at the first alarm and two will
5 be struck at the second alarm, substantially
as and for the purpose described.
In testimony whereof I have signed this

specification in the presence of two subscri-
ing witnesses.

EDMUND E. KATZ.

Witnesses:

HOLMON CURTIS,
LOUIS JACOBS.