No. 862,889. PATENTED AUG. 13, 1907.

T. EYNON.

INDICATOR.

APPLICATION FILED NOV. 25, 1903.

3 SHEETS—SHEET 1.

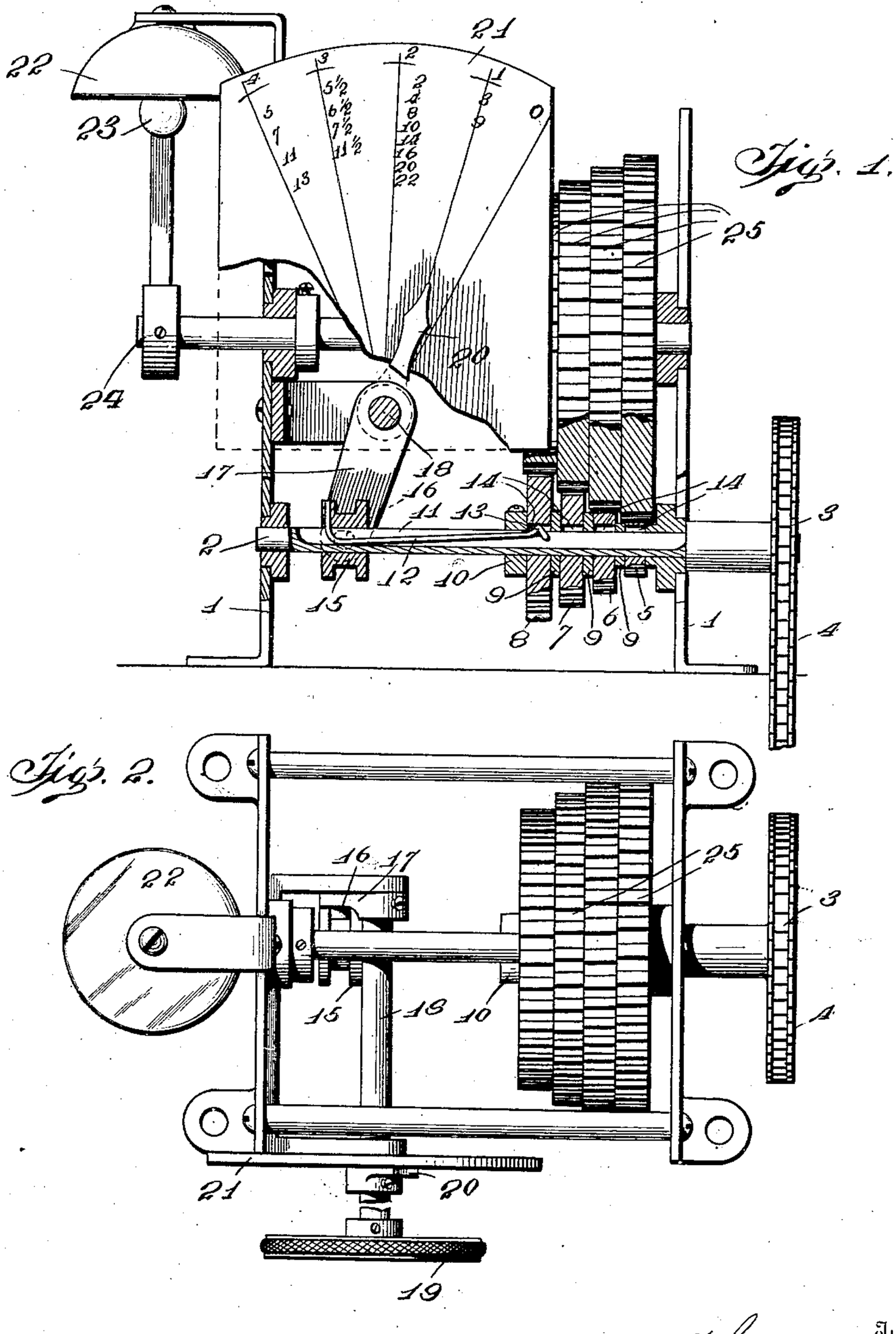

Fig. 1.

Fig. 2.

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3 SHEETS—SHEET 2.

Fig. 3.

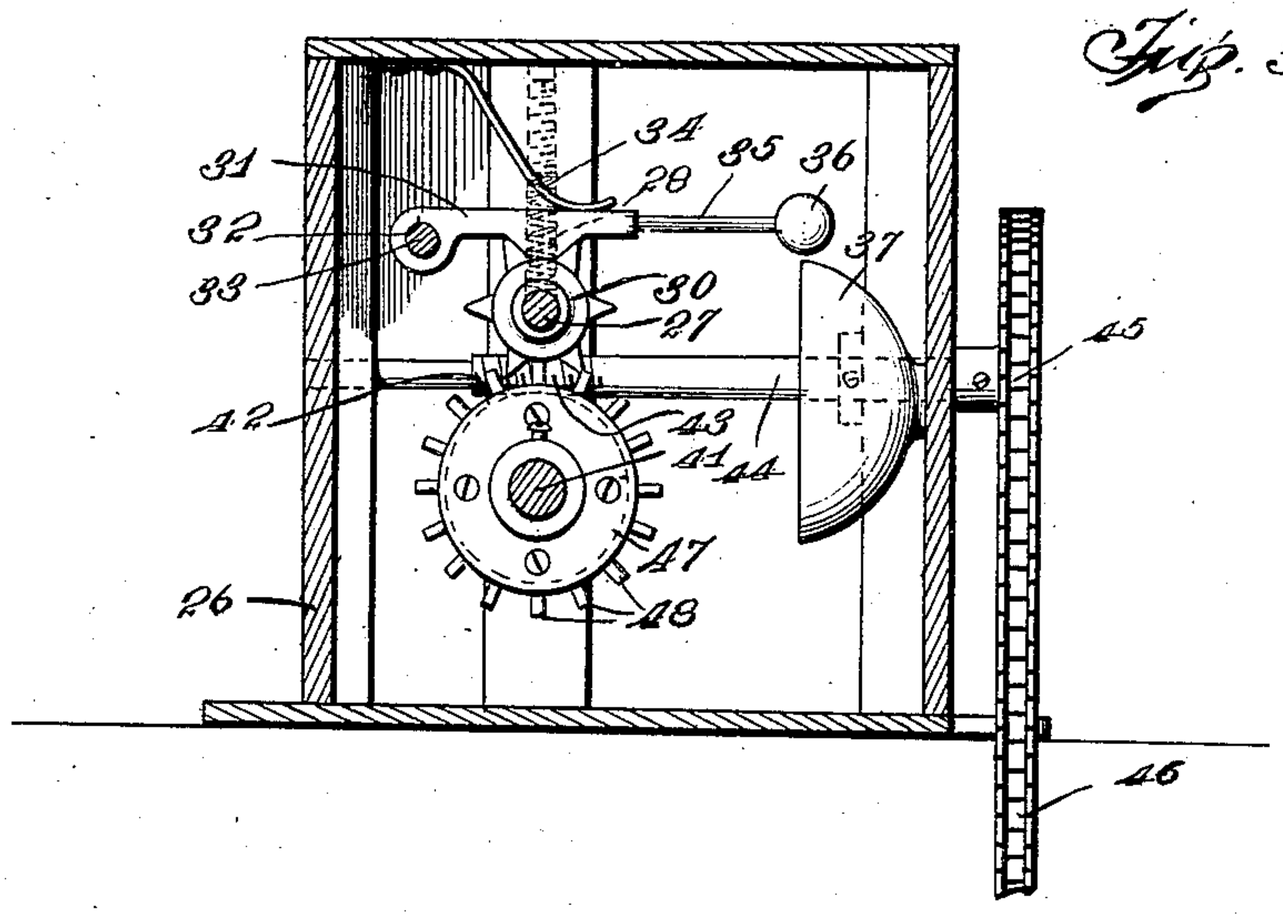


Fig. 4.

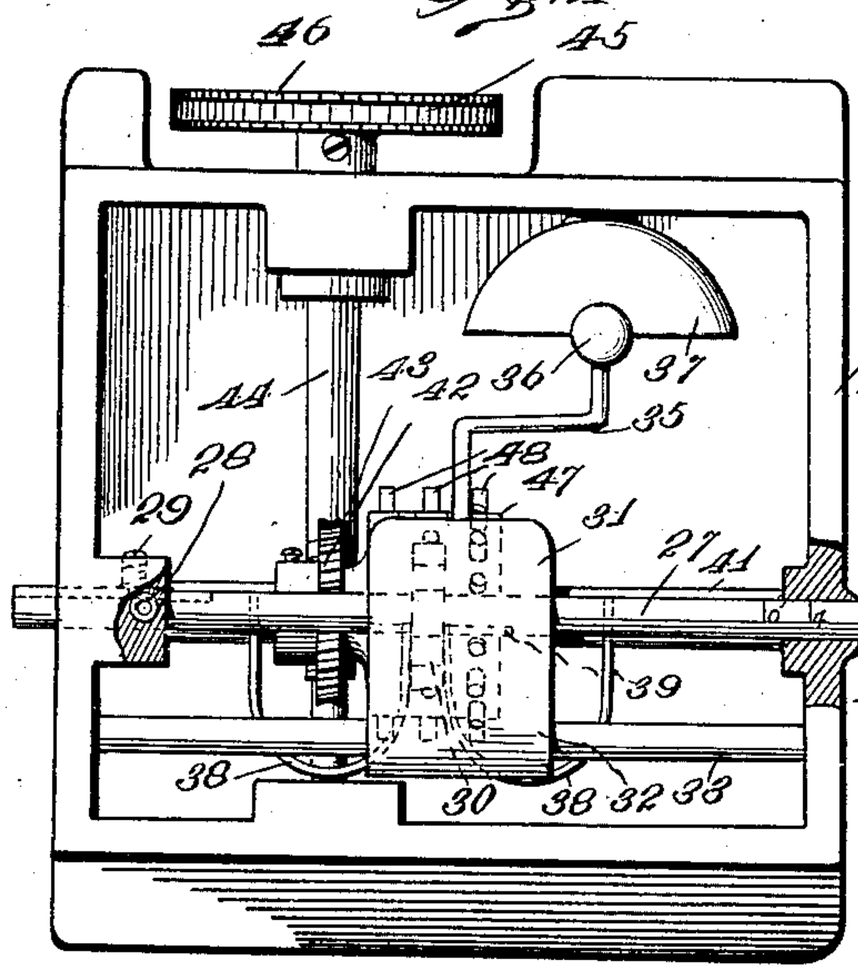


Fig. 5.

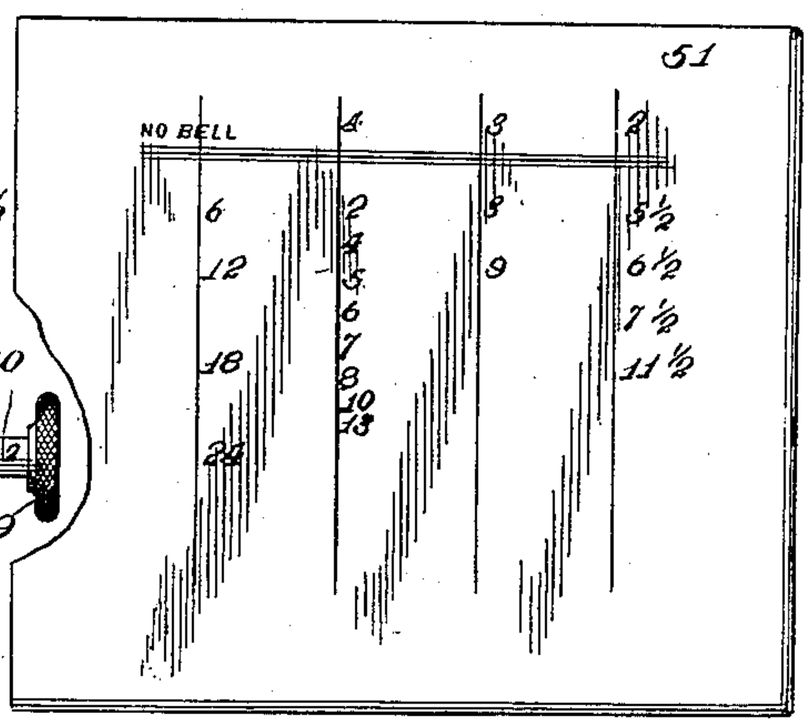
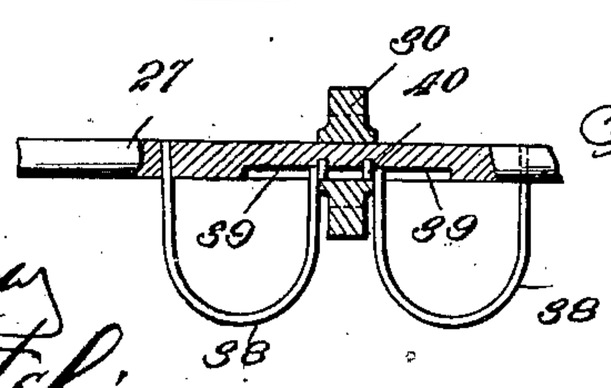


Fig. 6.



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3 SHEETS—SHEET 3.

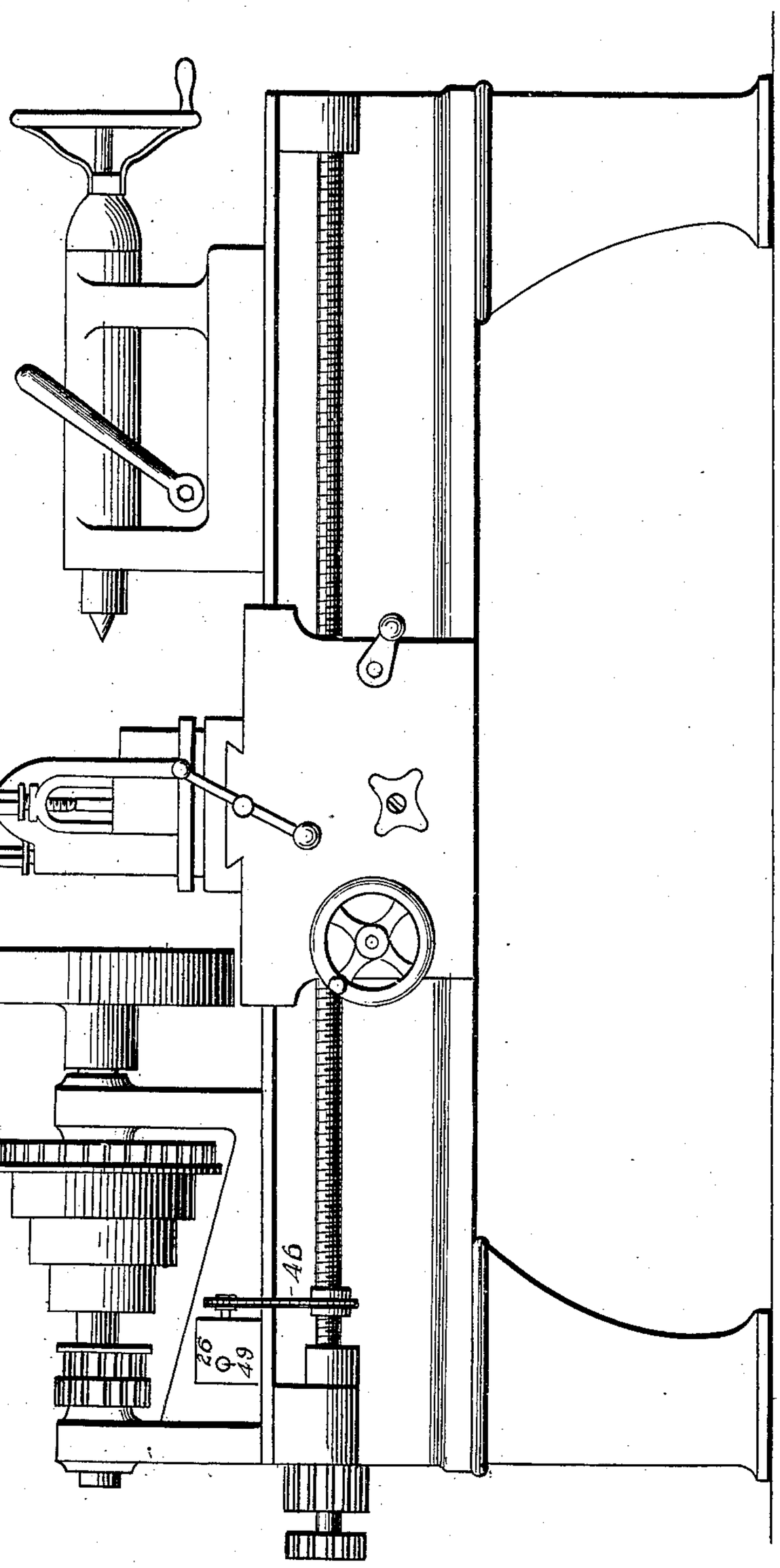

Fig. 7.

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UNITED STATES PATENT OFFICE.

THOMAS EYNON, OF CHICAGO, ILLINOIS.

INDICATOR.

No. 862,889. Specification of Letters Patent. Patented Aug. 13, 1907.

Application filed November 25, 1903. Serial No. 182,677.

To all whom it may concern:

Be it known that I, THOMAS EYNON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Indicators; 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.

This invention relates to improvements in indicating devices, and particularly to such as are adapted for showing the relation during rotation of the lead screw of a lathe to the article to be threaded actuated by the spindle of said lathe.

The object in view is the provision of means for indicating each time the threads of a lathe lead screw, during rotation, arrive at a point coincident or even with the thread being cut on an article actuated by the spindle of the lathe when said threads being cut are uneven with the thread of the lead screw, for facilitating the application of a cutting tool to such article.

A further object is the provision of means for indicating a given number of rotations of a lead screw relative to a desired number of rotations of an article being operated upon when cutting a thread thereon uneven with respect to the thread of the lead screw.

It further consists in certain other novel constructions, combinations and arrangements of parts as will be hereinafter fully described and claimed.

In the accompanying drawing: Figure 1 represents a view partially in elevation and partially in section of an indicating mechanism embodying the features of the present invention. Fig. 2 represents a top plan view of the same. Fig. 3 represents a transverse, vertical, central section taken through a further modification of the present improved indicating and signaling mechanism. Fig. 4 represents a top plan view of the same with the cover of the casing removed. Fig. 5 represents a top plan view of the said cover, illustrating the scale of indications thereon. Fig. 6 represents a detail, fragmentary view of the signal operating wheel and surrounding parts. Fig. 7 is an elevation of a lathe having my improved indicating and signaling mechanism thereon.

In the formation of screws upon a lathe it has heretofore been common to cut a partially complete thread with a tool by the contact of the same with the article being acted upon during the first movement of the carriage longitudinally of the screw. If an uneven number of threads per inch are being cut on the article being operated upon with respect to the threads on the lead screw, the difference in the speed of rotation of the lead screw and spindle of the lathe is produced by interposed gearing, and running the tool the second time over the article for deepening the threads is accomplished by measuring the distance of the travel of the carriage, after having stopped the lathe. This measuring is necessitated by reason of the fact that the movement of the lathe carriage during the second operation must be timed exactly the same as during the first operation and be positioned relative to the article operated upon and the feed screw of the lathe exactly the same at all points. This result is obtained by the starting of the lathe after the carriage has been positioned, by measurement, with its tool in the proper position relative to the threads being cut. The result may also be obtained by the use of a reversing belt and the returning of the tool carriage by a reversal of the lathe. The necessity for accuracy of measurement will be apparent, and it will be further seen that regardless of the difference between the number of threads per given distance on the lathe screw to the threads being cut, said threads will become even or, as I shall hereinafter, for the purpose of convenience term "coincident" after a given number of rotations of the feed screw. For instance, if a six-thread lathe screw is being used and a twelve-thread screw is being cut, each time the lead screw revolves once the screw being cut revolves twice and arrives at a position coincident with the lead screw, and if means are provided for indicating such coincidence, the cutting tool may be reapplied at any point of coincidence on the screw being cut without measurement or reversal of the part, subject only to control by such indicating means. By the structures illustrated in the accompanying drawing I propose to indicate such coincidence whereby I obviate the necessity for a reversing belt or measurement, as will hereinafter fully appear.

Referring to the drawings by numerals, 1 indicates any suitable support in which is mounted a shaft 2 driven by suitable sprocket 3 engaged by chain 4, said chain being connected with and driven by the lead screw of a lathe, not illustrated. Rotatably mounted upon shaft 2 are graduated or step gears 5, 6, 7, and 8. I have illustrated four of these gears, but it will be understood that any preferred number may be employed. Between each two of said gears is mounted a washer or bushing 9, which maintains said gears spaced apart and accomplishes a further object hereinafter specified. Any suitable collar 10 may be locked to the shaft 2 for retaining said gears loosely thereon in their given positions.

The shaft 2 is provided with a longitudinal groove 11 within which is arranged a longitudinally movable spring clutch member 12, whose head 13 is adapted to engage a groove 14 with which each gear 5, 6, 7, and 8

is provided on its inner surface. The end of the member 12 opposite that provided with head 13 projects beyond the groove 11 and engages an annularly grooved sleeve 15 slidably mounted on shaft 2. A pin 16 engages the groove of sleeve 15 and is carried by a crank 17 fixed to an operating shaft 18, said shaft extending outside the plane of the supports 1 and being provided with an operating disk or handle 19.

Fixed to the shaft 18 is a suitable pointer or other indicator 20 which is designed to extend in various directions, according to the relative position of the shaft 18 and sleeve 15, radially across an indication plate 21, said plate being preferably carried by one of the supports 1 and being provided with scales arranged in radiating lines, indicating given relation between the feed screw and the screw being cut and between the feed screw and present improved indicating means.

A suitable gong or other signaling apparatus 22 is carried by one of the supports 1 and is adapted to be struck by a knocker 23 carried by a shaft 24 journaled in the supports 1 parallel to shaft 2. The shaft 24 carries fixed cone gears 25, 25 arranged in a corresponding step relation to the gears 5, 6, 7, and 8 and disposed in an opposite sense so as to mesh with the said last mentioned gears, the smallest gear 25 meshing with gear 8 and the largest gear 25 meshing with gear 5.

The indication plate 21 is, as above indicated, provided with indications which are designed to obviate the necessity of calculation by an operator, said indications preferably consisting of numerals positioned in such relation on the plate to the pointer 20 as to indicate, when said pointer is directed toward a given numeral, a predetermined relation between the gears 25 and 5 to 8, whereby the number of times of coincidence between the lathe screw and spindle in a given number of rotations will be apparent.

In operation, the chain 4 engages a suitable sprocket, indicated in Fig. 7, carried by the lead screw of a lathe and thereby drives the sprocket 3, said sprocket imparting movement to the shaft 2 and through clutch member 12 to one of the gears carried thereby. The shaft 2 is, of course, revolving at the same speed as the lathe lead screw, and the speed of revolution of shaft 24 will be governed absolutely and dependent upon the particular gear carried by shaft 2 through which power is imparted. The shaft 18 may be rotated as desired for swinging the crank 17 and thus moving sleeve 15 longitudinally of the shaft 2 whereby the head 13 is caused to pass beneath the washers 9 and into the groove 14 of the desired gear carried by said shaft 2. The washers 9 are of considerable importance in that they cause the head 13 to descend flush with the outer surface of the shaft 2 before moving into contact with the next succeeding gear and the introduction of said head into the next groove 14 is thereby facilitated. Of course, the sounding of the device 22 will occur at intervals at a distance apart dependent upon the particular gears through which power is imparted and, as the actuation of the gears is dependent upon the position of the sleeve 15, the pointer 20 will, of course, indicate the speed of actuation of the knocker 23 which must increase or decrease corresponding with the movement of the said pointer to the right or left respectively.

For the sake of illustration, I have shown on the indication plate 21 certain numerals which have particular relation to a lathe screw of six threads to the inch. Of course, these numerals may be increased or decreased at will to correspond with the particular thread of the lead screw of the given lathe to which the present improved device is to be attached. Preferably at the upper edge of the plate I place numerals, as for instance 1, 2, 3, and 4 corresponding to gears 8, 7, 6, and 5, that is to say when the pointer 20 is directed toward the numeral 1 on the plate 21 the head 13 will lie within the groove 14 of gear 8 for driving the same. At times it may be desirable to throw the indicating mechanism out of operative relation with respect to the lathe, and in order to accomplish this result, I simply rotate the disk 19 sufficiently for bringing the pointer to a position over the plate 21 directed to the digit 0 thereon, which brings the sleeve 15 so far to the left as to bring the head 13 beneath the collar 10, thereby leaving all of the gears carried by shaft 2 loose thereon. Arranged in radial lines converging from the numerals 0 to 4 may be placed indicating figures showing the threads which may be cut with a six thread lathe screw while securing the proper signals with the present improved mechanism at the proper intervals. For instance, when the pointer 20 is directed toward the numeral 1, either three or nine threads may be cut upon the article operated upon, and the threads on said article will arrive at a point coincident with the threads on the lead screw every second revolution of the said lead screw, the knocker 23 operating at each time of such coincidence. Should the pointer be turned and directed toward the numeral 2, the head 13 will be thus caused to actuate gear 7 whereby two, four, eight, etc., threads to the inch may be cut on an article and the times of coincidence between the rotation of such article and the lead screw will be properly announced by the signal. This principle may be carried out to any degree, and I wish it understood that the main and all important feature of the present invention is the provision of means for announcing such coincidence whereby the valuable results, heretofore referred to, may be secured.

I wish it decidedly understood that I shall not consider myself limited to the details of structure delineated in the accompanying drawing, and specifically set forth herein, but shall feel myself at liberty to deviate therefrom to that degree of which the spirit of the present invention is susceptible. Of course, any form of indicating or signaling means may be substituted for the elements 22 and 23, as for instance an electric sparking device, light or other means as may be desired.

In Figs. 3, 4, 5, and 6 I have illustrated a slightly modified embodiment of the principles involved in the present invention, and in these figures 26 indicates a suitable casing through the walls of which extends a shaft 27 which shaft is movably mounted, but prevented from having too free a movement by the pressure of a contacting cushion or spring 28. The said shaft is grooved longitudinally and engaged by a screw or pin 29 in the groove for preventing the rotation of the shaft. Within the casing 26 a wheel 30 is mounted loosely upon the shaft 27 and provided with radially

projecting teeth normally engaging a depending lug carried by an operating lever 31. The lever 31 is pivoted as at 32 to a shaft 33 mounted in the casing 26 and is depressed by a suitable spring 34 for retaining the lug of lever 31 in contact with the teeth of wheel 30. A spring arm 35 projects from the lever 31 and at its free end is provided with a striking device 36 adapted in operation to engage a gong or other sounding means 37. The wheel 30 is retained in position loosely upon the shaft 27 by means of springs 38, 38 each connected at one end to the shaft 27 and at their free ends pressing the opposite sides of said wheel, the free ends of the springs 38 extending into an longitudinal groove 39 formed in shaft 27 and being limited in their movement toward the wheel 30 by pins or lugs 40, 40 projecting from within the groove 39. Arranged beneath the shaft 27 is a rotatably mounted shaft 41 carrying a worm gear 42 engaging a suitable worm 43 carried by a shaft 44 extending beyond the walls of the casing 26 and being provided with an operating sprocket 45 connected by a sprocket chain 46 to a similar sprocket carried by the lead screw of a lathe, not illustrated. The shaft 41 carries a drum 47 arranged beneath the wheel 30 and provided with a plurality of series of radially projecting pins 48, 48 adapted to engage the teeth of wheel 30 for causing rotation of said wheel when the teeth of the wheel project into the path of movement of said pin. It will thus be apparent that the toothed drum 47 and the sleeve 30 constitute gearing whereby motion is transmitted from the shaft 41 to the sounding device, and that by sliding the sleeve 30, upon the shaft 27, the relative speed of the said sleeve and the drum 47 can be varied. The shaft 27 is provided with an operating handle 49 at one end adapted to be grasped for moving said shaft longitudinally whereby the wheel 30 may be caused to lie in the path of movement of any one of the series of teeth 48. The shaft 27 is divided off by suitable marks of graduation 50 in such manner as to indicate which series of the teeth 48 is at any given time in position for actuating the wheel 30. The graduations 50 may be provided with suitable numerals which numerals agree with the corresponding numerals stamped into or upon the cap 51 of casing 26. Beneath the said numerals on the cap 51 may be arranged in suitable lines indications similar to and for the same purpose as those shown and described with reference to the indication plate in Fig. 1.

In operation, it is only necessary to examine the cap 51 of the casing for ascertaining which of the graduation marks 50 shall be utilized for securing a proper signal for a given thread to be cut, and the handle 49 accordingly moved until the proper graduation mark 50 is brought into line with the outer surface of the casing 26. Assuming this to be mark "3", the wheel 30 will be in position for being engaged by the intermediate series of teeth 48 and as the shaft 44 is driven by sprocket 45, the pins 48 will cause the lever 31 to be raised and dropped under the action of the teeth of wheel 30 whereby the device 36 will be caused to engage the gong 37. It is to be observed that the series of teeth 48 at one end of the drum 47 consists of a greater number of teeth than the intermediate series of pins and that the series of pins at the opposite end consists of a less than number of pins than those of the intermediate series. Should it be desired to move the shaft 27 from the position indicated in Fig. 4, assuming that at the time of actuation of the handle 49, one of the teeth 48 was in the path of lateral movement of one of the lowermost teeth of wheel 30, said wheel would necessarily be stopped by said pin and the spring 38 opposite the pin would be compressed, the spring 38 on the other side being prevented from expanding by lug 40. As soon as the drum 47 has been moved from the position indicated, the wheel 30 will be free to move laterally to its proper position under the pressure of the said spring 38, said spring being limited in its movement by the lug 40 and the wheel 30 thus readily positioned for further operation.

The drum 47, as may be seen in Fig. 4, is preferably made up of a series of disks carrying the radially projecting pins 48 secured together by bolts, as seen in Fig. 3, with washers or bushings interposed between said disks for spacing the same apart.

I have stated that the driving sprocket and each of the structures herein disclosed may be actuated by a sprocket carried directly by the lead screw of a lathe, but it will be seen that the indicating mechanism may be actuated with as efficient results by connecting said sprocket to the spindle of a lathe or to any of the gears thereof. In fact, the present improved indicating means may be geared to any driving mechanism timed to the movement of the elements of a lathe, and the desired results obtained.

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

1. In a mechanism of the class described, the combination with an actuating wheel, of a shaft actuated thereby, gears of different sizes carried loosely by said shaft, a clutch for throwing any one of the same into and out of operation, a second shaft, gears carried thereby and intermeshing with the first mentioned gears, means actuated by said last mentioned gears, for indicating the relation of a feed screw of a lathe to the spindle thereof, means for actuating said clutch, and means carried by said clutch actuating means for indicating the gear in operation.

2. In a mechanism of the class described, the combination with power transmitting means adapted to be actuated from a source of power timed to the movement of the elements of a lathe, of gearing actuated by said power transmitting means, an indicator actuated by said gearing, clutch mechanism for throwing said gearing into and out of operative relation with respect to said indicating means, a crank engaging said clutch mechanism for actuating the same, a shaft carrying said crank, an indication plate, and a pointer carried by said shaft and directed across said plate.

3. In a mechanism of the class described, the combination with a rotatable shaft, and means for transmitting rotary motion thereto; of stepped gears loosely mounted upon the shaft, spacing devices interposed between said gears, means for locking any one of the gears to the shaft, a visual indicating device connected to said means, an alarm and stepped gears meshing with the gears of the shaft and adapted when rotated to operate the alarm.

4. In an indicating device for lathes and the like, the combination of a casing, a shaft journaled in the casing, means for transmitting motion from the lead screw of the lathe to the said shaft, a second shaft mounted in the casing, a sounding device, means carried by the second shaft for operating the sounding device, gearing transmitting motion from the first shaft to the means carried by the second shaft for operating the sounding device,

means for adjusting the gearing to vary the intervals between the operation of the sounding device, and a scale indicating the relation between the gearing.

5. In an indicating device for lathes and the like, the combination of a support, a shaft journaled in the support, means for transmitting motion from the lead screw of the lathe to the said shaft, a second shaft mounted in the support, a rotating member carried by the second shaft, gearing connecting the first-mentioned shaft and the rotating member, means for regulating the gearing whereby the relative speed of the first-mentioned shaft and the rotating member can be varied, a sounding device, and means whereby the sounding device is operated by the movement of the rotating member upon the second-mentioned shaft.

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

THOMAS EYNON.

Witnesses:
JOHN L. FLETCHER,
EDGAR M. KITCHIN.