

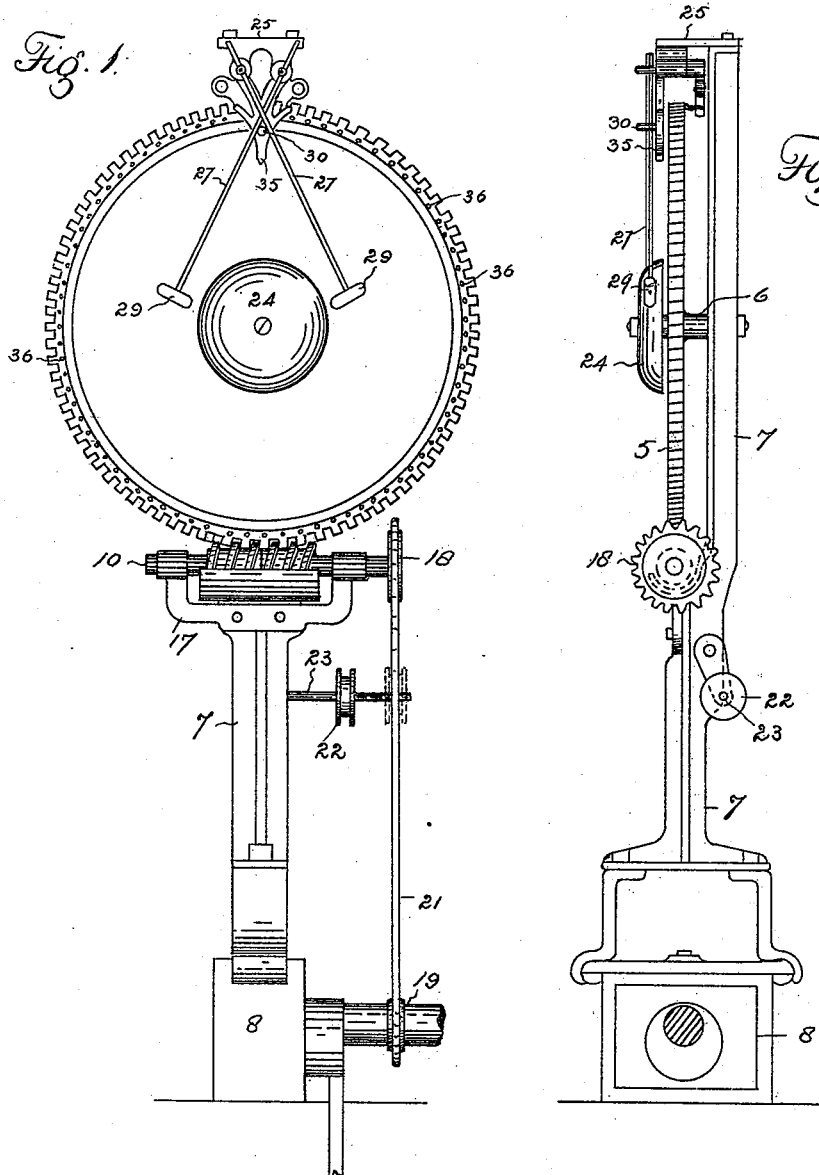
(No Model.)

2 Sheets—Sheet 1.

H. BOLTHOFF.
ALARM INDICATOR.

No. 494,519.

Patented Mar. 28, 1893.



WITNESSES:
C. J. Rolland
Wm. McConnell

INVENTOR
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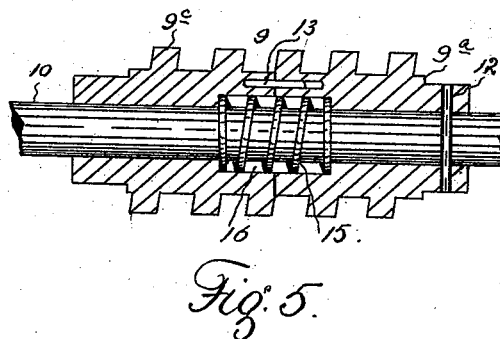
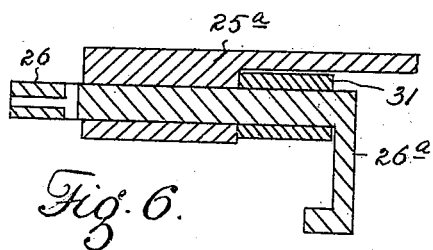
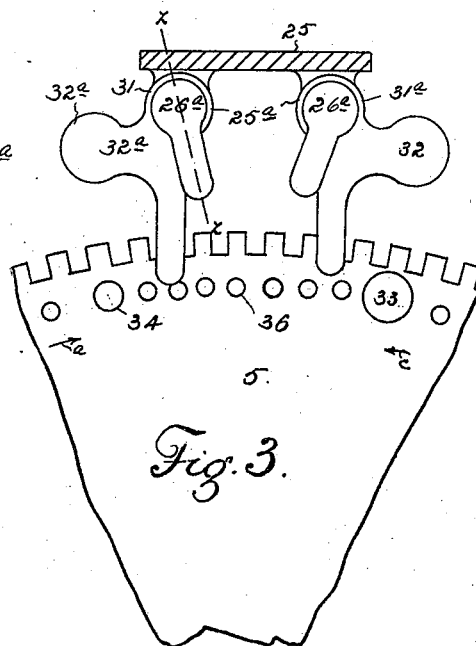
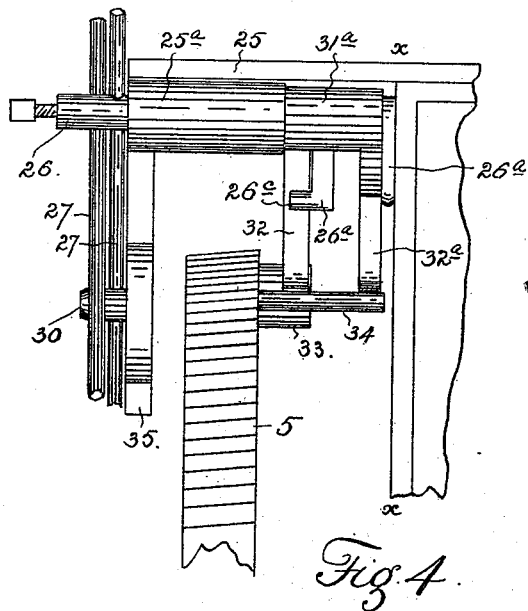
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2 Sheets—Sheet 2.

H. BOLTHOFF.
ALARM INDICATOR.

No. 494,519.

Patented Mar. 28, 1893.



WITNESSES:
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UNITED STATES PATENT OFFICE.

HENRY BOLTHOFF, OF DENVER, COLORADO.

ALARM-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 494,519, dated March 28, 1893.

Application filed May 9, 1892. Serial No. 432,375. (No model.)

To all whom it may concern:

Be it known that I, HENRY BOLTHOFF, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Alarm Indicators; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in alarm indicators and though specially designed for use in connection with hoisting engines, may be employed to equal advantage with any mechanism having a frame upon which the indicator may be supported, and a rotating part from which it may be operated.

To these ends my improved indicator consists of the features, arrangements and combinations hereinafter described and claimed, and will be fully understood by reference to the accompanying drawings in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a front view of the indicator. Fig. 2 is a side view thereof. Fig. 3 is a rear fragmentary view of the mechanism shown on an enlarged scale, being a section on line $x-x$, Fig. 4. Fig. 4 is a side view of the mechanism. Fig. 5 is an enlarged section showing the construction of the worm engaging the indicator disk. Fig. 6 is a section taken on the line $z-z$, Fig. 3.

Similar reference characters indicating corresponding parts or elements of the mechanism in the several views, let the numeral 5 designate a rotating disk mounted upon a stationary spindle 6 secured to a suitable upright frame 7 which is made fast to and supported upon the frame 8 of the engine. The disk 5 has a cogged periphery and may be of any desired size. It is actuated by a divided worm 9 mounted upon a shaft 10 to which one part 9^a of the worm is rigidly secured by a pin 12. The other part 9^b of the worm is connected with the part 9^a by means of a pin 13 located in coinciding apertures formed in the engaging extremities of the parts which are interiorly recessed as shown at 16 to make

room for a coil spring 15 surrounding the shaft 10. The extremities of this spring engage shoulders formed on the worm sections and are located at the extremities of the recess 16. It will thus be seen that the worm sections rotate together and in this respect constitute an integral acting instrumentality. The part 9^b of the worm is free to move longitudinally upon its shaft for the purpose of taking up lost motion or to compensate for the wear upon the engaging parts of the disk and the worm. To this end the spring 15 is continually under tension and has a natural tendency to separate the sections of the worm, thus preventing any longitudinal movement or play between the thread of the worm and the cogs of the disk. This compensating feature is important since it secures a degree of accuracy in the working of the mechanism otherwise unobtainable.

Shaft 10 is journaled in a forked frame 17 secured to the main frame 7. To one extremity of this shaft is made fast a sprocket wheel 18 connected by means of a chain 21 with a suitable wheel 19 made fast to the shaft 20 of the engine. A tension pulley 22 mounted upon a spindle 23 secured to frame 7 is adapted to engage the chain 21. This pulley has a longitudinal as well as a rotary movement upon its spindle and may be used or not as may be desired. To one extremity of the spindle 6 and in proximity to the disk 5 is secured a gong 24. To the top of frame 7 is attached a plate 25 which projects outward from the frame over the disk 5, and is provided on its under surface with two sockets 25^a which form the support for the spindles 26 which terminate at their inner extremities or those nearer the frame in small crank arms 26^a, their opposite extremities being provided with apertures for the reception of the rods 27 which are held in place by the set bolts 28 which enter threaded apertures formed in the ends of the pins 26 and extending at right angles to the apertures for the reception of the rods 27. The rods 27 are provided at their lower extremities with the hammers 29 which are normally held in suitable proximity to the gong by a stop 30 secured to a hanger 35 made fast to the sockets 25^a. As shown in the drawings this hanger and the sockets are formed integral with plate

25. This construction is preferable, but of course not necessary or essential since the parts may be cast separately and secured together in any suitable manner.

5 Movably supported upon pins 26 and located between crank arms 26^a and sockets 25^a are sleeves 31 and 31^a carrying the depending dogs 32 and 32^a which occupy different vertical planes and lie respectively in the
10 path of the wrist-pins or projections 33 and 34 located in suitable openings 36 formed in the disk 5 near its cogged periphery. The free extremities of the crank arms 26^a project inwardly toward the plane of the disk as
15 shown at 26^c and normally engage the adjacent edges of their respective dogs 32 and 32^a. Hence when the disk 5 moves in the direction indicated by the arrow *c* in Fig. 3, wrist
20 pin 33 engages dog 32 and gives the corresponding pin 26 a partial rotation. As the pin turns one of the hammers 29 is raised from the gong and as soon as the arcs of the two moving parts (the wrist pin 33 and the dog
25 32) diverge sufficiently to release the dog, the hammer falls and sounds the gong. It will be observed that though the hammer is not normally in contact with the gong the momentum of the falling hammer will be sufficient to bring the same in contact with the
30 gong with sufficient force to give the required alarm or signal, since the rods 27, being formed of spring metal, will yield sufficiently as soon as they engage the stop 30 to bring about this result. Now if the disk 5 be
35 moved in the opposite direction as indicated by the arrow *a*, pin 34 will engage the dog 32^a, give the other spindle 26 a partial rotation, raise the other hammer, and then release the same, again sounding the gong. After
40 the gong has been sounded by either hammer the movement of disk 5 in the opposite direction will bring the actuating wrist pin 33 or 34 again in contact with its corresponding dog, but this time the dog moves
45 freely away from the crank arm 26^a, its sleeve turning upon the spindle or axis of the hammer, allowing the wrist pin to pass under the dog without any movement of said spindle.

It will be observed that the dog 32 is shorter
50 than the dog 32^a, while the wrist pin 33 is of greater diameter than the pin 34. This construction of the dogs and pins makes it possible to leave the centers of the pins 33 and 34 in the same arc, as shown in the drawings,
55 and at the same time prevent the pin 34 from engaging the dog 32. The pin 33 cannot engage the dog 32^a, since the dog occupies a vertical plane farther from the disk 5 than the plane of the outer extremity of the pin.
60 Hence the pin 33 will always engage the dog 32 once for every rotation of the disk 5 in either direction. If the disk moves in the direction indicated by the arrow *c* the gong is sounded, while if the disk moves in the opposite
65 direction the dog has no function except to swing freely back from the crank arm and allow the pin to pass without obstruction.

On the other hand the pin 34 will engage the dog 32^a once for every rotation of the disk 5 in either direction; if the disk moves in the direction indicated by the arrow *a*, the gong is sounded, but if the disk moves in the opposite direction the pin passes the dog without moving its spindle as heretofore explained.

75 If it is desired to sound the gong more than once for each revolution of disk 5, it is only necessary to employ more pins 33 or 34, an extra pin of either kind causing an additional signal when the disk moves, the disk being properly rotated. It will thus be seen that
80 by a proper arrangement of the pins 33 and 34 in the openings 36 the engineer may be notified the instant the elevator or bucket reaches any point in the shaft, whether the
85 bucket is moving downward or upward. The disk should also be graduated so that when the gong is sounded the engineer by glancing at the dial knows the exact distance of the bucket beneath the surface.

90 Having thus described my invention, what I claim is—

1. In an alarm indicator the combination of a rotating gear carrying a gong, the actuating worm operated from a rotating shaft, a
95 hammer carried by an oscillating spindle mounted upon the frame, a dog connected with the spindle and projecting into the path of a pin located on the gear, the construction being such that when the gear moves in one
100 direction the pin acting on the dog moves the spindle, raises the hammer, and sounds the gong, while when the gear moves in the opposite direction the pin raises the dogs without moving the spindle, substantially as described.

2. In an alarm indicator the combination with a frame, a rotating gear mounted thereon and carrying a gong, a divided worm
110 mounted upon a suitable shaft, one part of the worm having a normal tendency to move away from the other part under the influence of a spring to take up lost motion and compensate for the wear of the part, and a hammer carried by an oscillating spindle mounted
115 on the frame and actuated by the gear to sound the gong substantially as described.

3. In an alarm indicator the combination of the rotating disk provided with a gong and carrying pins and oscillating hammers mounted
120 upon the frame and controlled by dogs projecting into the path of the pins on the disk by which they are actuated to sound the gong, substantially as described.

4. In an alarm indicator the combination
125 of the rotating disk carrying a gong and a pin, a movable spindle mounted upon the frame and provided at one extremity with a crank arm, a hammer connected with the spindle at the opposite extremity, a dog mounted
130 upon the spindle and adapted to engage the crank arm and projecting into the path of the pin on the disk, whereby as the disk moves in one direction the spindle is turned and the

gong sounded, while when the disk moves in the opposite direction the dog allows the pin to pass without turning the spindle, substantially as described.

- 5 5. In an alarm indicator the combination with suitable alarm mechanism, of actuating means therefor consisting of a disk having a cogged periphery, and the divided worm engaging the periphery of the disk and mounted
10 upon a rotating shaft, one part of the worm having a longitudinal movement on the shaft and having a normal tendency to separate from the other part to take up lost motion or compensate for the wear of the parts, substan-
15 tially as described.

6. In an indicator the combination of a suitable lever alarm mechanism and means for operating the same consisting of a disk having a cogged periphery and a divided actuating worm mounted upon a shaft, the sections 20 of the worm being interiorly recessed, a coil spring surrounding the shaft located in said recess and engaging the shoulders of the worm sections, substantially as described.

In testimony whereof I affix my signature in 25 presence of two witnesses.

HENRY BOLTHOFF.

Witnesses:

WM. McCONNELL,
MURIEL STRODE.