

7 SHEETS—SHEET 1.

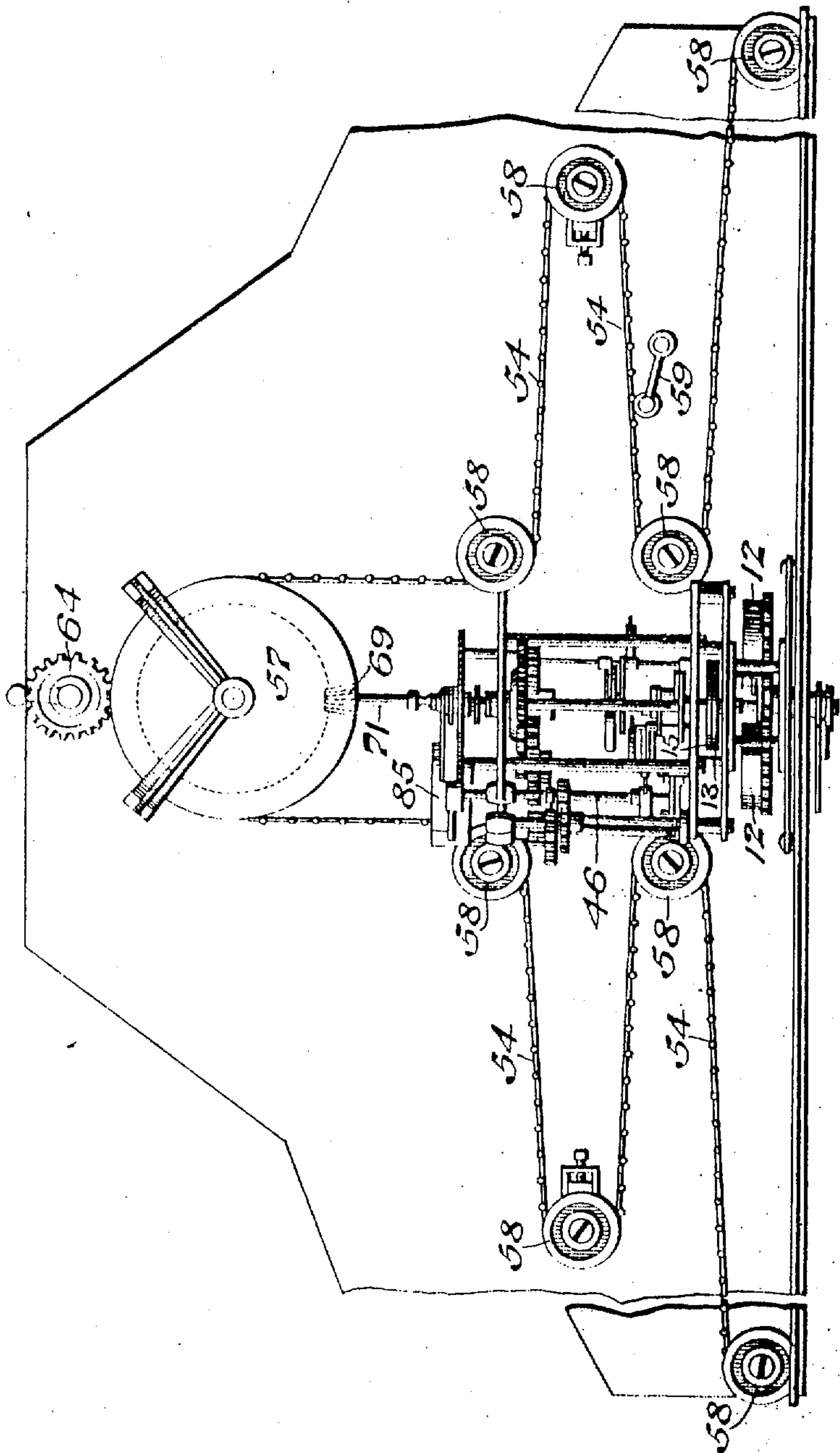
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975,877.

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CLOCK.
APPLICATION FILED FEB. 2, 1910.

Patented Nov. 15, 1910.
7 SHEETS-SHEET 2.

Fig. 2.



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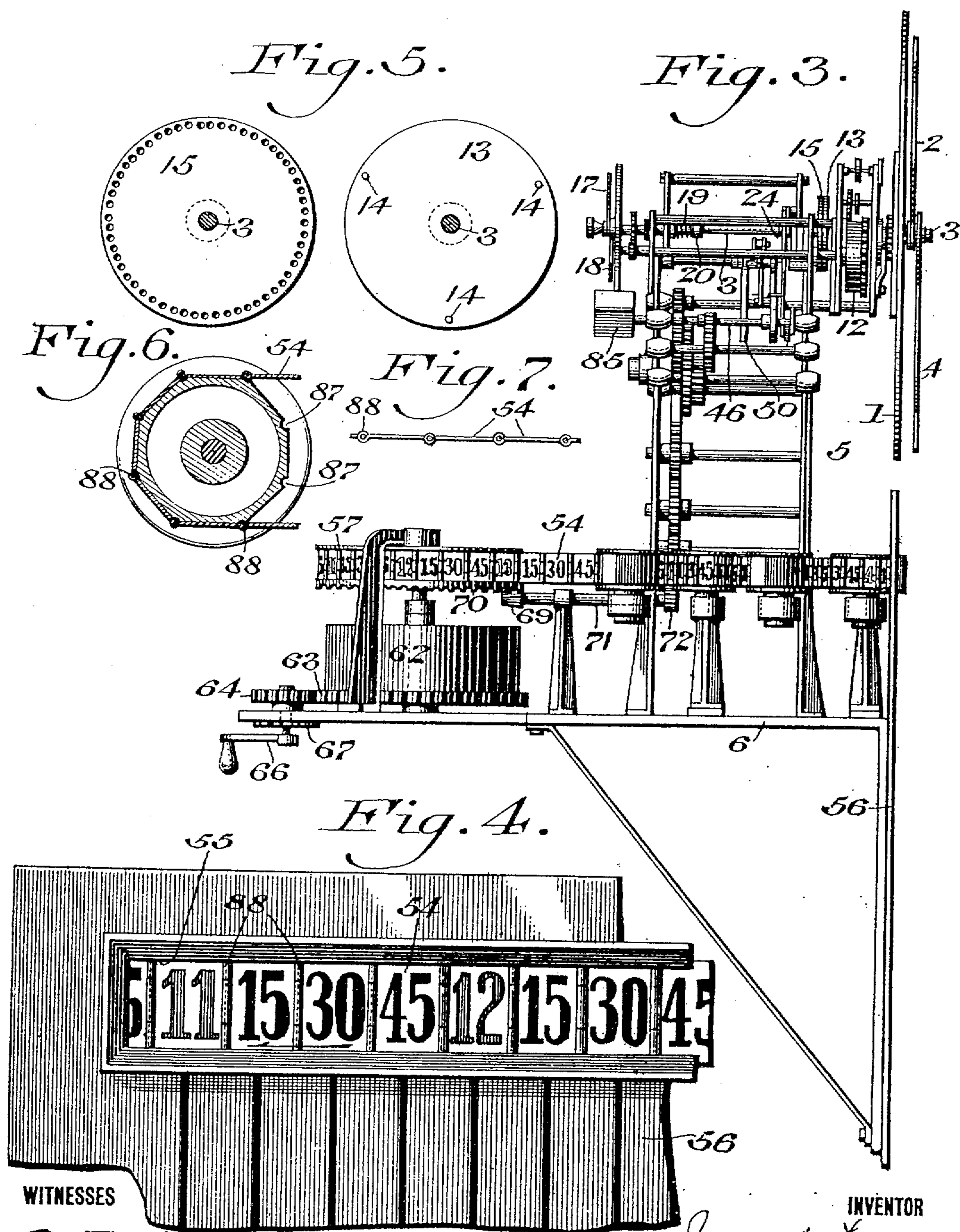
7 SHEETS—SHEET 3.

Fig. 5.

Fig. 3.

Fig. 6.

Fig. 7.



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7 SHEETS—SHEET 4.

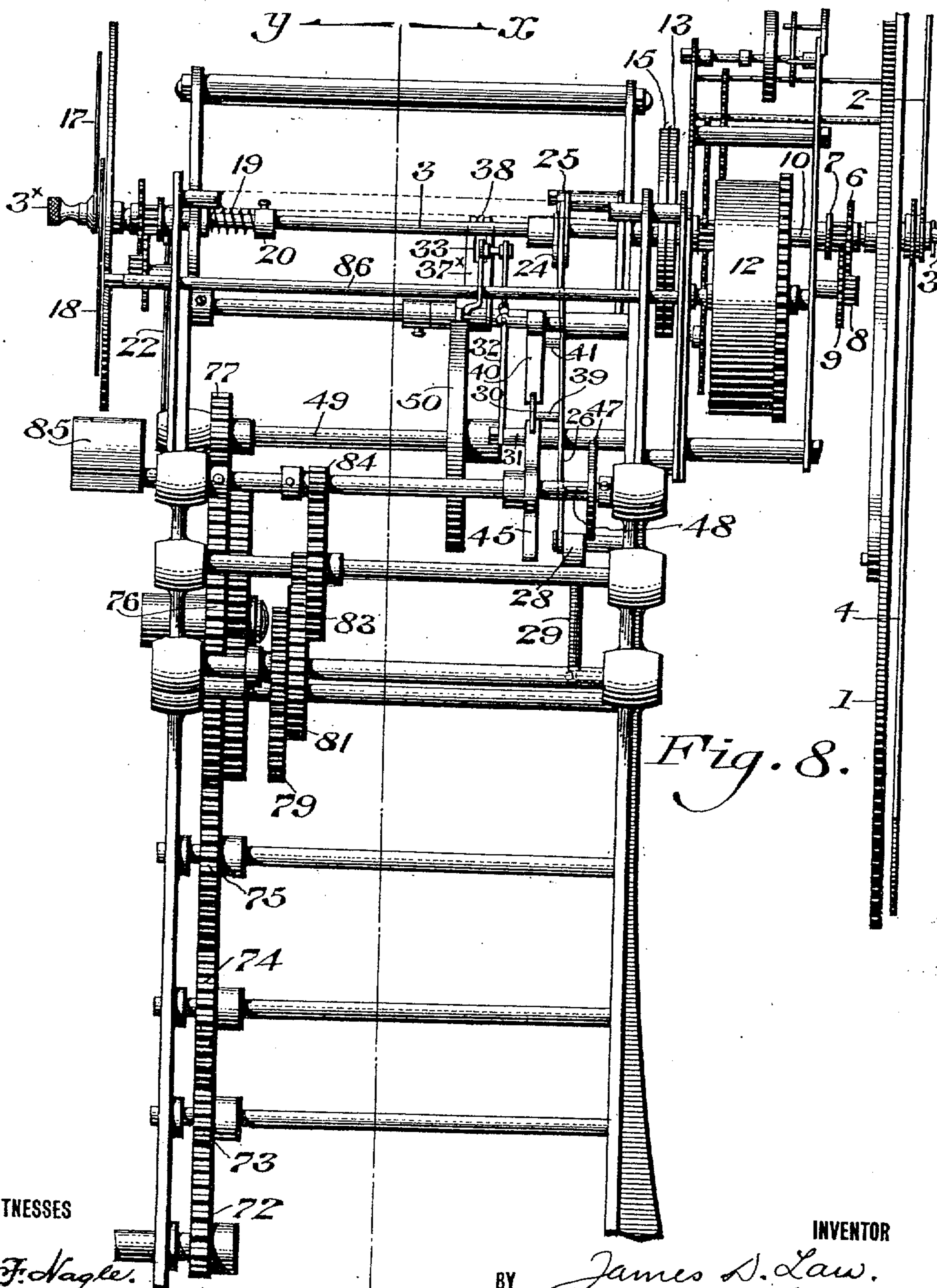


Fig. 8.

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7 SHEETS—SHEET 5.

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Fig. 9.

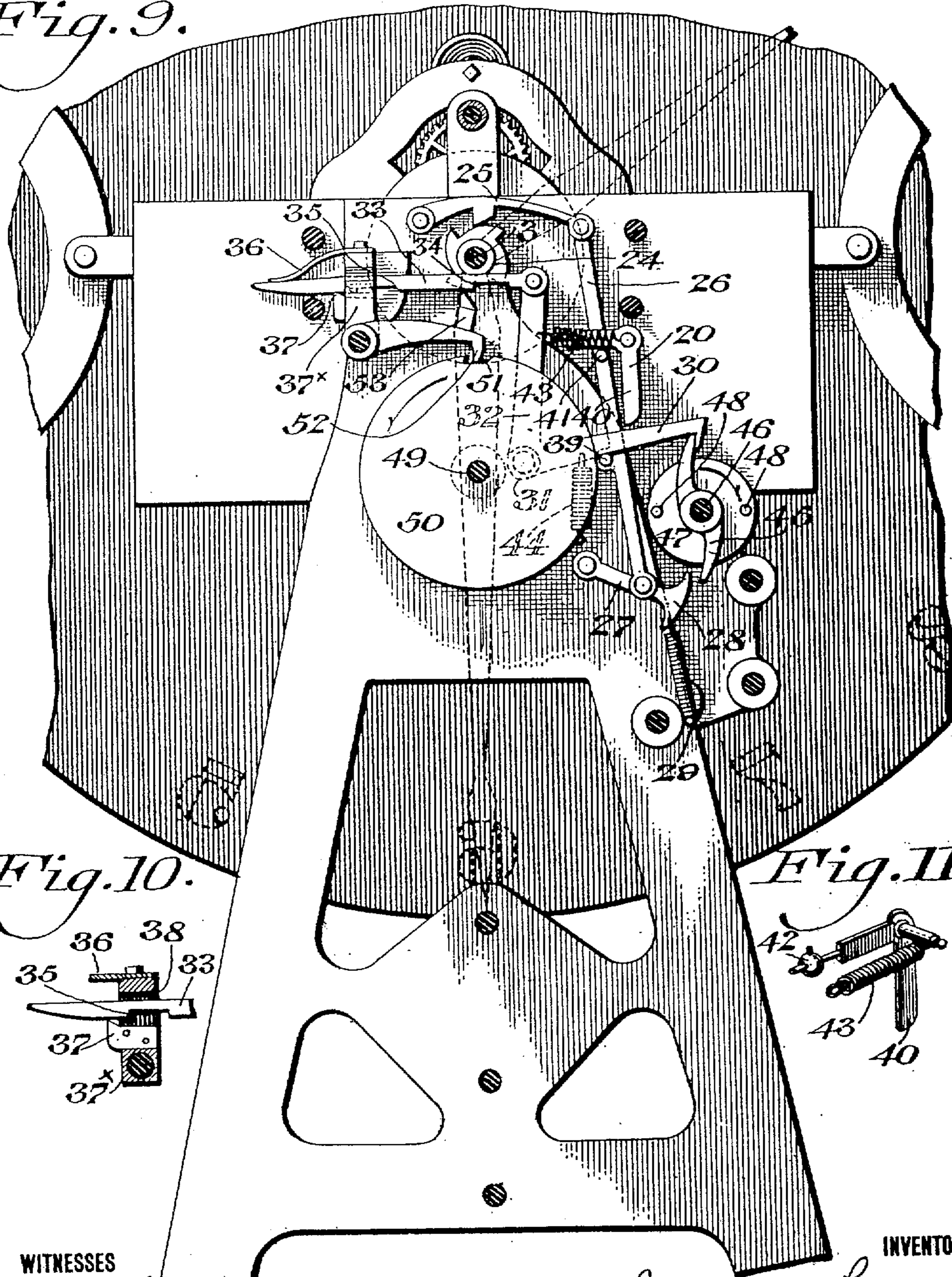


Fig. 10.

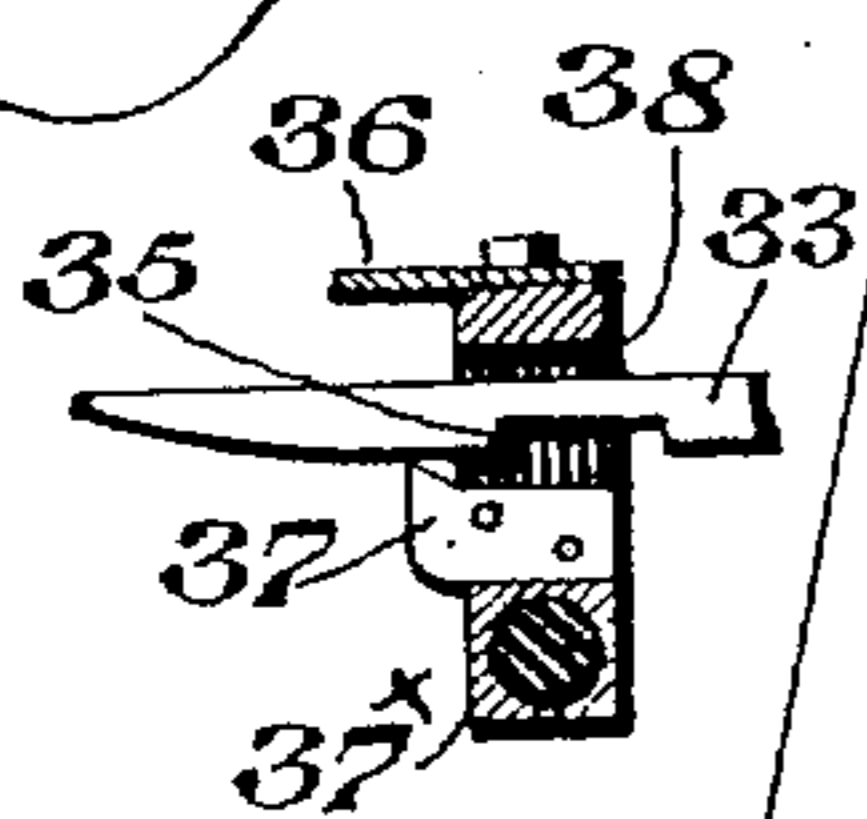
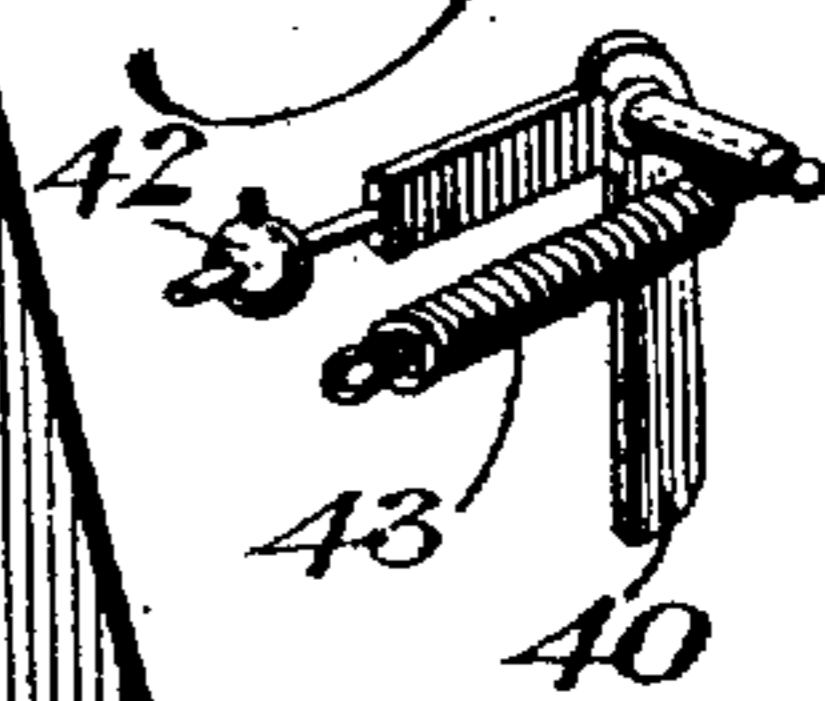


Fig. 11.



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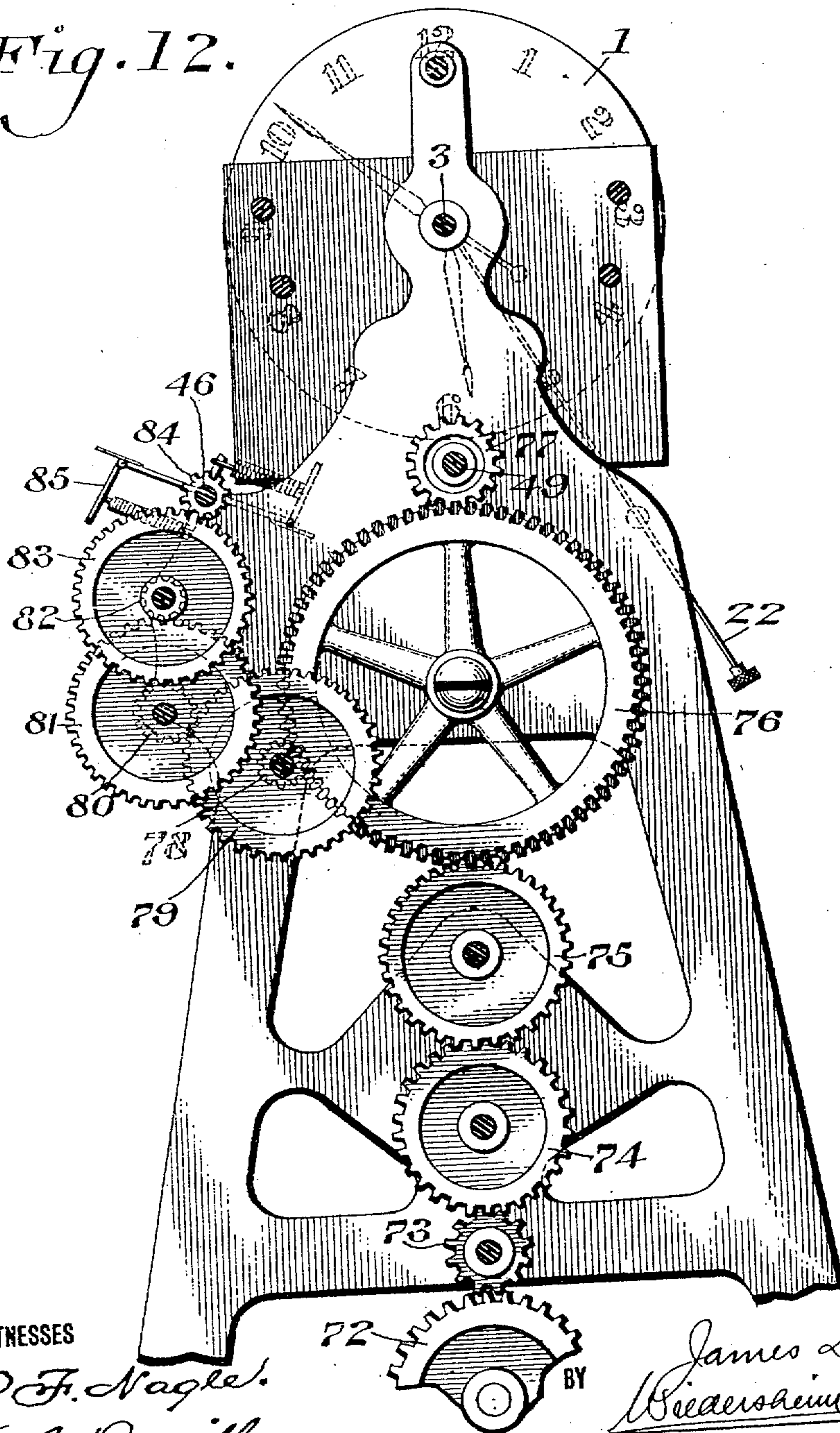
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7 SHEETS—SHEET 6.

Fig. 12.



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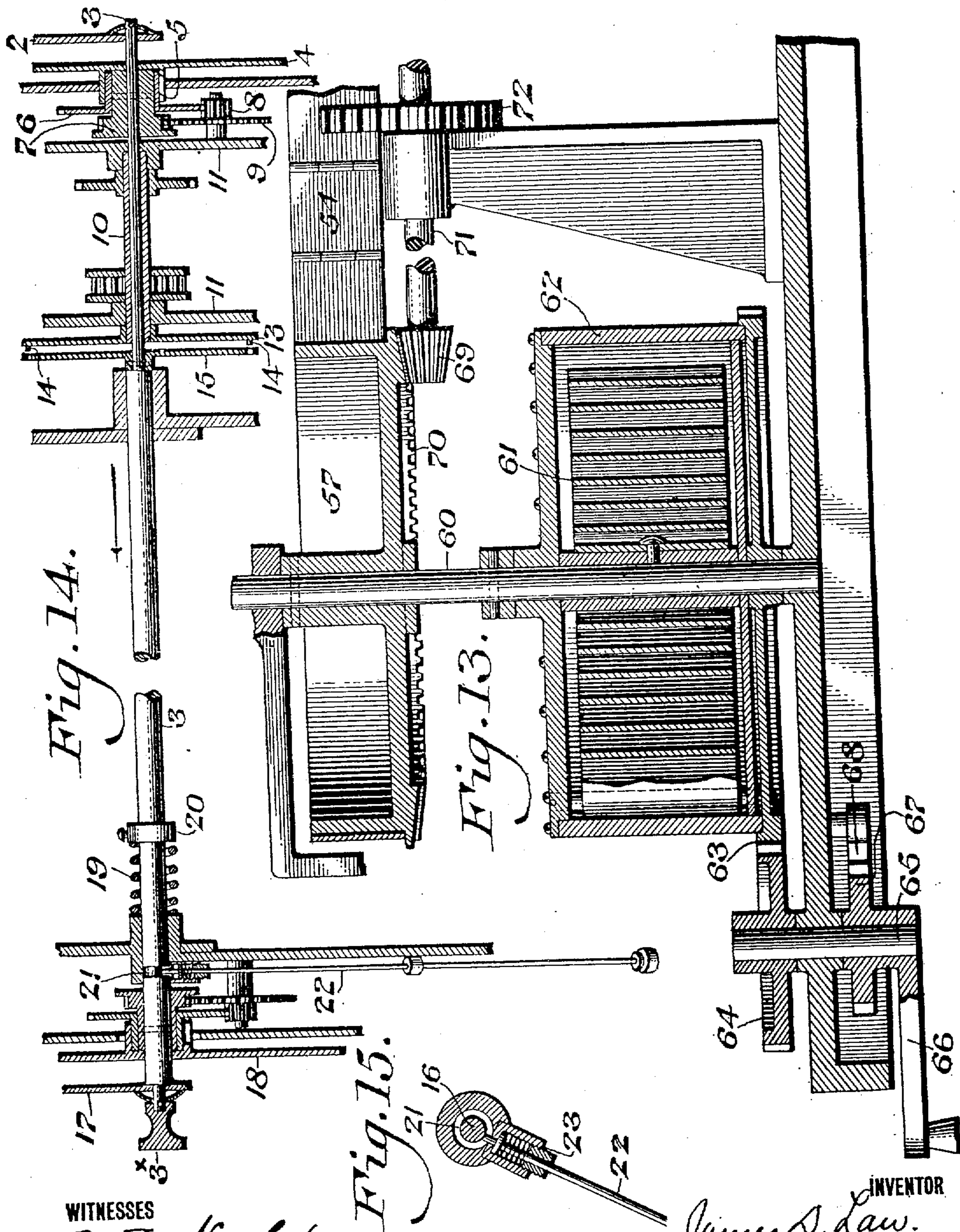
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7 SHEETS-SHEET 7.



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Specification of Letters Patent.

Patented Nov. 15, 1910.

Application filed February 2, 1910. Serial No. 541,005.

To all whom it may concern:

Be it known that I, JAMES D. LAW, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Clock, of which the following is a specification.

My invention relates to a device for indicating or showing the time synchronically and continuously of a plurality of different sets or places and it consists of a clock and an indicator suitably actuated or timed in its movement with respect to a clock in order to indicate or show the time it is at different places in the world, corresponding with the time shown on the face of the clock.

It further consists in providing a suitably actuated endless belt or chain carrying the time notations and serving as the indicator, which belt is automatically controlled by the movement of the clock.

It further consists of novel details of construction all as will be hereinafter fully set forth.

Figure 1 represents a front elevation showing a clock and the indicator adjacent thereto and with a portion of a table or chart with names of a few towns or cities properly located thereon. Fig. 2 represents a plan view thereof. Fig. 3 represents a side elevation thereof. Fig. 4 represents, on an enlarged scale, a portion of the indicator or chain with the time notations thereon. Fig. 5 represents a front elevation of two disks employed. Fig. 6 represents a sectional view of one of the supports for the indicator or endless chain. Fig. 7 represents a plan view of a portion of the indicator showing the connection of the links. Fig. 8 represents a side elevation, on an enlarged scale, of a portion of the mechanism shown in Fig. 3. Fig. 9 represents a sectional view on line $x-x$ Fig. 8. Fig. 10 represents a sectional view of a portion of the device in detached position. Fig. 11 represents a perspective view of a stop employed in detached position. Fig. 12 represents a sectional view on line $y-y$ Fig. 8. Fig. 13 represents a sectional view showing the spring motor for actuating the indicator and a portion of the indicator around one of its supports. Fig. 14 represents a sectional view showing the mechanism for setting the clock in detached position. Fig. 15 represents a partial sectional view showing

means for locking the shaft of the setting mechanism. Fig. 16 represents a portion of the indicator showing one manner of indicating the difference between the night and day time.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings. My invention is designed for the purpose and in order that anyone at a glance can see and know the time it is at another place or places throughout the world in relation to the local hour or time and I have provided means for automatically controlling the movement of the indicator.

In the drawings I have shown one embodiment of my invention which I have found to operate successfully in practice but it will be evident that changes may be made in the construction, the arrangement of the parts may be varied and other instrumentalities may be employed which will come within the scope of my invention and I do not therefore desire to be limited in every instance to the exact construction as herein shown and described but desire to make such changes as may be necessary.

It will be understood that the various parts hereinafter described are suitably supported and properly arranged with respect to each other in order to cooperate at the proper time and that all of the parts are timed to operate at the proper time with respect to each other in order to produce the desired results.

I designate a clock having a suitable face and minute and hour hands, the minute hand 2 being mounted on a shaft 3 and suitably actuating the hour hand 4 in any desired manner.

In the present instance the hour hand 4 is provided with a split sleeve 5, see Fig. 14, which closely engages or is forced upon the hub of a gear wheel 6 which is carried in any suitable manner upon the hub of a gear wheel 7, said gear wheel 6 meshing with a gear 8 suitably supported and to which motion is imparted by means of a gear 9 which meshes with the gear wheel 7, which is suitably connected with the shaft 3, whereby it will be understood that when the shaft 3 is rotated the gear 7 will be correspondingly rotated and through the medium of the gear 9, gear 8 and gear 6 will impart the proper motion to the hour hand 4, so that the same

and the minute hand 2 will be properly actuated and moved.

The shaft 3 is suitably journaled and passes through a hollow shaft 10 which is suitably supported in the frame 11 of the clock, said hollow shaft being adapted to be actuated by the springs 12 of the clock, the actuation of this shaft being accomplished in any suitable or desired manner.

Mounted upon the hollow shaft 10 is a disk 13 which is provided with three pins 14 projecting therefrom. Mounted on the shaft 3 is a disk 15 which is provided with suitable small openings preferably sixty in number, that is, one for each minute, and three of which openings are adapted at the proper time to receive the pins 14, as will be hereinafter described, it being understood, when the two disks are in engagement, that the hollow shaft 10 and the minute shaft 3 are locked with respect to each other, so that suitable movement or motion from the clock mechanism is imparted to the shaft 3 and thus to the minute or hour hands of the clock.

It will be understood particularly from Fig. 14 that the shaft 3 extends entirely across the device and that the rear end of said shaft is provided with a second set of mechanism similar to that in the clock, that is to say, I provide a clock face 16, a minute hand 17 and an hour hand 18 which are actuated in a similar manner to that already described with respect to the other end of the shaft 3 and that these hands are actuated by the clock mechanism also in order that from the rear of the clock the time can be seen. The purpose of this is to provide means for setting the clock from the rear, since it will be understood that the device is often situated in such a manner that access to the front or face of the same is impossible and for this purpose I have slidably mounted the minute shaft 3 in its supports, in order that the disk 15 can be removed from engagement with the disk 13 so that the shaft 3 can be independently rotated in order that the hands of the clock can be set, it being understood of course that the amount of sliding movement of the shaft is exceedingly small, it being only necessary to remove the pins 14 from engagement with the openings of the disk 15.

19 designates a spring bearing upon a suitable stationary point or also against a collar 20 mounted on the shaft 3, said spring tending to hold the shaft 3 in its proper position and to return it to its position after it has been moved therefrom to set the hands. At a suitable point in the shaft 3 I provide a groove 21 which is normally out of line with a pin 22 which is suitably supported and guided, the end of said pin being adapted to enter the groove 21 in the shaft 3 when the same has been pulled from

place in order to release the disks 13 and 15, that is, when the parts are in the position seen in Fig. 14 ready for setting the hands of the clock, it being understood that this pin 22 prevents the return of the shaft 3 while the hands are being set and until the pin 22 is pulled out, immediately upon which the spring 19 will return the parts to their former position, the disks 13 and 15 will be reengaged and the clock will be operated under the clock mechanism. The spring 23 in Fig. 15 is in suitable connection with the pin 22 in order to hold the same in the groove 21 and tend to force the same therein when the groove is brought into line therewith. In order to set the clock, the operator grasps a handle 3* on the shaft 3 and pulls the same to overcome the tension of the spring 19, bringing the groove in line with the pin 22 which immediately enters the same and prevents return of the shaft 3 as previously stated. The disks 13 and 15 are disengaged and the shaft 3 is thus freed from the shaft 10 and can rotate independently thereof as will be evident.

I have now described the operation of the clock, it being of course understood that any suitable clock mechanism may be employed for the operation of the same which is provided with the usual escapements and other portions or devices necessary to make the same operate properly.

At a suitable point on the minute shaft 3 I mount a star wheel 24, see more particularly Figs. 8 and 9, which is provided in the present instance with the four cam projections and which wheel it will be understood is rotated by the movement of the clock. Contacting with the star wheel 24 is the pivoted lever 25 which has a suitable portion thereof bearing upon the cams of the said wheel 24 in order to be raised thereby and permitted to fall, as the cams rotate with the shaft 3. Suitably connected with the lever 25 is a bar 26 the end of which is connected with the lever 27 having the arc 28 thereon, said lever 27 being suitably pivotally mounted and being connected with a spring 29, which is also connected with a suitable stationary point, and which tends to hold the arc lever 27 in its lowered position and to return the same thereto, after it has been actuated.

30 designates a pawl which is pivotally mounted and carries a hub 31 to which is connected a lever 32, it being understood that the said levers 30 and 32 operate together through the medium of the said hub 31. Upon the upper end of the lever 32 is mounted a notched lever 33 provided with the two notches 34 and 35, said lever 33 having a spring 36 bearing upon one end thereof which tends to lower that end and hold the same in contact with a tooth 37, as illus-

trated in Fig. 10, carried by a suitable support 37, it being understood that the lever 33 moves in a suitable opening or guide 38 in the support 37 and that the lever 33 is actuated backward and forward at the proper time in order to cause the notch 35 to be engaged with the tooth 37 whereby it will be understood that the lever 32 and the lever 33 are held stationary at the proper time until released, as will be hereinafter described.

39 designates a pin which is carried by the bar 26 and which engages with the lower portion of the pawl 30 to lift the same when the arm 26 is lifted, and 40 designates a pivoted stop situated at a suitable point above the pawl 30 in order to prevent the improper upward movement thereof, said stop 40 being suitably rotated on its pivot by means of a pin 41 also carried by the bar 26 and which is in engagement with an offset on the stop 40, in order to lift the end of the latter and to remove it out of the path of the pawl 30 at the proper time.

42 designates an adjustable weight on the offset of the stop 40 which controls the speed of the return movement of the said stop 40 after it has been rotated as above described and then released.

43 designates a spring, one end of which is in suitable connection with a stationary point and the opposite end of which is connected with the lever 32 which tends to draw the same into such position as to return the pawl 30 to its normal position, as illustrated in full lines in Fig. 11 and parts in dotted lines in Fig. 9. 44 designates another spring which is connected with the pawl 30 itself and also a suitable stationary point, which also tends to draw down or return the pawl 30 to its proper position to engage one of the arms 45 as illustrated in dotted lines in Fig. 9.

45 designates arms which are mounted on the governor shaft 46 which is suitably supported, said arms being adapted at the proper time to be engaged by the pawl 30 to hold the same and prevent rotation thereof and so the governor shaft 46. Also carried on the governor shaft 46 is a disk 47 having the pins 48 thereon, said pins being in the path of movement of the arc 28 of the lever 27, whereby it will be understood, when the arc lever 27 is elevated by the arm 26 being raised by the lever 25 due to engagement of the latter with one of the cams on the star wheel 24, that the pawl 30 is elevated and so released from its engagement from one of the arms 45, meanwhile the arm lever 27 moves upwardly so that the arc 28 is placed in the path of movement of the pins 48, which will contact therewith and so be held against rotation until the end of the cam on the star wheel 24 with which the lever 25 is in engagement is reached, immediately upon

which the lever 25 falls, lowering the bar 26 and the arc lever 27, whereby the arc 28 is removed from engagement with one of the pins 48 and the disk 47 is released and with it the governor shaft 46 which is free to rotate. The actuation of the shaft 46 is accomplished by mechanism as will be hereinafter described.

It will be understood that when the bar 26 is raised the pawl 30 is raised, rotating the lever 32 on its pivot and moving the lever 33 from its position seen in Figs. 9 and 10 to the left in said figures and so causing the notch 35 to be engaged by the tooth 37 thus holding the lever 33 and so the pawl 30 in elevated position, the end of the stop 40 being removed from the path of movement of the pawl 30 by the upward movement of the bar 26 as previously stated.

49 designates a plate shaft which is suitably supported and is in suitable connection with the governor shaft 46 by means of a train of gears, whereby it will be understood that when the governor shaft 46 is permitted to rotate it will actuate the plate shaft 49 to rotate the same.

50 designates a round plate mounted on the plate shaft 49, which plate is provided with a cut-away portion or notch 51 in which is normally seated the end of a dog 52 pivotally mounted, and it will be understood that when the plate 50 is rotated with the shaft 49, the dog 52 will be elevated out of the notch 51 and will cause an extension 53 thereon to engage the notch 34 on the lever 33 at the same time lifting the latter and releasing the notch 35 from engagement with the tooth 37 but as the dog 52 is held in elevated position while it contacts with the edge of the rotating plate 50, the pawl 30 will be held in its elevated position, that is, until the dog 52 is returned to the notch 51 immediately upon which the springs 43 and 44 act to return the pawl 30 to engage with one of the arms 45 on the shaft 46 and so stop the rotation of said shaft.

From the above it will be understood that I have provided means for locking the governor shaft against rotation and for releasing the same automatically at predetermined times, the parts being actuated by the clock mechanism, so that as the hands of the clock rotate, the governor shaft will be actuated at the proper time and for the proper amount of time all of which, as previously stated, being controlled by the clock mechanism.

I will now describe the indicator and the connections between the same and a governor shaft in order that the indicator will be intermittently and automatically controlled by the clock mechanism.

54 designates the indicator which is in the form of an endless belt or chain composed of a plurality of links suitably hinged together

and upon the faces of which links appear numerals indicating different fractions of time in proper sequence, said indicator being suitably supported and mounted in any suitable or desired manner, in order that the actuation thereof will be properly controlled automatically by the clock and it being understood, with reference more particularly to Fig. 1, that a suitable portion or extension of said indicator appears at a suitable opening 55 in the front of the table, plan or chart 56 adjacent the clock 1, it being understood that the said table, plan or chart represents a completed day of twenty-four hours of time and upon the chart are placed the names of the towns or cities at their proper time positions with respect to the divisional lines.

For supporting and moving the indicator in the present instance, I provide a drum 57 which is suitably supported and also the idlers 58 which are suitably supported at proper points on the frame of the clock and one of which is situated adjacent each end of the opening 55 of the chart 56, the belt or chain passing suitably around the drum and the idlers. Any suitable number of the idlers 58 are adjustably mounted in order that suitable tension will be given to the indicator or chain 54 in order that it will be properly moved, and I in addition provide a suitable take-up device 59 should there be slight stretching or any other reason, for increasing the tension to the proper degree.

Referring more particularly to Fig. 2 it will be understood that the indicator passes around the drum 57 and is actuated thereby as will be hereinafter described and also passes around the idlers 58 presenting the front of the links at the opening 55 and continuing its movement around back to the drum 57. Each plate or link of the indicator represents, in the present instance, fifteen minutes of time, this being more clearly understood from Figs. 1 and 4, and referring to the latter it will be seen that the one indicator has eleven o'clock thereon, the next 11:15, the next 11:30, the next 11:45 and then 12:00 and so on, and as will be seen from Fig. 1, that twenty-four hours are always represented by the links in the opening, that is, from twelve o'clock midnight to twelve o'clock midnight and that the chain is provided with two hundred and eighty-eight links which allow for three days' time.

It will be understood that the indicator is adapted to be intermittently actuated and in such a manner that at each movement the distance of one divisional line is moved, that is to say, referring to Fig. 4, that where the link with 11:00 thereon appears, over the divisional line to the left of the figure that the indicator will be moved so that the link with the numeral 15 thereon will be

moved to a position over the said line and each of the succeeding links will be moved the distance of one line, and it is necessary to properly actuate the chain in order that this movement results and to move the chain or indicator at the proper time with respect to the movement of the hands of the clock 1. To accomplish this result I have mounted the drum 57 upon a shaft 60 suitably supported and which has one end of a spring 61 connected therewith, the opposite end of which is connected with a barrel 62 which is provided with a gear 63 which meshes with a gear 64 carried on a pin 65 which is in suitable connection with a handle 66 for rotating the same, said pin 65 having suitably connected therewith a ratchet 67, the teeth of which engage a pawl 68, to prevent improper return movement of the pin 65, it being understood that by the proper rotation of the handle 66 the pin 65 is rotated which thus rotates the gear 64 and so rotates the barrel 62 in order to wind up the spring 61 which will thus impart motion through the shaft 60 at the proper time, to the drum 57, in order to rotate the same and so move the indicator 54.

In order to provide an even rotation to the drum 57 and thus to the indicator 54 and further in order to control the rotation of the drum 57, starting and stopping the same at the proper time, I provide a beveled gear 69 which meshes with a beveled gear 70 on said drum 57, said beveled gear 69 being mounted on a shaft 71 which carries a gear 72 which is in suitable connection with a train of gears between it and the governor shaft 46.

In the present instance I have shown the gear 72 meshing with the gear 73 which is in mesh with the gear 74 which meshes with gear 75, said gear 75 meshing with the large gear 76, which gear meshes with a gear 77 which is carried on the plate shaft 49. Also meshing with the gear 76 is a small gear 78 carried by a gear 79 which meshes with a small gear 80 carried by a gear 81 which meshes with a small gear 82 carried by the gear 83 which meshes with the gear 84 which is mounted on the governor shaft 46. 85 designates a governor which may be of any suitable style or arrangement and which is mounted on said shaft 46. From this it will be understood that while the governor shaft 46 is prevented from rotation by means of the mechanism previously described, no motion is imparted to the train of gears nor to the indicator 54. As there is a steady tension on the train of gears due to the spring 61, the drum 57 will immediately be rotated when the pawl 30 releases the governor shaft 46 and will continue to rotate until the pawl 30 again locks in one of the arms 45 and so stops rotation of the governor shaft 46, whereby it will be seen

that intermittent motion, every fifteen minutes, in the present instance, will be imparted to the indicator 54 and the same will be moved the distance of one division on the chart at each actuation thereof, in order to properly indicate the time at one of the division lines corresponding to the time on the clock.

It will be understood that one revolution of the minute shaft 3 represents an hour and that the four cams thereon represent the movement or the actuation of the indicator four times every hour or every fifteen minutes.

From the above it will be seen that I provide the indicator with means for actuating the same and connections between the indicator and the governor shaft in order that the said indicator will be actuated at the proper time in order to move the links carrying the numerals into the proper position to indicate the time of the places on the table or chart beneath the same or in line therewith corresponding to the local time.

86 designates a winding stem which is in suitable connection with the springs 12 of the clock, said stem as best understood from Fig. 4 extending completely across the machine in order that the clock may be wound from the rear.

I desire further to call attention to the construction of the idlers 38 and of the drum 57, in which the portion of the same engaged by the indicator or chain being octagonal and being provided with grooves or recesses 87, at suitable points therearound, in order to receive the extending portions 88 of the indicator 54, which in portions, in the present instance, form the connections between the various links, it being understood that by this means the indicator is actuated by the drum 57 and is always maintained in proper position as it passes around the various idlers.

It will be noted more particularly from Fig. 7 that the portions 88, extend equally each side of the links or, in other words, each link extends centrally from its joint.

In the construction shown in Fig. 16, I have shown a preferred form or one manner in which I can arrange the plates, forming the indicator, in order to show the difference thereon between the night and day time.

Referring to Fig. 1 it will be understood that the opening 55 permits a full day to appear on the indicator and that the indicator is there placed in position to show from twelve o'clock midnight to twelve o'clock midnight. In order to have a uniformity of arrangement of the plates I have provided that from six o'clock in the morning to six o'clock at night shall be considered day hours and that from six o'clock at night to six o'clock in the morning shall be

considered night hours. The plates having the time indications from six o'clock in the morning to six o'clock at night I have shown with a white background and the others from six o'clock at night to six o'clock in the morning I have shown with a blue background so that it will be very easy to read the hour. I have also arranged that the hour numerals are in red and the minute numerals in black in order to make a clear distinction between the same and so that the time can be easily determined.

The operation of the device is as follows: The clock having been wound and the spring 61 having been properly wound by the actuation of the handle 66 the parts are ready for movement, it being understood that the position of the indicator (and the links composing the same) is properly placed or adjusted in order to correspond to the local time indicated on the clock, for example, referring to Fig. 1, it will be understood that if it is seven o'clock a. m. by the local Philadelphia clock 1 the link having seven thereon will be on the divisional line of the chart on which, say Philadelphia is situated, when the times at the other places will be automatically and properly indicated by the numerals on the links of the indicator, for example, if it is seven o'clock a. m. in Philadelphia and it is desired to know the time at London by following up the line on which London is indicated it will be seen that it is twelve o'clock noon there and the time of any other place on the chart will also be correctly and synchronously indicated.

It will be understood that the governor shaft 46 is held against rotation by the pawl 30, the parts being in the position seen in Fig. 9 and that as the clock 1 continues in its movement the minute hand shaft 3 is rotated, carrying with it the star wheel and causing one of the cams thereof to elevate the lever 25 which raises the bar 26 elevating the pawl 30 to release the arms 45, at the same time moves the end of the stop 40 from its position to prevent the upward movement of the pawl 30, and, at the same time, forcing over the lever 33 by reason of its connection with the lever 32 and causing the notch 35 to be engaged by the tooth 37 so that the lever 33, the lever 32 and pawl 30 will be held in elevated position with the latter out of the path of movement of the arms 45. When the end of one of the cams is reached the bar 26 falls and will be drawn down by the springs connected therewith, immediately upon which the governor shaft 46 is released and is permitted to rotate by reason of the tension of the spring 61 on the train of gears in connection with the governor shaft and the drum 57 is immediately caused to rotate and move the indicator 54 so that a link is moved from one

divisional line to the next, at which time the mechanism operates to stop the further movement of the indicator for a certain time when it is again actuated as previously described.

It will be understood that at the same time the governor shaft 46 is rotated the plate shaft 49 will also be rotated by reason of the train of gearing between the same. This will carry with it the plate 50 and will elevate the dog 52 causing the extension 53 on the dog to engage with the notch 34 on the lever 32 and at the same time elevating the said lever 33 and removing the notch 35 from engagement with the tooth 37. The pawl 30 will be held, however, in elevated position until a complete revolution of the plate 50 occurs, since the dog 52 being in engagement with the edge of said plate will be held in elevated position, until it again enters the recess 51, in said plate, immediately upon which the lever 33 is released and permits the pawl 30 to fall to engage again with one of the arms 45 on the governor shaft 46 and thus stopping rotation thereof. By this means it will be seen that the indicator is moved every fifteen minutes at the proper time with respect to the movement of the hands of the clock and is controlled by the clock mechanism while the actuation thereof occurs through the medium of the spring motor.

As previously stated, it may be necessary to set the clock from the back and applicant has provided the structure more particularly seen in Fig. 14 for this purpose, since it would be impossible in some instances to have access to the front or face of the clock. By grasping the handle 3* on the shaft 3 the said shaft can be moved in the direction indicated by the arrow in Fig. 14 a suitable distance to release the pins 14 from engagement with the openings in the disk 15 at which time it will be seen that the shaft 3 is disengaged from the hollow shaft 10 which is in suitable connection with the springs of the clock, and the said shaft 3 can be independently rotated by hand to set the clock. As the shaft 3 is moved over, the groove 21 therein is brought into line with the pin 22 which immediately enters the same and prevents rotation of the shaft 3 until the rod 22 is removed from said groove 21 at which time the pins 14 will again engage with three of the openings in the disk 15 so that the shaft 3 will again be locked with respect to the hollow shaft 10 and so to the clock mechanism and will be actuated thereby.

From the above it will be seen that I employ an ordinary clock face adjacent to the chart and show on its dial twelve hours, which being of usual construction can easily be read by the observer.

I also desire to call attention to the use

of a divisional table, plan or chart by which I can show thereon every important city properly located as to time position that touches or comes near any divisional line, whereby I can thus easily group all the big cities in the United States and in Europe etc., while if I employ a regular or true meridianally divided chart, plan or table with a map I could only show a few cities. By arranging the cities in groups alphabetically any city is easily located and its correct position as to international time located, so that the reading of the device is very simple to understand, involving no calculations, being all readable at a glance, and impossible of misinterpretation.

It will of course be understood that if desired I can employ a true outline map of the world on the chart without alphabetical arrangement of names but with the places in their true geographical position. By this method I could not provide as many names on the chart and it would further need a knowledge of geography to locate the names whereas by the alphabetical arrangement of the names, as previously set forth, it is only necessary to know how to read. Thus at any time one may look, local time can be seen by the ordinary clock on top and any leading city's time throughout the world by locating that city on the chart and following the divisional line nearest it, at the top of which on the indicator will be shown the correct time in that city.

The indicator may be subdivided as desired although I have shown, in the present instance, the quarter hours and also by shading the night and day hours. The spaces between the divisional lines as shown may be further subdivided if desired.

It will be further understood that it is only necessary to have the local time on the divisional chart to correspond with the time on the ordinary clock and as the clock and the indicator travel properly with respect to each other the time of practically the world or the whole twenty-four hours will be shown correctly at any point and continuously at any time it may be inspected, the daylight hours and the night hours being clearly distinguished by the shadings on the background of the indicator.

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

1. In a device of the character stated, a clock, a chart adjacent the clock and having suitable subdivisions thereon, an indicator having notations on the face thereof, means for actuating said indicator, a governor shaft, a train of gears between said governor shaft and said actuating means, a pawl normally adapted to prevent rotation of said governor shaft, a minute hand shaft, a star wheel thereon, and means actuated by

said star wheel for raising said pawl to release the said governor shaft whereby the same is free and permits rotation of said indicator actuating means.

2. In a device of the character stated, a clock, a chart adjacent the clock and having suitable subdivisions thereon, an indicator formed of a plurality of links suitably connected and having notations on the face thereof, means for actuating said indicator, a governor shaft, a train of gears between said governor shaft and said actuating means, a pawl normally adapted to prevent rotation of said governor shaft, a minute hand shaft, a star wheel thereon, and means actuated by said star wheel for raising said pawl to release the said governor shaft whereby the same is free and permits rotation of said indicator actuating means.

3. In a device of the character stated, a clock, a chart adjacent the clock and having suitable subdivisions thereon, an indicator formed of a plurality of links suitably connected and having notations on the face thereof, means for actuating said indicator, a governor shaft, a train of gears between said governor shaft and said actuating means, a pawl normally adapted to prevent rotation of said governor shaft, a minute hand shaft, a star wheel thereon, means actuated by said star wheel for raising said pawl to release the said governor shaft whereby the same is freed and permits rotation of said indicator actuating means, and means for holding said pawl in elevated position for a predetermined time.

4. In a device of the character stated, a clock, a chart adjacent thereto having subdivisions thereon and having an opening in its face, an indicator movably supported and passing said opening, said indicator being formed of a plurality of links suitably connected having numerals thereon indicating time, means for actuating said indicator, a governor shaft, a connection between said governor shaft and said indicator whereby the governor shaft controls said actuating means, a pawl adapted to prevent rotation of said governor shaft in a certain position, a minute hand shaft, a star wheel thereon, means actuated by said star wheel for elevating said pawl and releasing the governor shaft, a stop for preventing improper movement of said pawl, and means for returning said pawl to position to again engage with said governor shaft to prevent rotation thereof.

5. In a device of the character stated, a clock, a chart adjacent said clock having suitable subdivisions thereon and provided with a laterally extending opening, an indicator movably mounted and supported and adapted to pass said opening, said indicator being formed of a plurality of links having numerals thereon, means for actuating said

indicator, a governor shaft, a connection between said governor shaft and said actuating means whereby the governor shaft controls said actuating means, a pawl for engagement with said governor shaft to prevent rotation thereof, a minute hand shaft, a star wheel thereon, means in engagement with said star wheel for elevating said pawl and releasing the governor shaft, means for holding said pawl in elevated position a predetermined time, and means for releasing said pawl whereby the same returns to its normal position to again engage with said shaft.

6. In a device of the character stated, a clock, a chart adjacent said clock having suitable subdivisions thereon and provided with a laterally extending opening, an indicator movably supported and adapted to pass said opening, said indicator being provided with a plurality of links having numerals thereon, means for actuating said indicator, a governor shaft, a connection between said governor shaft and said actuating means, a pawl for engagement with said governor shaft to prevent rotation thereof, a minute hand shaft for the clock, a star wheel thereon, a lever adapted to be raised by said star wheel at predetermined intervals and allowed to fall, a bar actuated by said lever and adapted to engage with said pawl for elevating the said bar and releasing the governor shaft, a notched lever in suitable connection with said pawl, means for engaging said notched lever when said pawl is elevated for holding the same in elevated position a predetermined time, and means for releasing said pawl whereby the same returns to its normal position to again engage with said shaft.

7. In a device of the character stated, a clock, a chart adjacent said clock, having suitable subdivisions thereon and provided with a laterally extending opening, an indicator movably supported and adapted to pass said opening, said opening being provided with a plurality of links having numerals thereon, means for actuating said indicator, a governor shaft, a connection between said governor shaft and said actuating means, a pawl for engagement with said governor shaft to prevent rotation thereof, a minute hand shaft for the clock, a star wheel thereon, a lever adapted to be raised by said star wheel at predetermined intervals and allowed to fall, a bar actuated by said lever and adapted to engage with said pawl for elevating the same and releasing the governor shaft, a notched lever in suitable connection with said pawl, means for engaging said notched lever when said pawl is elevated for holding the same in elevated position a predetermined time, a plate adapted to be rotated when the governor shaft is released, said plate having a recess therein,

and a dog normally seated in said recess and adapted to be elevated to release said notched lever and to hold the same in elevated position a predetermined time.

8. In a device of the character stated, a clock, a minute hand shaft therefor slidably mounted in the clock frame, means in suitable connection with said minute shaft for actuating the hour hand, and means adapted to be connected and disconnected from said minute hand shaft, said means being actuated by the clock mechanism.

9. In a device of the character stated, a minute hand shaft slidably mounted in the frame of the clock, connections between said minute hand shaft and the hour hand for properly actuating the latter, a hollow shaft through which the minute hand passes, connections between said hollow shaft and the clock mechanism for actuating the hollow shaft, and means for connecting the hollow shaft with said minute hand shaft.

10. In a device of the character stated, a minute hand shaft slidably mounted in the frame of the clock, connections between said minute hand shaft and the hour hand for properly actuating the latter, a hollow shaft through which the minute hand passes, connections between said hollow shaft and the clock mechanism for actuating the hollow shaft and engaging means, one of which is mounted on the hollow shaft and the other on the minute hand shaft, whereby the two shafts may be connected and disconnected.

11. In a device of the character stated, a minute hand shaft slidably mounted in the frame of the clock, connections between said minute hand shaft and the hour hand for properly actuating the latter, a hollow shaft through which the minute hand passes, connections between said hollow shaft and the clock mechanism for actuating the hollow shaft, a disk on said hollow shaft, a disk on said minute hand shaft, and means whereby said disks are caused to engage with each other in one position of the minute hand shaft.

12. In a device of the character stated, a minute hand shaft slidably mounted in the frame of the clock, connections between said minute hand shaft and the hour hand for properly actuating the latter, a hollow shaft through which the minute hand passes, connections between said hollow shaft and the clock mechanism for actuating the hollow shaft, a disk on said hollow shaft, a disk on said minute hand shaft, means whereby said disks are caused to engage with each other in one position of the minute hand shaft, and a spring for holding said minute hand shaft in the proper position and for returning the same thereto.

13. In a device of the character stated, a minute hand shaft slidably mounted in the frame of the clock, connections between said

minute hand shaft and the hour hand for properly actuating the latter, a hollow shaft through which the minute hand passes, connections between said hollow shaft and the clock mechanism for actuating the hollow shaft, a disk on said hollow shaft, a disk on said minute hand shaft, means whereby said disks are caused to engage with each other in one position of the minute hand shaft, a spring for holding said minute hand shaft in the proper position and for returning the same thereto, and means for holding said minute hand shaft in detached position from said hollow shaft.

14. In a device of the character stated, a minute hand shaft slidably mounted in the frame of the clock, connections between said minute hand shaft and the hour hand for properly actuating the latter, a hollow shaft through which the minute hand passes, connections between said hollow shaft and the clock mechanism for actuating the hollow shaft, a disk on said hollow shaft, a disk on said minute hand shaft, means whereby said disks are caused to engage with each other in one position of the minute hand shaft, a spring for holding said minute hand shaft in the proper position and for returning the same thereto, means for holding said minute hand shaft in detached position from said hollow shaft, a groove in said minute hand shaft, and a pin adapted to enter said groove when the minute hand shaft is moved to disengage the same from said hollow shaft.

15. In a device of the character stated, a clock train, a separate motor spring barrel, a drum concentric to said barrel and connected to the shaft of the barrel to be revolved with the same, an endless indicator belt around said drum, idlers around which said belt passes and arranged to present a section of the same to view, a train of gears connected to the drum to be driven from the same, and releasing and stopping mechanism intermediate said train and the clock-train and connected to the latter to be actuated at given intervals and to the former to intermittently release and again stop the same to actuate the indicator for a given interval.

16. In a device of the character stated, a chart having suitable subdivisions thereon and an opening transversely intersecting the latter, a clock train having its face presenting in a plane with such chart, a separate motor spring-barrel, journaled to revolve in a plane at right angles to that of the clock face, a drum upon the shaft of such barrel and in a plane with the opening in the chart, an endless indicator belt composed of links corresponding to the subdivisions and each having a time division marked thereon and passing around the drum, idlers around which the belt passes and arranged to present a section of the same through the opening, a train of gears connected to be driven

from the drum and arranged in a plane at a right angle to that of the drum and parallel with that of the clock train, and releasing and stopping mechanism intermediate said train and the clock-train and connected to the latter to be actuated at given intervals and to the former to intermittently release

and again stop the same to actuate the indicator belt for the space of one link.

JAMES D. LAW.

Witnesses:

WM. C. WIEDERSEIM,
C. D. McVAY.