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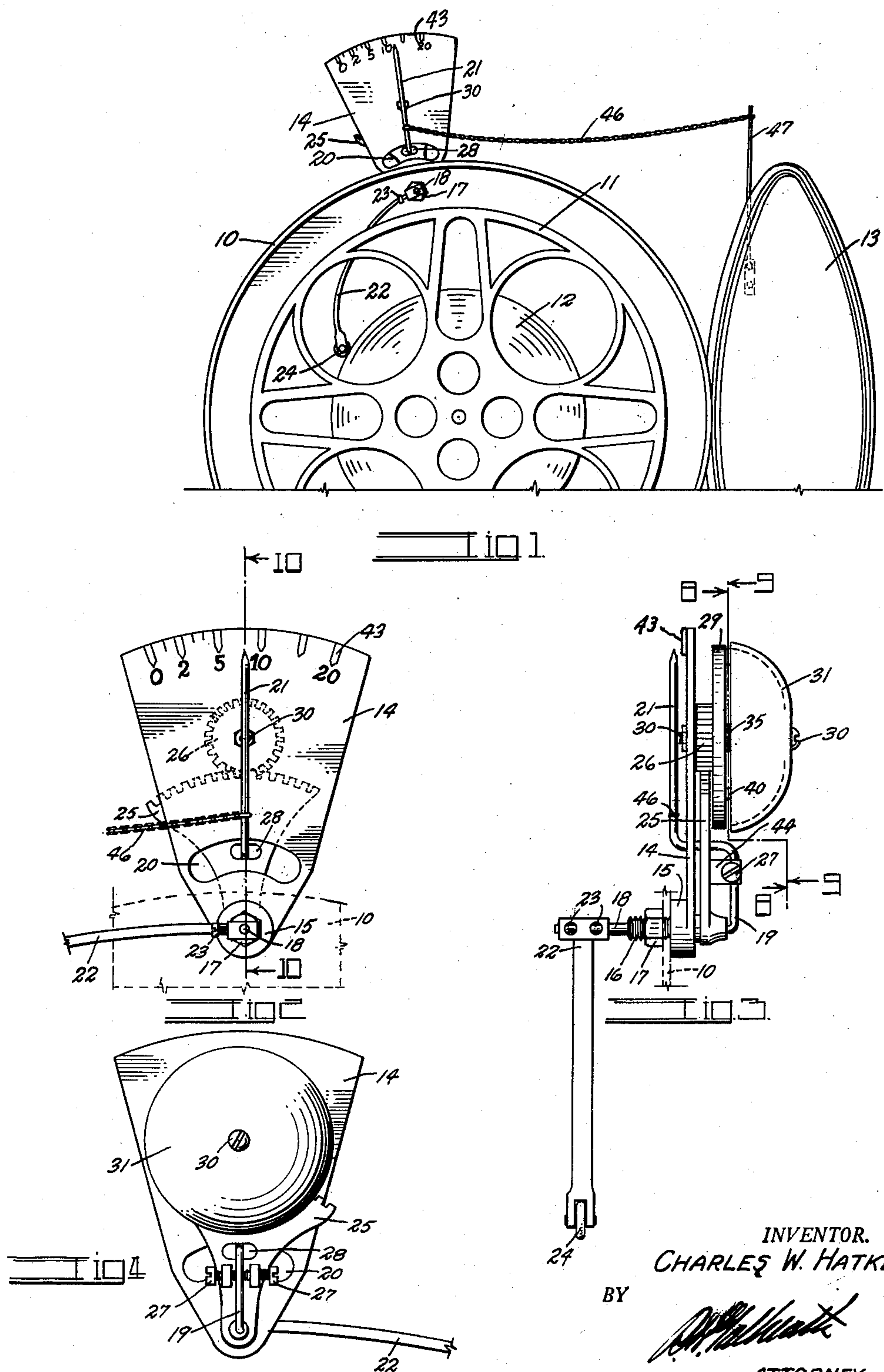
C. W. HATKE

2,624,306

MOTION-PICTURE REEL END INDICATOR

Filed Aug. 11, 1950

2 SHEETS—SHEET 1



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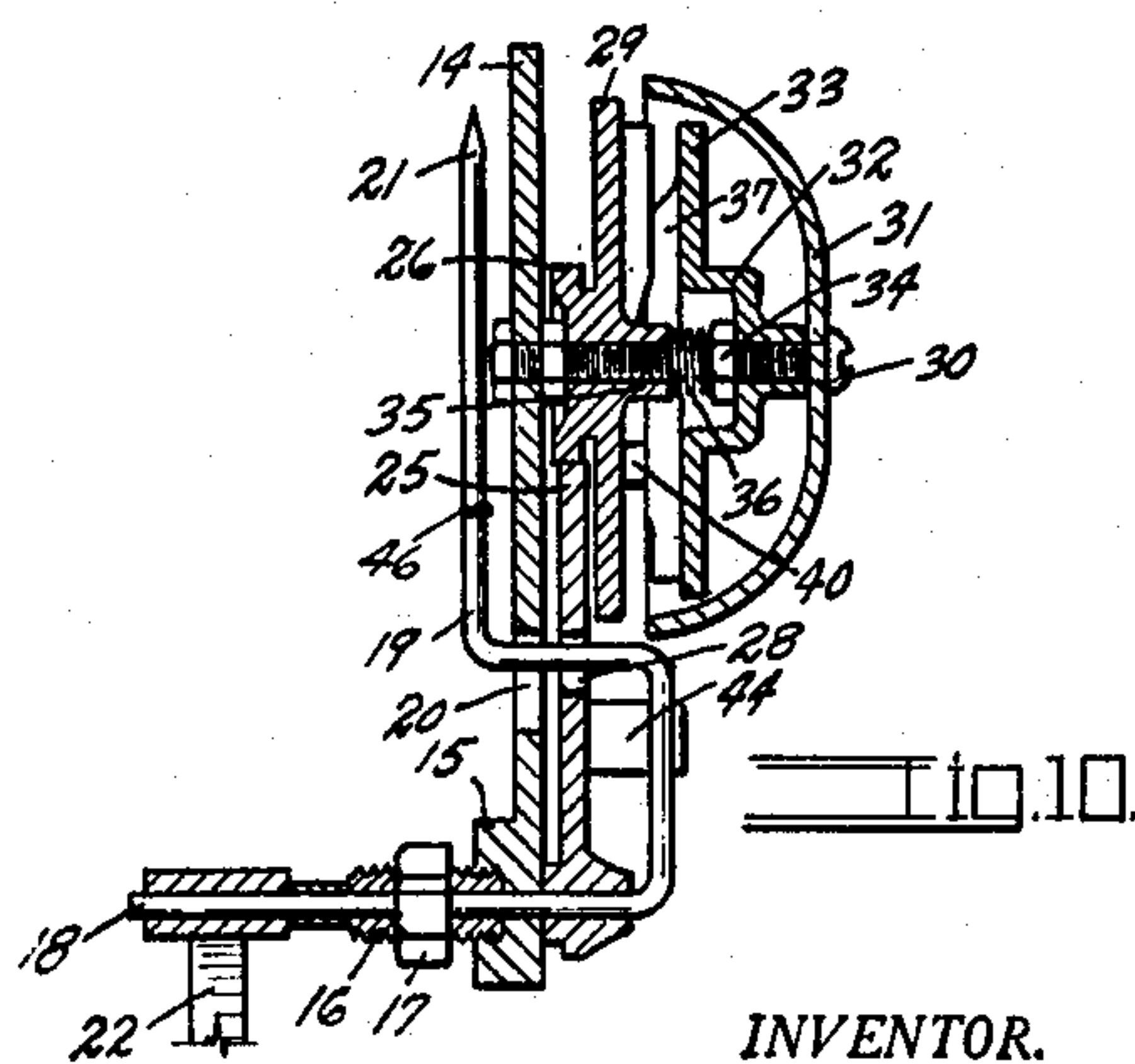
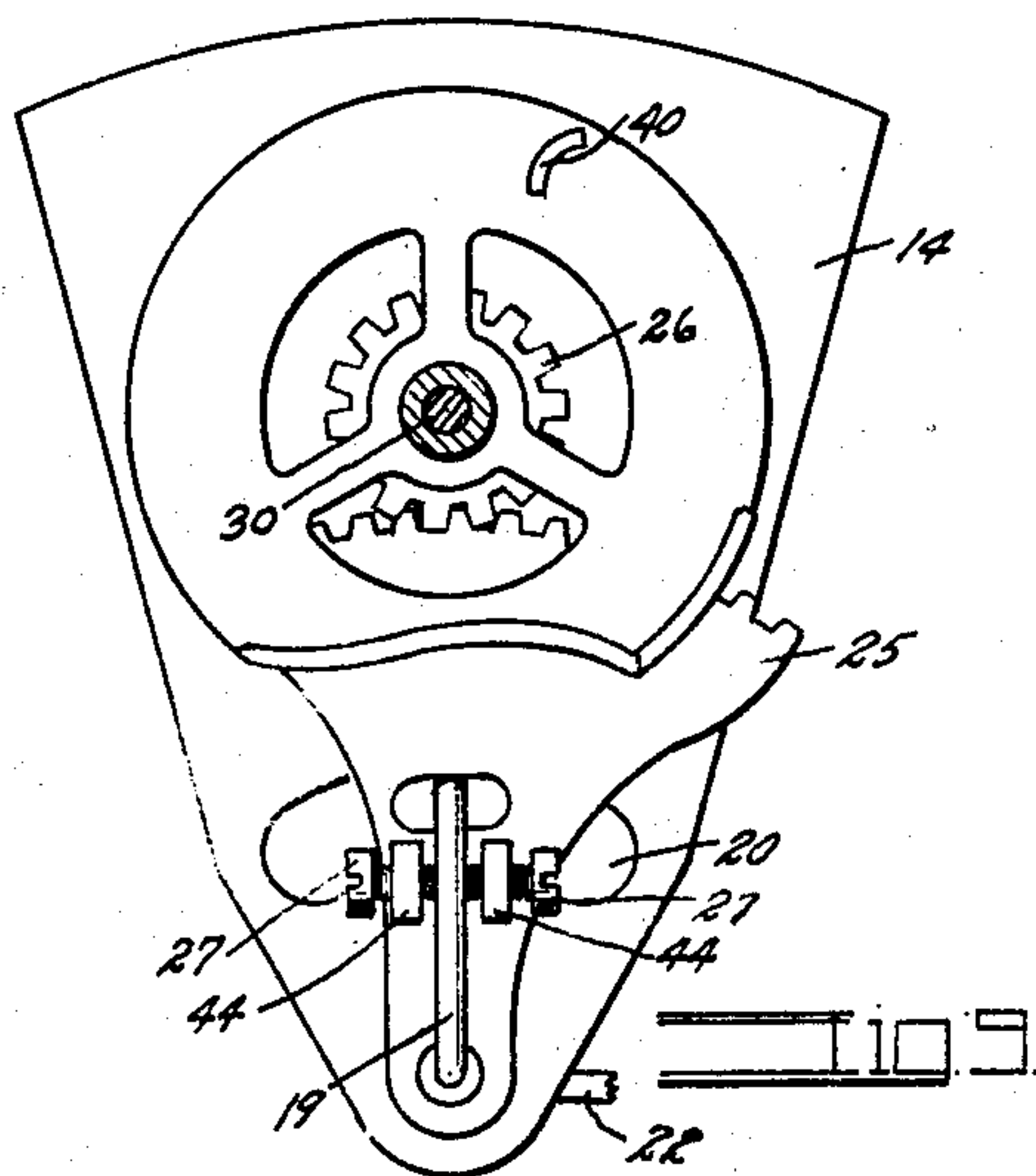
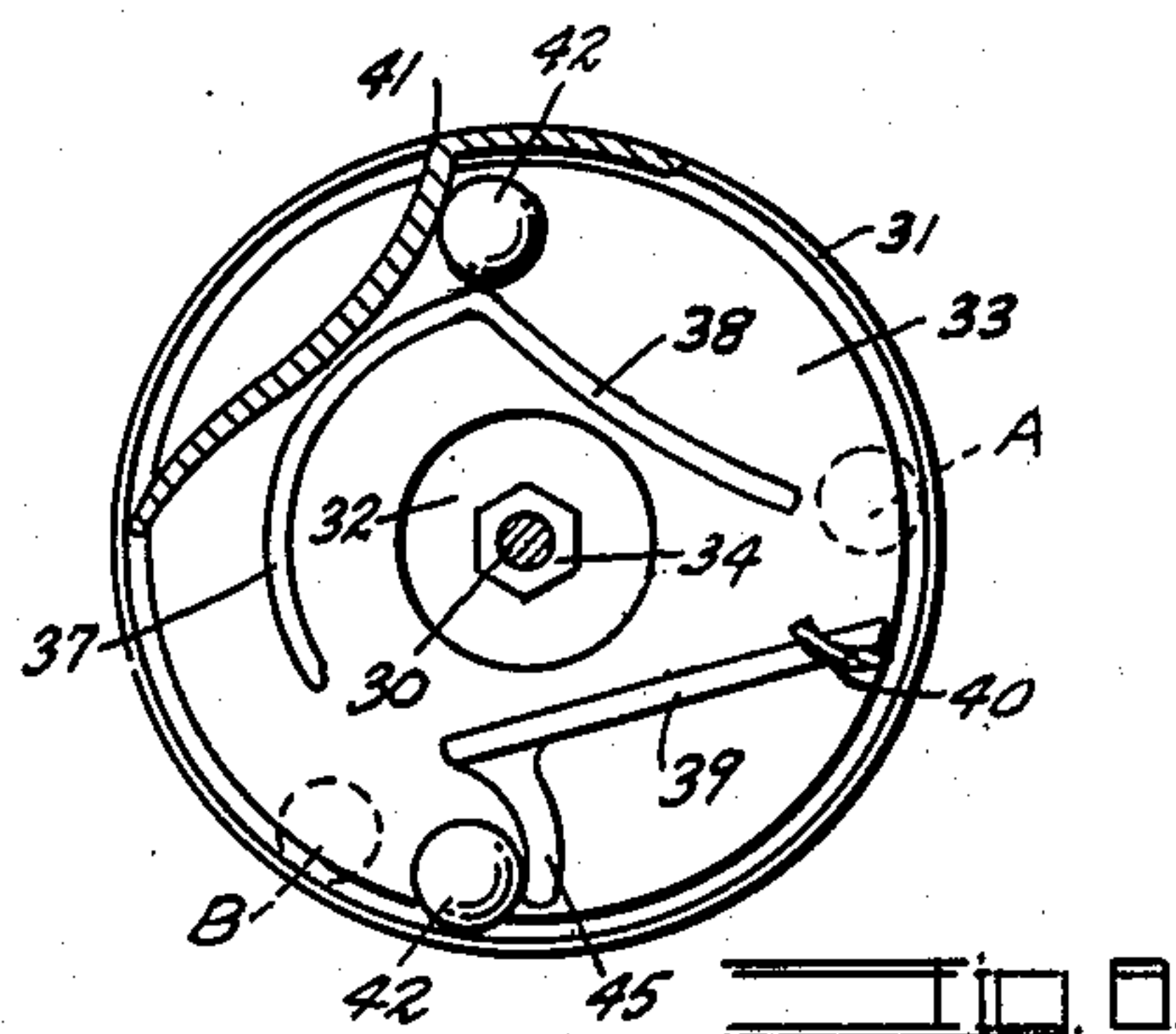
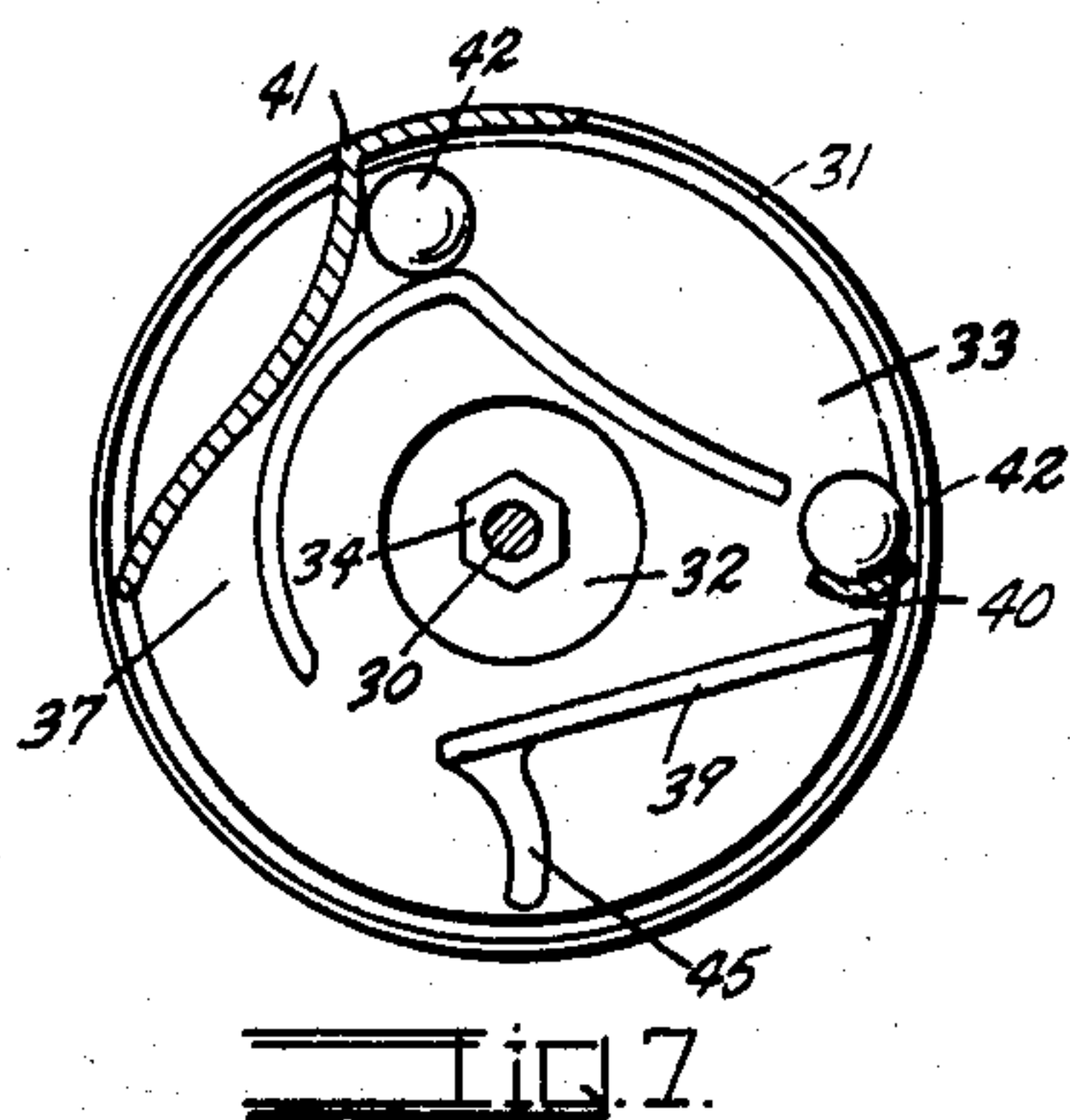
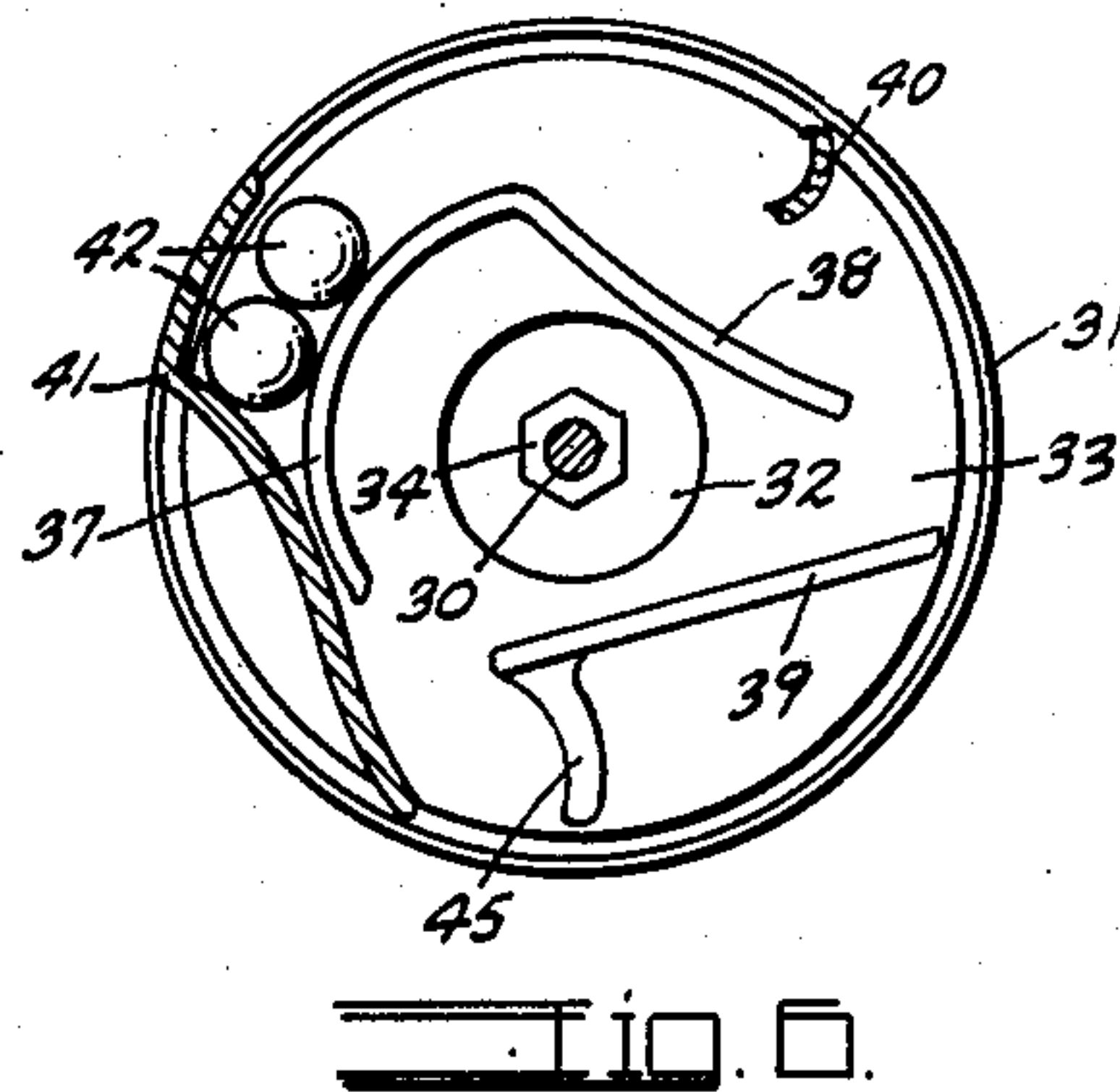
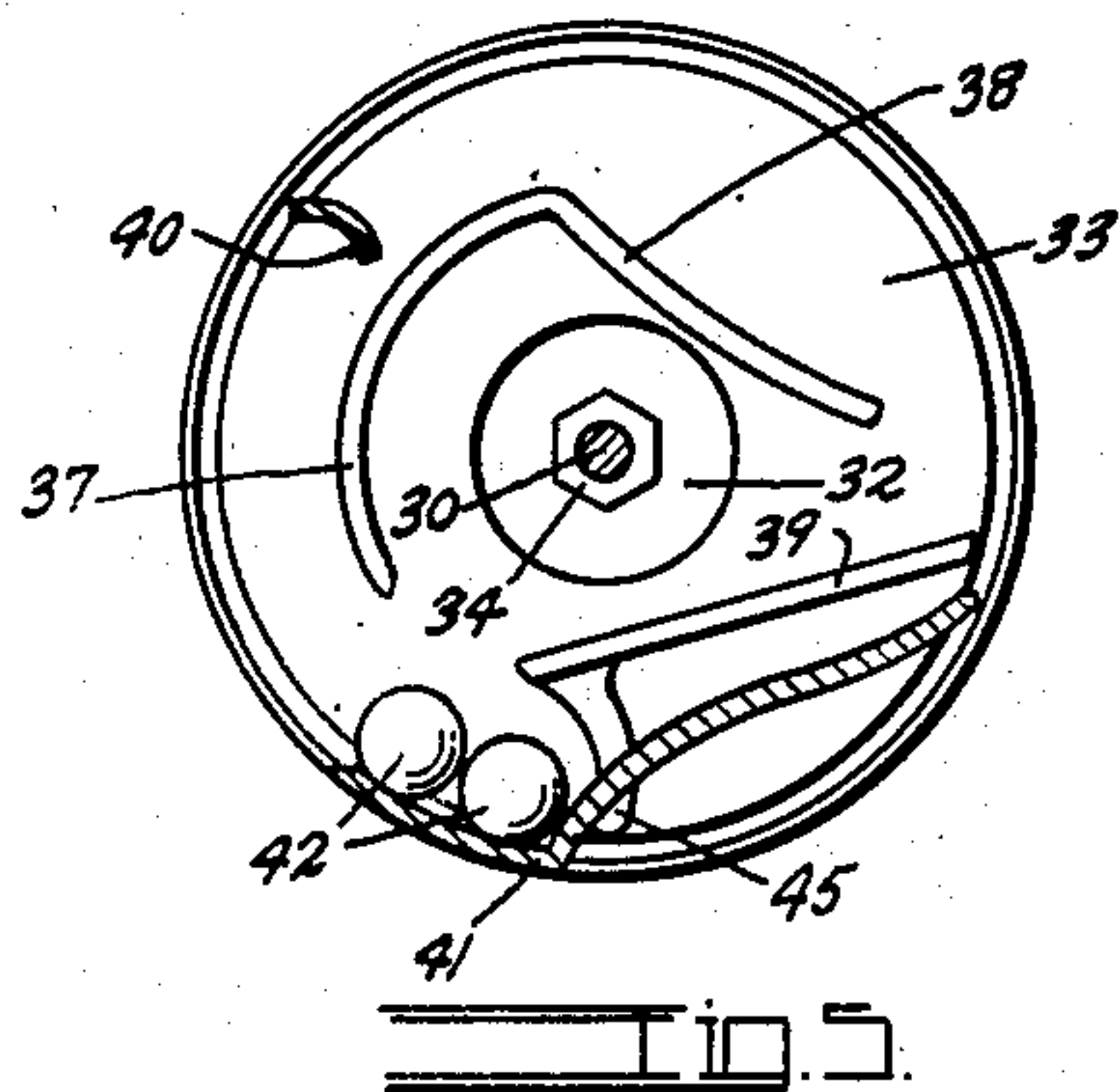
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2 SHEETS—SHEET 2



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MOTION-PICTURE REEL END INDICATOR

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7 Claims. (Cl. 116—4)

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This invention relates to a device for giving an audible signal as the end of a reel of motion picture film is approached in a projector. The principal object of the invention is to provide a simple and highly efficient device which can be attached to any of the conventional film magazines, and which will give a series of audible signals as the end of the reel is approaching, to amply warn the operator when the reel will be completed.

Another object of the invention is to provide a mechanism of this character which will operate from freely rolling balls under the influence of gravity, so that the uncertainties of springs and other mechanical elements will be avoided.

A further object is to so construct the device that the operator can note at any time how much time remains on the running reel, and to provide means for automatically removing the signal device from the reel when the door of the film magazine is opened so that it will not interfere with the removal and replacement of the reels.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawings:

Fig. 1 is a side view of a film magazine of a conventional motion picture projector, with its door partially opened, illustrating the invention in place thereon;

Fig. 2 is an enlarged front view of the improved reel end indicator;

Fig. 3 is a side view of the indicator;

Fig. 4 is a rear view thereof;

Figs. 5, 6, 7, and 8 are vertical sections, taken on the line 8—8, Fig. 3, indicating various successive positions of the signaling mechanism;

Fig. 9 is a similar section, taken on the line 9—9, Fig. 3; and

Fig. 10 is a vertical cross-section taken on the line 10—10, Fig. 2.

In Fig. 1 the film magazine of a conventional motion picture projector is indicated at 10, with a film reel at 11 and the roll of film thereon at 12. Such magazines are provided with circular hinged doors 13 for completely opening and closing the magazines. In Fig. 1 the door 13 is illustrated in the partially opened position.

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The improved signaling device employs a sector-shaped dial plate 14 provided with a peripheral time scale 43. The dial plate 14 terminates at its bottom in a circular spacing boss 15. A hollow threaded stud 16 is mounted in the boss 15 and projects forwardly therefrom through a suitable receiving opening which is drilled or otherwise formed in the back of the magazine 10. The hollow threaded stud 16 is provided with a clamp nut 17 by means of which the boss 15 is clamped to the back of the magazine 10.

An operating shaft 18 extends throughout the length of the hollow stud 16 and projects from both extremities of the latter. The rear extremity of the operating shaft is turned upwardly to form a lever arm 19, thence upwardly over the front face of the plate 14 to form a pointer 21 to indicate positions on the time scale 43. The forward extremity of the shaft 18 carries a film follower arm 22 which is secured to the former at any desired radial position by means of set screws 23. The free extremity of the follower arm enters between the sides of the reel 11 and terminates in a freely rotatable rubber roller 24 which bears against the roll of film 12 so as to swing toward the axis of the reel 11 as the film unreels and the roll of film decreases in size.

A segment gear plate 25 is rotatably mounted on the rearward portion of the operating shaft 18 and extends upwardly therefrom into mesh with a toothed pinion 26. Two lugs 44 are formed on the segment gear, there being one lug positioned on each side of the lever arm 19. The lugs are provided with two oppositely facing set screws 27 which can be brought into contact with opposite sides of the lever arm 19 so as to adjust the relative positions of the segment gear and the lever arm and to cause the segment gear to move in unison with the lever arm. The segment gear 25 is slotted, as indicated at 28, for the passage of the outwardly turned upper extremity of the lever arm 19 and to allow for relative movement between the lever arm and the segment gear.

The pinion 26 is mounted or formed on a backing plate 29 which is rotatably mounted on a shaft screw 30 which is supported in and projects horizontally rearward from the dial plate 14. A bell 31 is fixedly secured on the rear extremity of the shaft screw 30. The screw 30 also supports a ball guide plate 33 having a projecting hub 32. The bell 31 and the hub 32 are fixedly secured together on the screw 30 by means of a clamp nut 34. The ball guide plate 33 is positioned completely within the confines of the

bell 31. The backing plate 29 is also provided with a projecting hub 35 which rotates on the screw 30 and which is held separated from the ball guide plate 33 by means of a separating spring 36.

Thus, it can be seen that the ball guide plate 33 and the bell 31 remain stationary while the backing plate 29 rotates under the influence of the segment gear 25 and pinion 26.

The forward face of the ball guide plate facing the backing plate is provided with a concentric, semi-circular guide flange 37 which terminates at its upper extremity above the shaft screw in an inclined ball chute 38 which extends across the shaft screw 30 to the opposite side of the ball guide plate 33, where it terminates above the upper extremity of an inclined platform flange 39. The platform flange 39 terminates below the shaft screw 30 above the lower rim of the bell. A ball stop member 45 extends downward from the lower extremity of the flange 39 toward the lower rim of a bell 31. The backing plate 29 is provided with a rearwardly projecting boss 40 and a peripheral ball pocket 41. Two freely rolling steel balls 42 are positioned between the backing plate 29 and the ball plate 33.

It can be seen that as the film reel 12 decreases in diameter, the arm 22 will swing under the influence of gravity toward the axis of the reel 11, and the pointer 21 will move to the left in Fig. 1, indicating on the scale 43 the minutes remaining on the reel 12. The backing plate will also be rotated in a clockwise direction in Figs. 6 to 8, inclusive. The rotation of the backing plate 29 causes the two steel balls 42 to be carried upwardly in the pocket 41 along the guide flange 37, as shown in Figs. 5 and 6. The balls continue to move upwardly over the guide flange 37 as the film unreels until the foremost ball passes over the top of the flange 37 onto the chute 38. It will now roll down the chute 38 and strike the rim of the bell, as shown in Fig. 7, giving a single bell tone.

The ball is stopped after striking the bell by the boss 40, which has moved to a position below the chute 38, as shown in Fig. 7. As the film continues to unreel, the boss 40 will move downwardly away from the foremost ball 42, allowing it to roll down the inclined platform flange 39 and from the extremity of the latter to again strike the rim of the bell 31 to produce a second single bell tone, as shown in Fig. 8. As the film continues to unreel, the ball guide plate will carry the second ball 42 to the top of the inclined chute 38, from whence it will roll to strike the bell once at the extremity of the chute 38, as indicated at "A," Fig. 8. It will then fall to the inclined platform 39 and roll down the latter and fall from the extremity of the platform to strike the bell a second time, as indicated at "B," Fig. 8. The two balls 42 rest against the ball stop 45 until the device is re-set to bring the ball pocket 41 back beneath the balls to the starting position of Fig. 6.

Thus, it can be seen that three separate audible signals are produced—two single bell strokes followed by a double bell stroke. These can be arranged for any desired intervals, such as one stroke indicating two minutes remaining; a second single stroke indicating one minute remaining; and a final double stroke indicating fifteen seconds remaining. The time settings can be adjusted by varying the position of the arm 22 on the shaft 18 by means of the set screws 23 and by varying the relative positions of the lever

arm 19 and the segment gear plate 25 by means of the set screws 27.

It will be noted that it is impossible to remove the reel 11 while the follower arm 22 is positioned between the sides of the reel, as shown in Fig. 1, without damage to either the arm or the reel or both. In order to prevent this, a flexible member, such as a chain 46, is secured at its one extremity to the pointer 21 and at its other extremity to a post 47 mounted on the magazine lid 13. The length of the chain is such that when the lid is opened sufficiently to permit removal of the reel 11, the pointer 21 will be pulled to the right in Fig. 1 sufficiently to lift the follower arm 22 completely from the confines of the reel 11. When the lid is closed, the follower arm will be lowered until its roller 24 rests on the roll of film.

While a specific form of the improvement has been described and illustrated herein, it is to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. A film reel alarm and indicator for attachment to the film roll magazine of a motion picture projector, comprising: a dial plate; a time-indicating scale on said dial plate; a hollow stud projecting from said dial plate and arranged to pass into said magazine; means for securing said stud to said magazine; an operating shaft extending throughout the length of said hollow stud; a pointer on one extremity of said operating shaft and arranged to move along said time-indicating scale; an operating arm mounted on the other extremity of said shaft within said magazine and positioned to contact the film roll in said magazine to actuate said pointer; a toothed segment gear plate movably mounted on said shaft; means for causing said gear plate to move with said pointer; a toothed pinion rotatably mounted on said dial plate in mesh with said segment gear plate so as to be rotated by the latter; and audible signal means connected with and actuated by the rotation of said toothed pinion.

2. A film reel alarm and indicator for attachment to the film roll magazine of a motion picture projector, comprising: a dial plate; a time-indicating scale on said dial plate; a hollow stud projecting from said dial plate and arranged to pass into said magazine; means for securing said stud to said magazine; an operating shaft extending throughout the length of said hollow stud; a pointer on one extremity of said operating shaft and arranged to move along said time-indicating scale; an operating arm mounted on the other extremity of said shaft within said magazine and positioned to contact the film roll in said magazine to actuate said pointer; a toothed segment gear plate movably mounted on said shaft; means for causing said gear plate to move with said pointer; a toothed pinion rotatably mounted on said dial plate in mesh with said segment gear plate so as to be rotated by the latter; a bell supported from said dial plate concentric with said pinion; a freely rolling ball in said bell; a ball pocket member connected with said toothed pinion and rotatable by the latter within said bell, said ball pocket member being positioned to receive and elevate said ball so that the latter may drop against said bell at predetermined times.

3. A film reel alarm and indicator for attach-

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ment to the film roll magazine of a motion picture projector, comprising: a dial plate; a time-indicating scale on said dial plate; a hollow stud projecting from said dial plate and arranged to pass into said magazine; means for securing said stud to said magazine; an operating shaft extending throughout the length of said hollow stud; a pointer on one extremity of said operating shaft and arranged to move along said time-indicating scale; an operating arm mounted on the other extremity of said shaft within said magazine and positioned to contact the film roll in said magazine to actuate said pointer; a toothed segment gear plate movably mounted on said shaft; means for causing said gear plate to move with said pointer; a toothed pinion rotatably mounted on said dial plate in mesh with said segment gear plate so as to be rotated by the latter; a bell supported from said dial plate concentric with said pinion; a freely rolling ball in said bell; a ball guide plate fixedly mounted within said bell; ball guide flanges projecting from said guide plate; a backing plate rotatably mounted in parallel relation to said guide plate; and a ball pocket on said backing plate; said backing plate being mounted on said toothed pinion so that movement of said segment gear plate will rotate said backing plate to elevate the ball in said pocket to a position to allow the ball to roll on the flanges of said stationary guide plate into contact with said bell.

4. A film reel alarm for attachment to the film roll magazine of a motion picture projector, comprising: a dome-shaped bell; a ball guide plate fixedly mounted within said bell; a backing plate rotatably and concentrically mounted in parallel relation to said ball guide plate; means for rotating said backing plate in consequence of changes in diameter of the film roll in said magazine; a ball positioned between said backing plate and said guide plate; a peripheral pocket formed on said backing plate adapted to receive and elevate said ball as said backing plate rotates; and means projecting from said fixed ball guide plate for guiding the ball during its elevation and acting to guide said ball into contact with the bell to give an audible signal.

5. A film reel alarm for attachment to the film roll magazine of a motion picture projector, comprising: a dome-shaped bell; a ball guide plate fixedly mounted within said bell; a backing plate rotatably and concentrically mounted in parallel relation to said ball guide plate; means for rotating said backing plate in consequence of changes in diameter of the film roll in said magazine; a ball positioned between said backing plate and said guide plate; a peripheral pocket formed on said backing plate adapted to receive and elevate said ball as said backing plate rotates; an arcuate guide flange projecting from said fixed ball guide plate and adapted to guide said ball upwardly as it is elevated by said pocket; and a fixed ball chute projecting from

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said ball guide plate at the upper termination of said guide flange and adapted to receive and carry the ball into contact with the bell.

6. A film reel alarm for attachment to the film roll magazine of a motion picture projector, comprising: a dome-shaped bell; a ball guide plate fixedly mounted within said bell; a backing plate rotatably and concentrically mounted in parallel relation to said ball guide plate; means for rotating said backing plate in consequence of changes in diameter of the film roll in said magazine; a ball positioned between said backing plate and said guide plate; a peripheral pocket formed on said backing plate adapted to receive and elevate said ball as said backing plate rotates; an arcuate guide flange projecting from said fixed ball guide plate and adapted to guide said ball upwardly as it is elevated by said pocket; a fixed ball chute projecting from said ball guide plate at the upper termination of said guide flange and adapted to receive and carry the ball into contact with the bell; and a stationary inclined platform flange projecting from said ball plate below the termination of said chute and arranged to receive, reverse the direction of, and guide said ball to a second contact with said bell.

7. A film reel alarm for attachment to the film roll magazine of a motion picture projector, comprising: a dome-shaped bell; a ball guide plate fixedly mounted within said bell; a backing plate rotatably and concentrically mounted in parallel relation to said ball guide plate; means for rotating said backing plate in consequence of changes in diameter of the film roll in said magazine; a ball positioned between said backing plate and said guide plate; a peripheral pocket formed on said backing plate adapted to receive and elevate said ball as said backing plate rotates; an arcuate guide flange projecting from said fixed ball guide plate and adapted to guide said ball upwardly as it is elevated by said pocket; a fixed ball chute projecting from said ball guide plate at the upper termination of said guide flange and adapted to receive and carry the ball into contact with the bell; a stationary inclined platform flange projecting from said ball plate below the termination of said chute and arranged to receive, reverse the direction of, and guide said ball to a second contact with said bell; and a boss projecting from said backing plate and arranged to rotate into the path of said ball at the extremity of said chute to retain the ball for a time interval.

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