

W. D. HAWLEY.

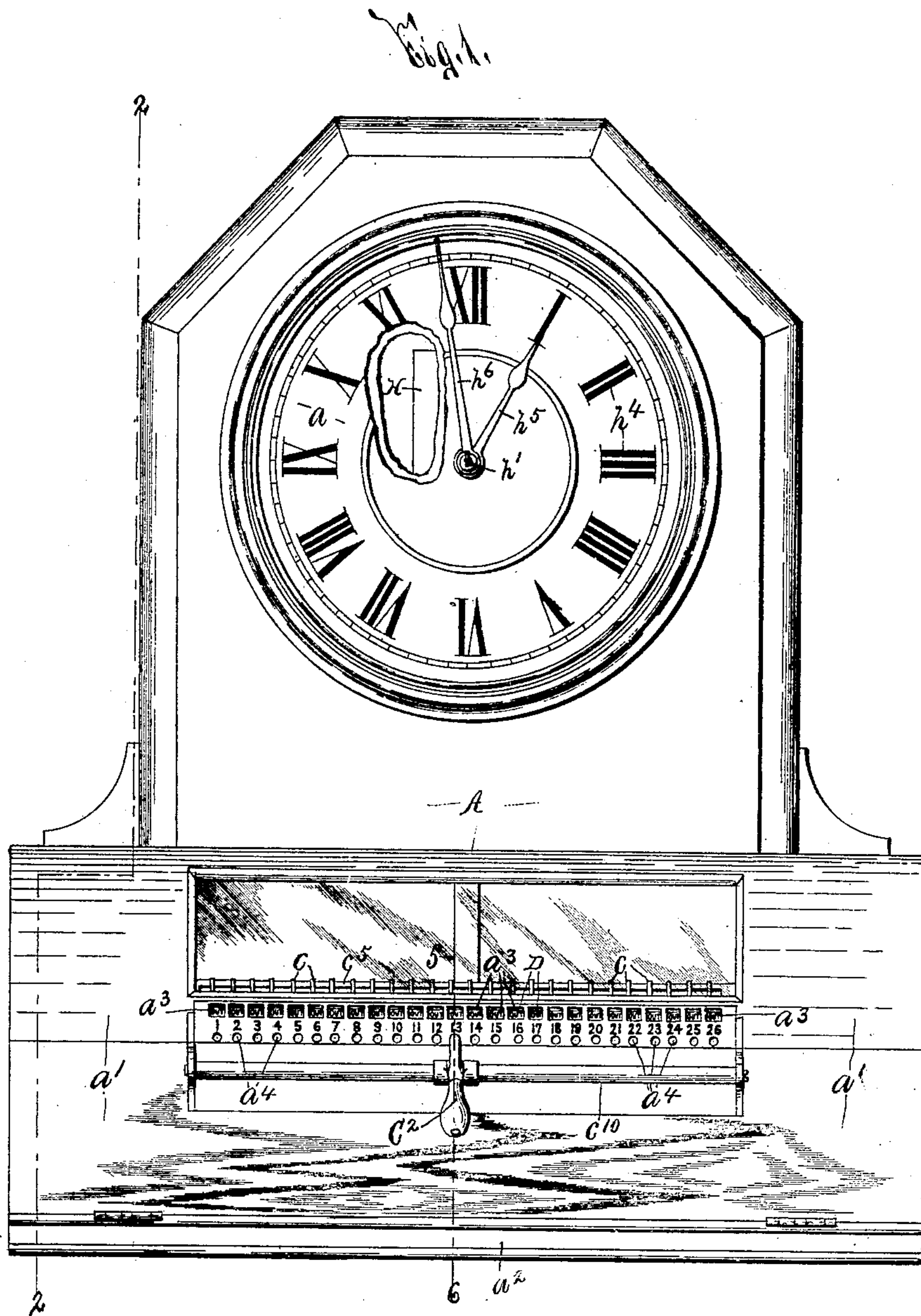
TIME RECORDER.

APPLICATION FILED DEC. 18, 1899. RENEWED NOV. 6, 1908.

969,370.

Patented Sept. 6, 1910.

8 SHEETS—SHEET 1.



WITNESSES:

*H. B. Chase,*  
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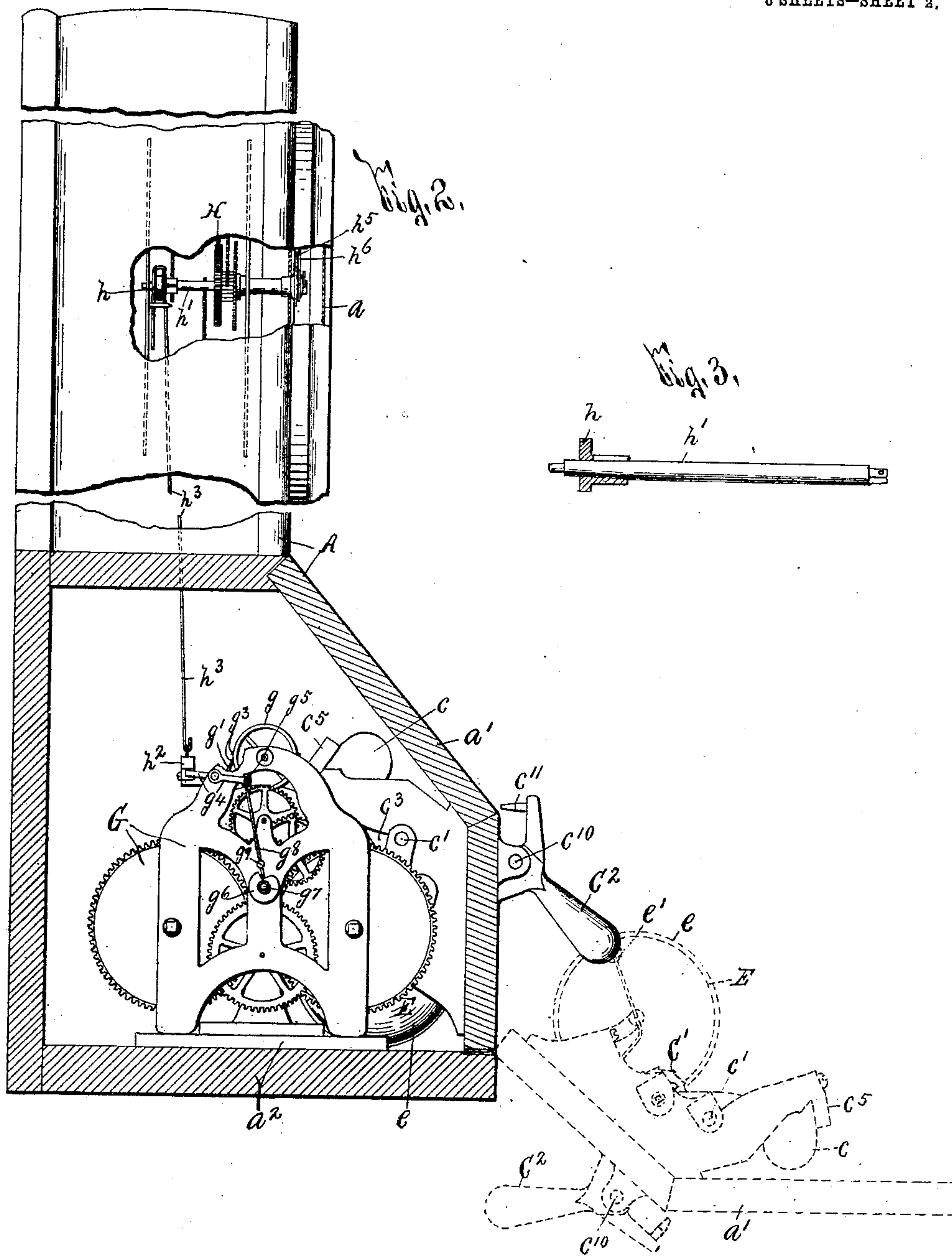
ATTORNEYS.

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8 SHEETS—SHEET 2.



**WITNESSES:**

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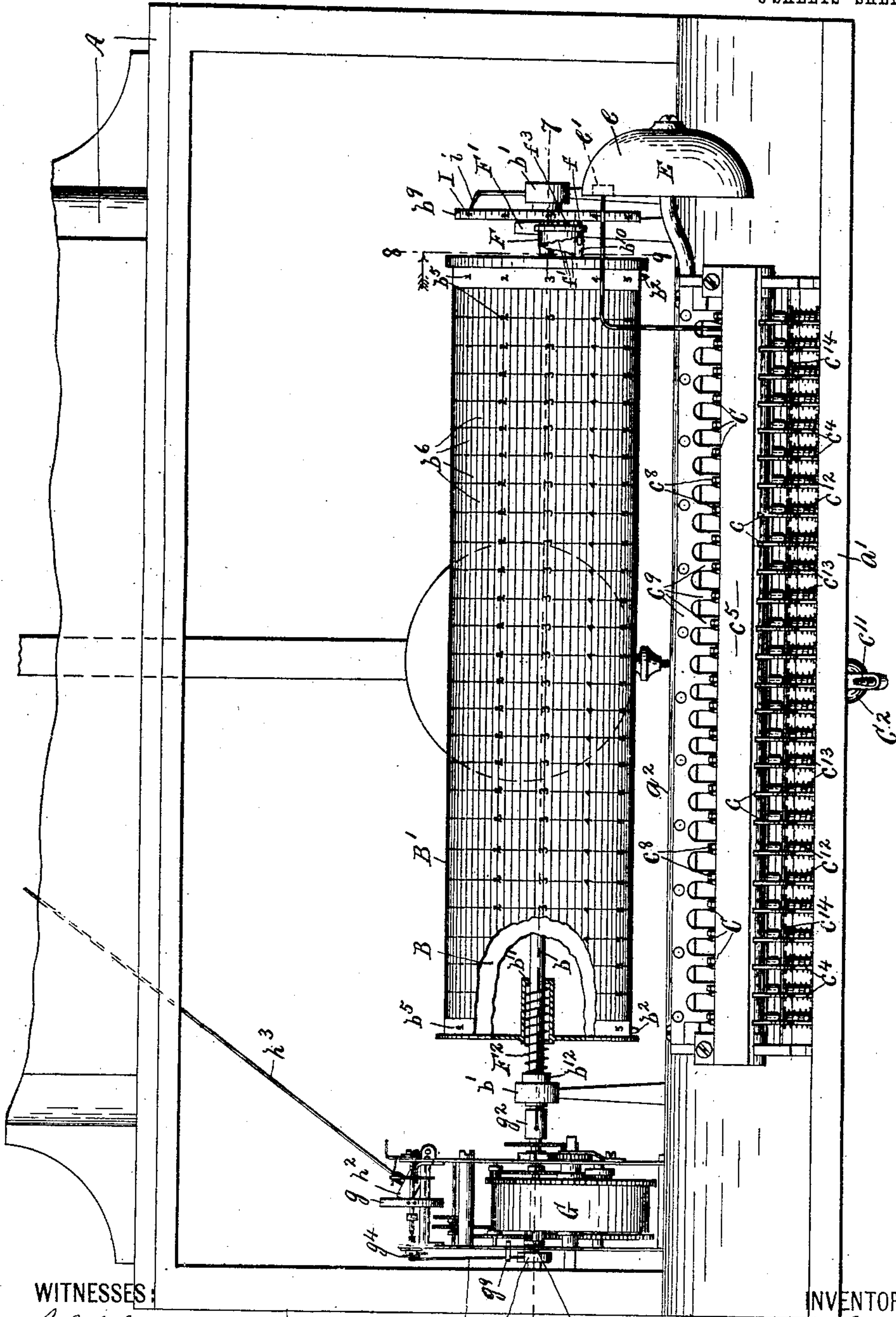
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8 SHEETS—SHEET 4.



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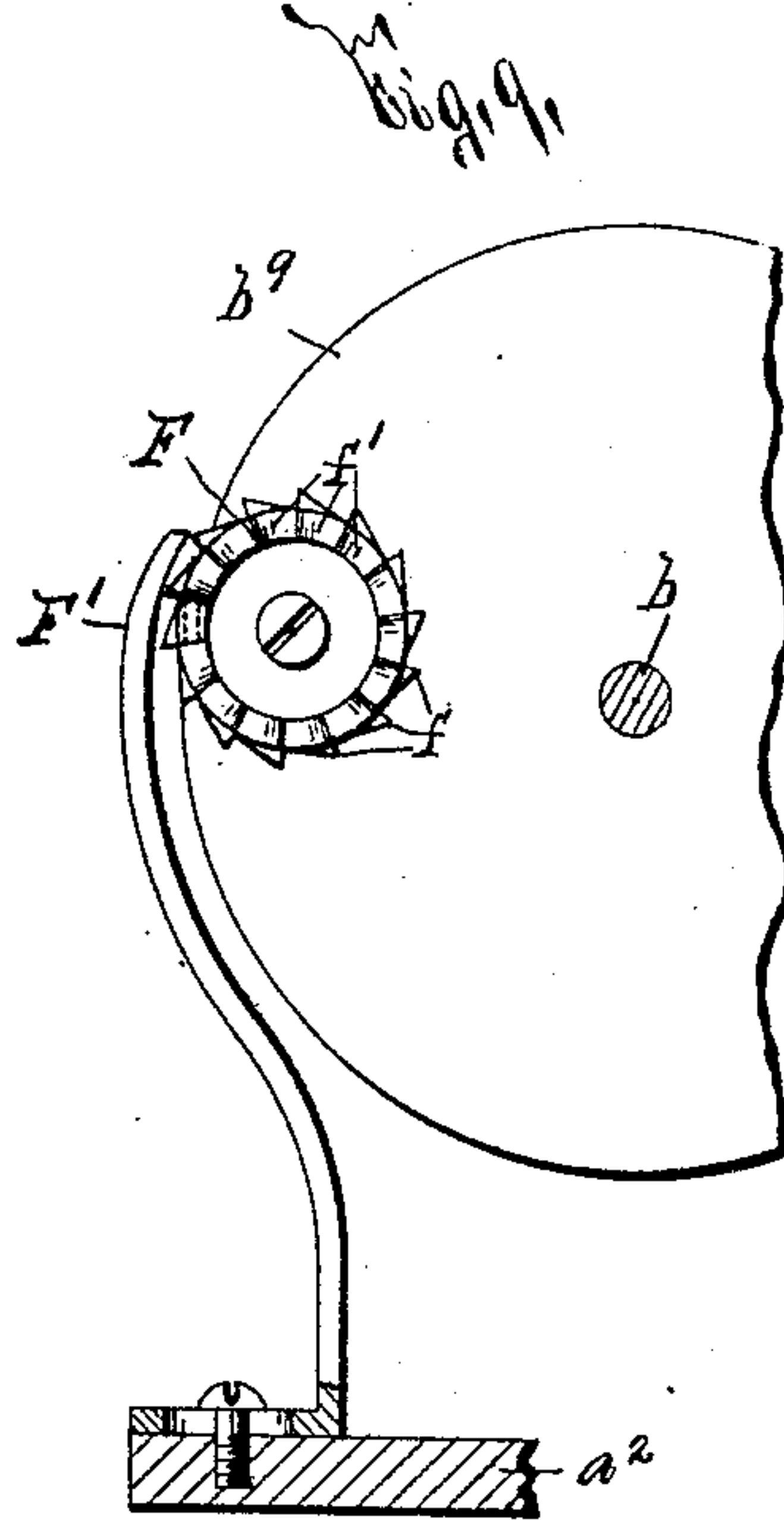
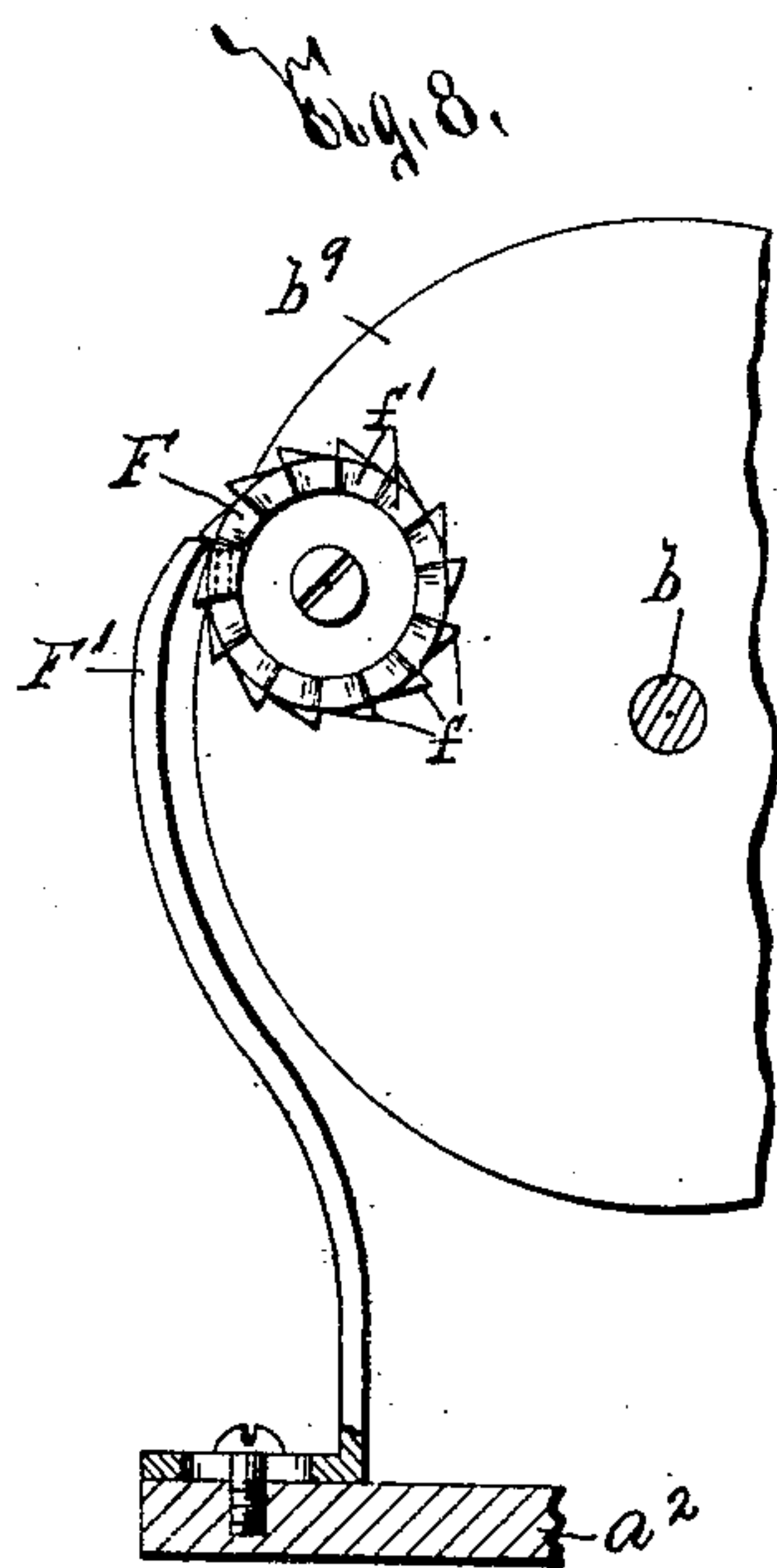
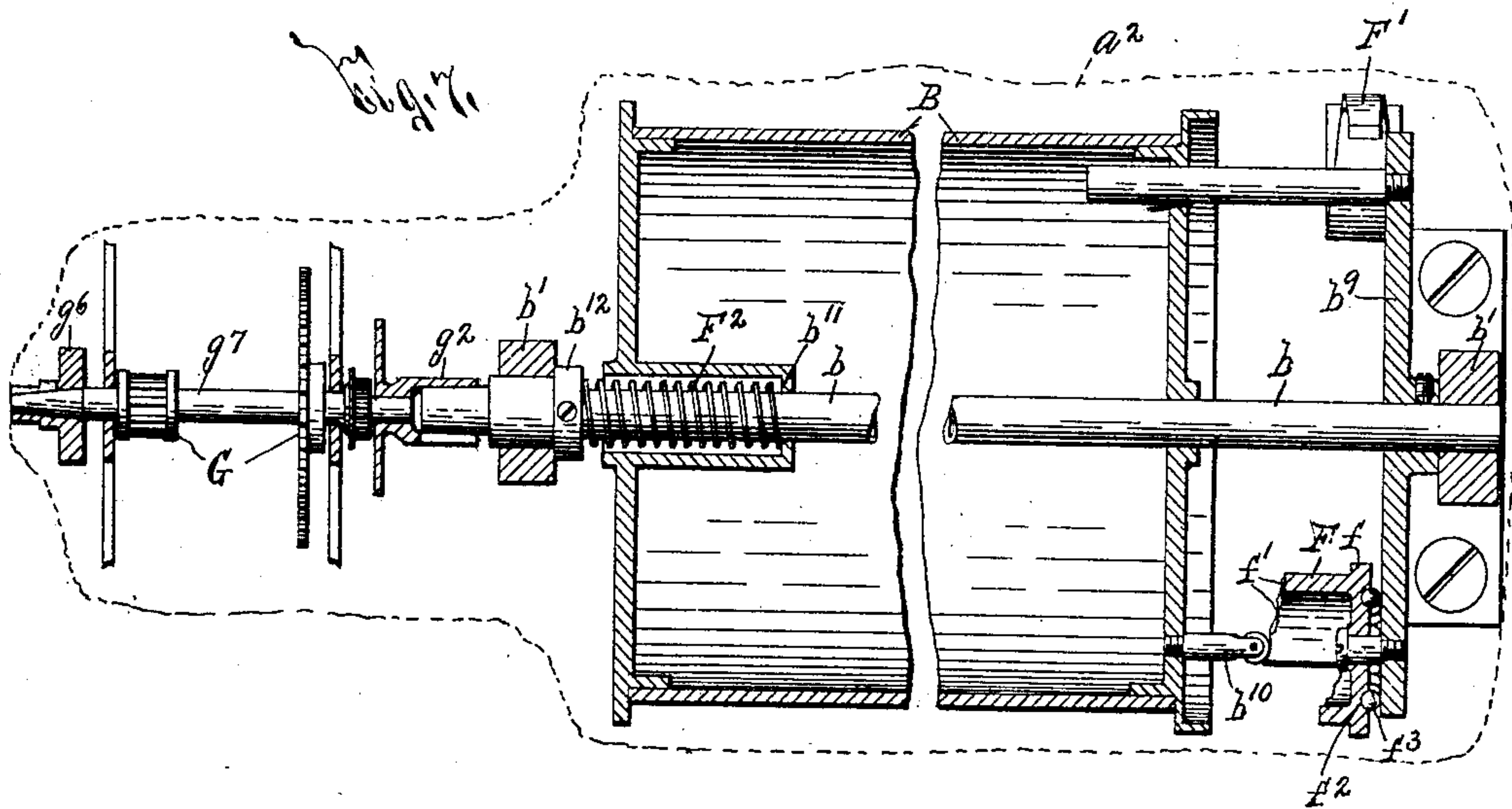
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WITNESSES:

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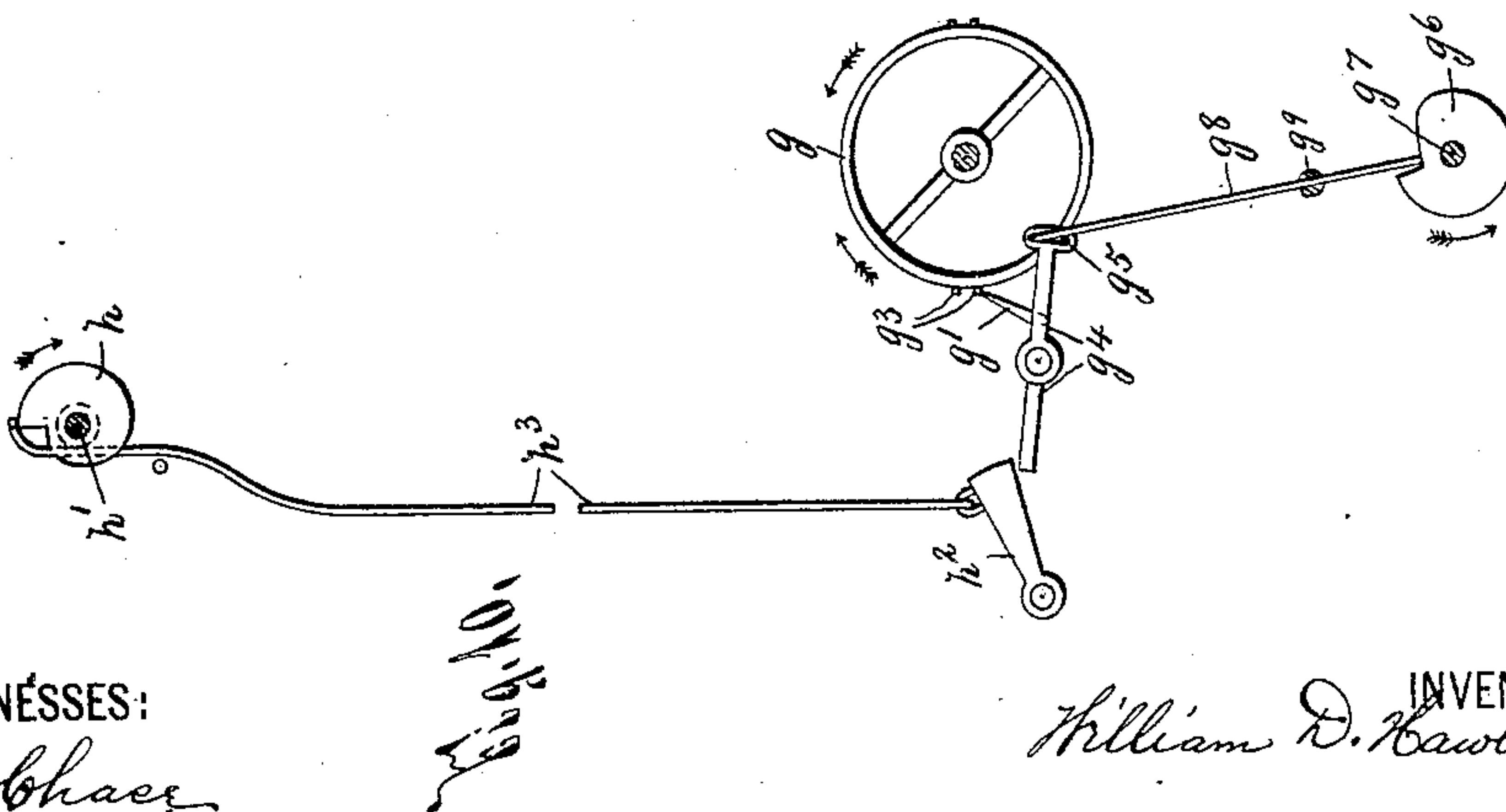
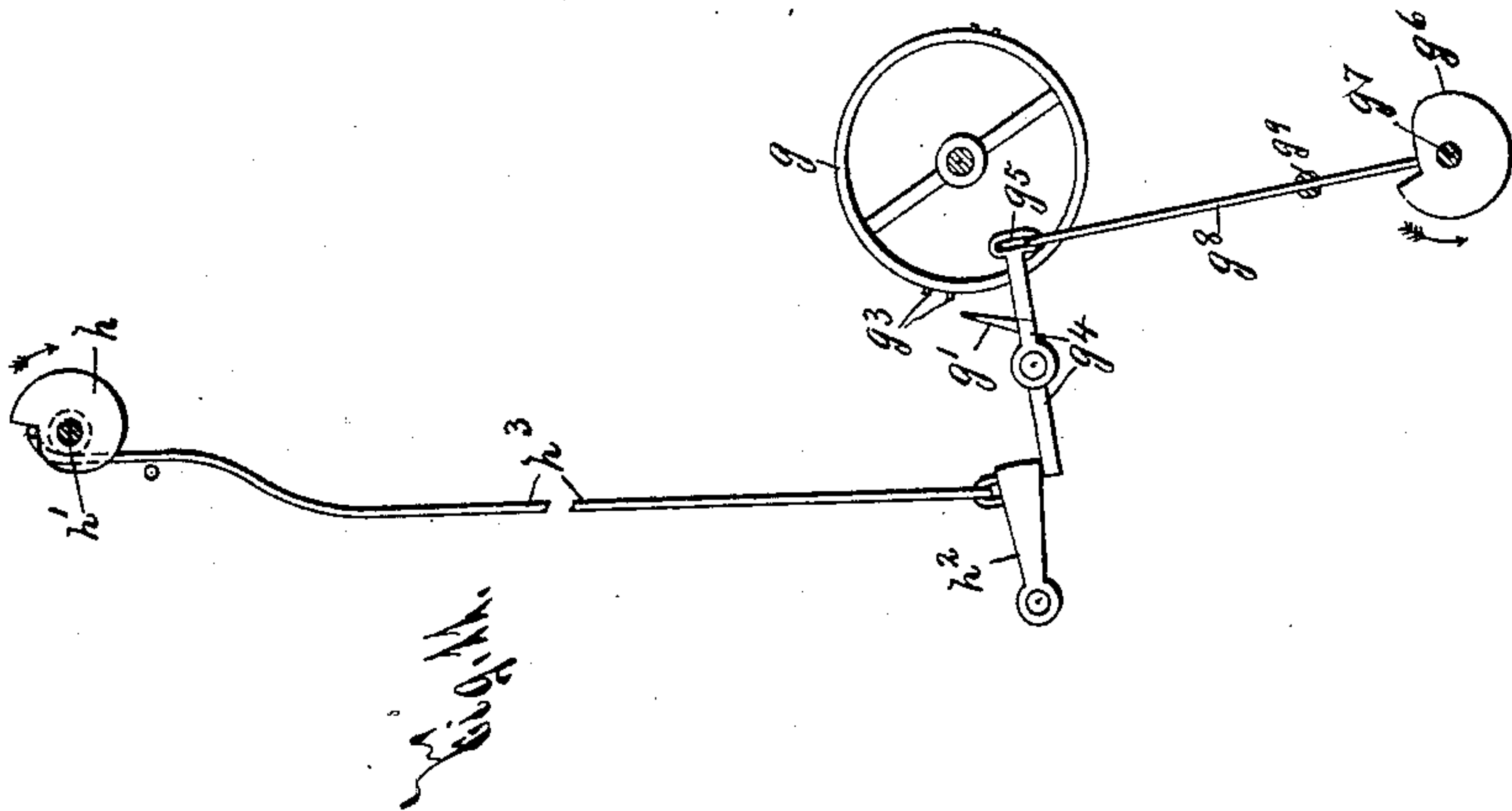
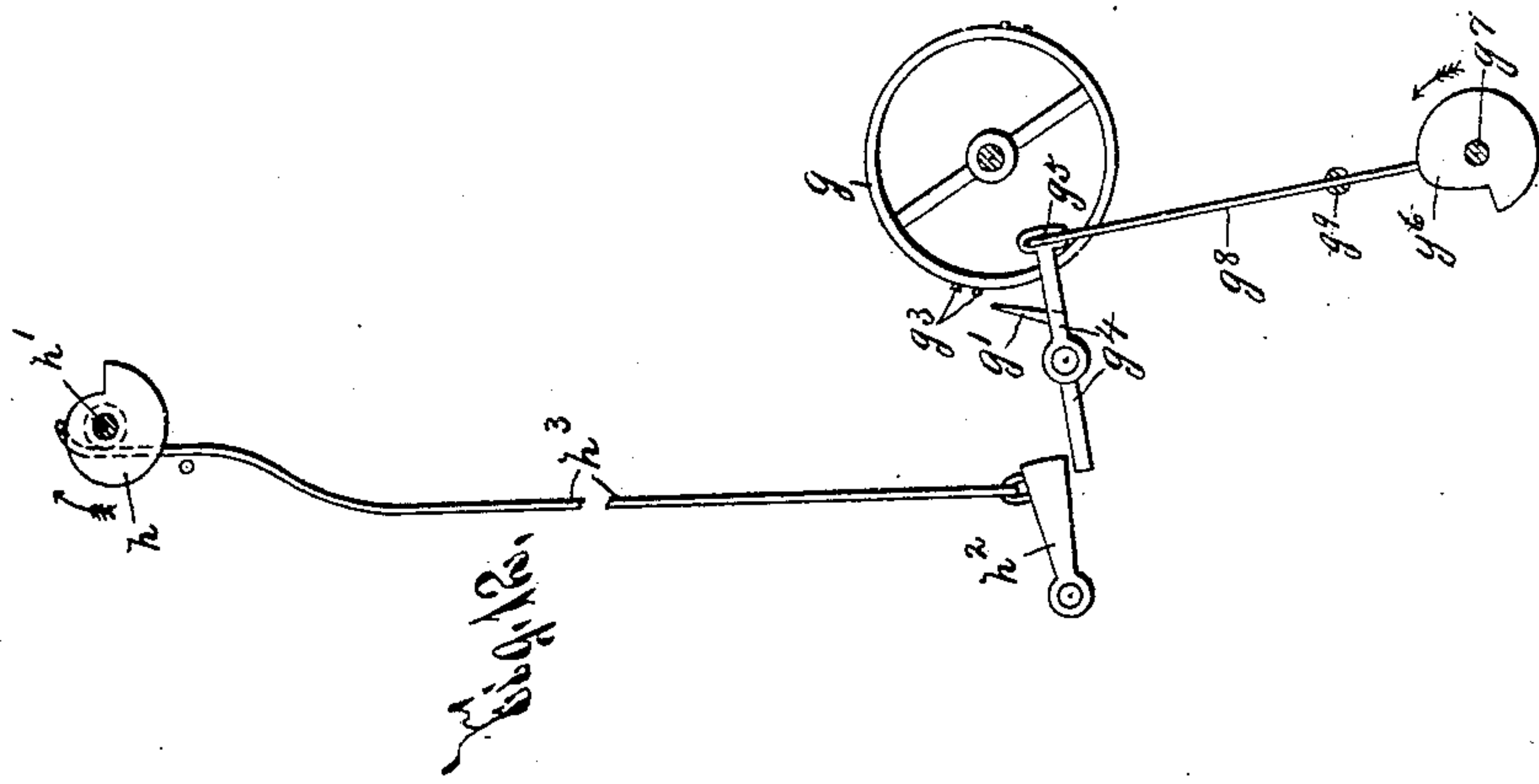
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8 SHEETS—SHEET 6.



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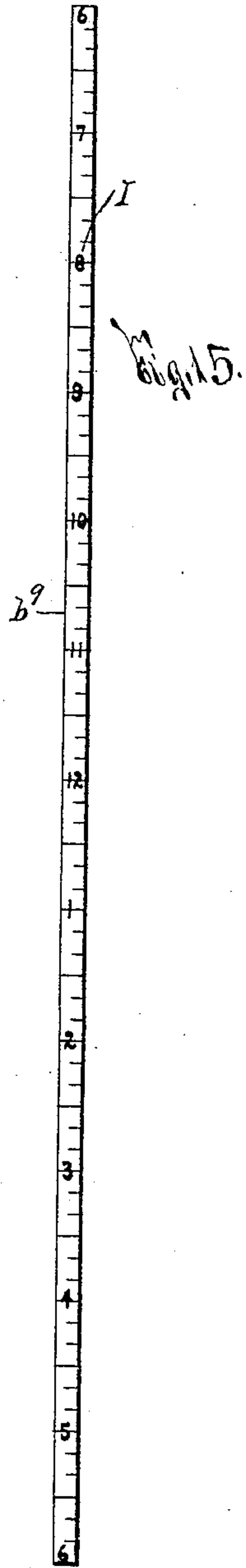
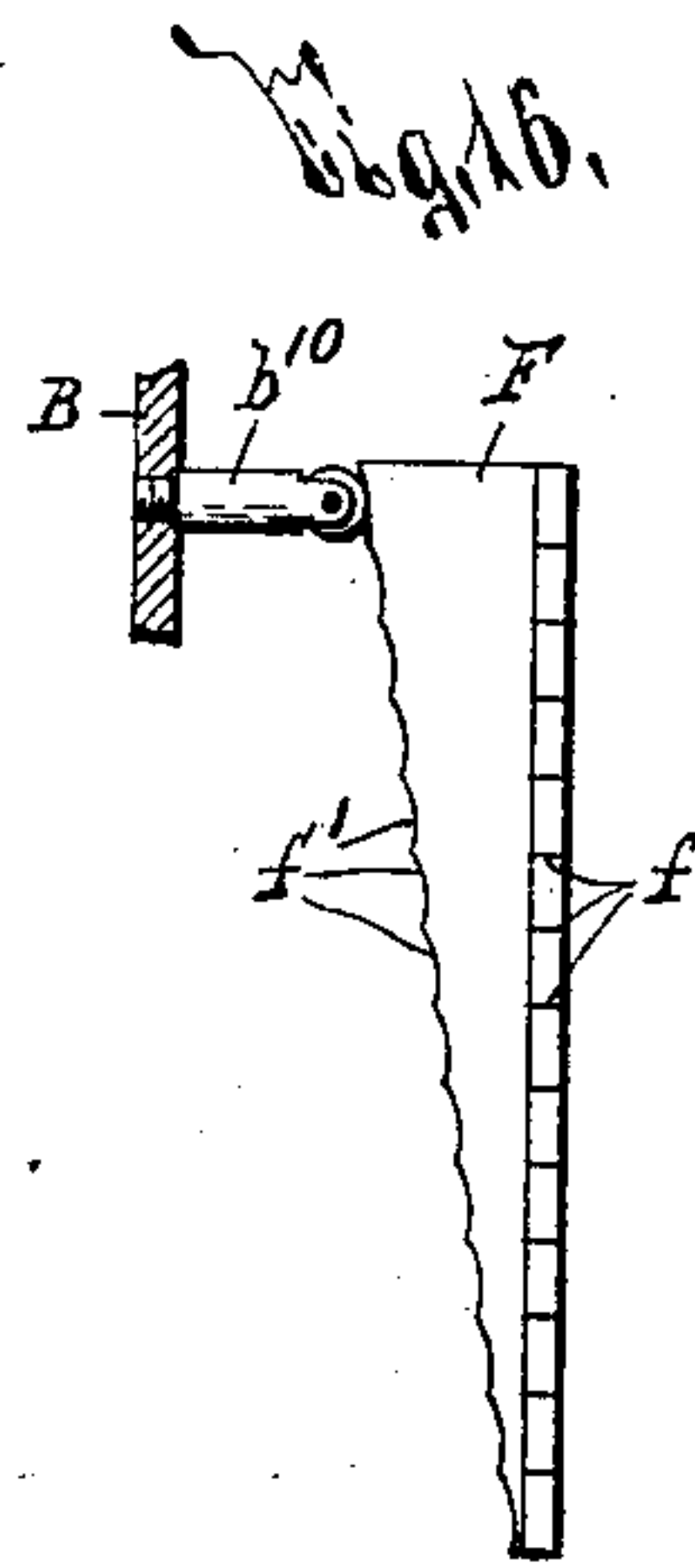
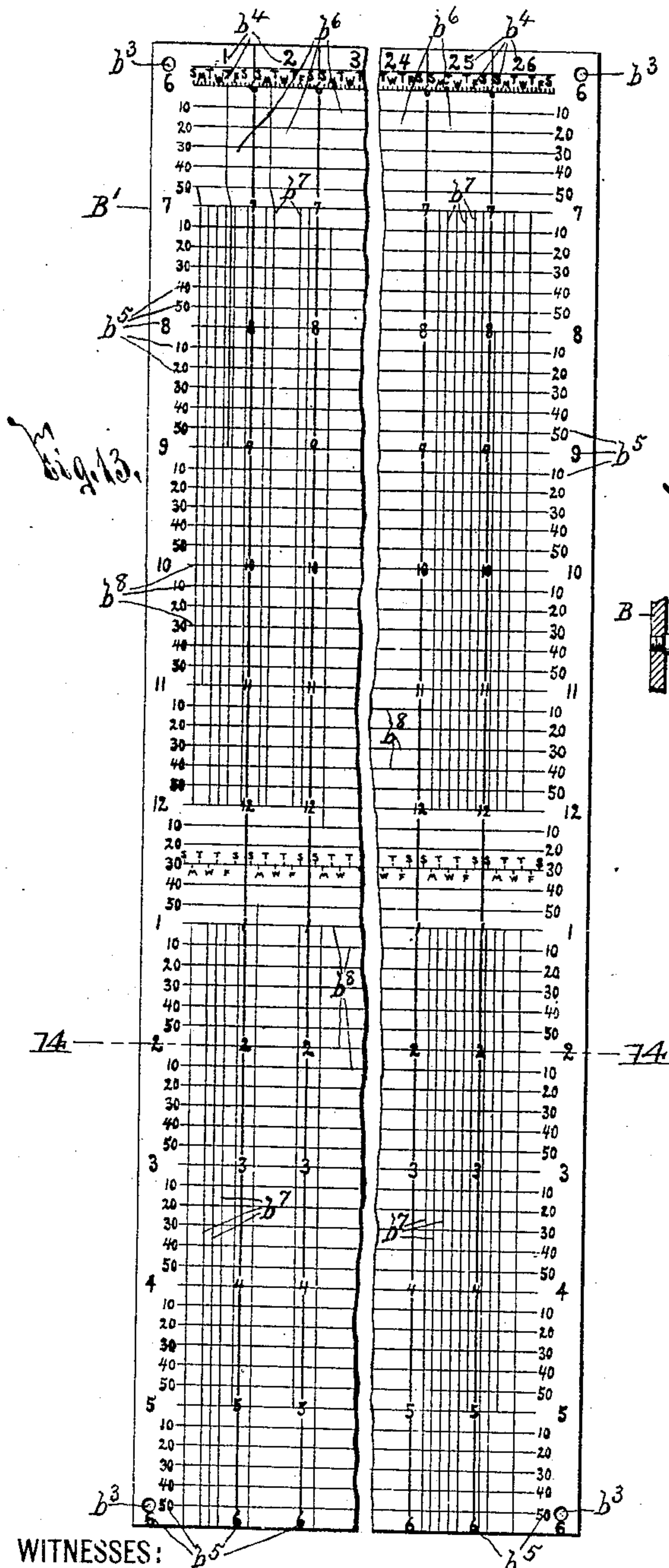
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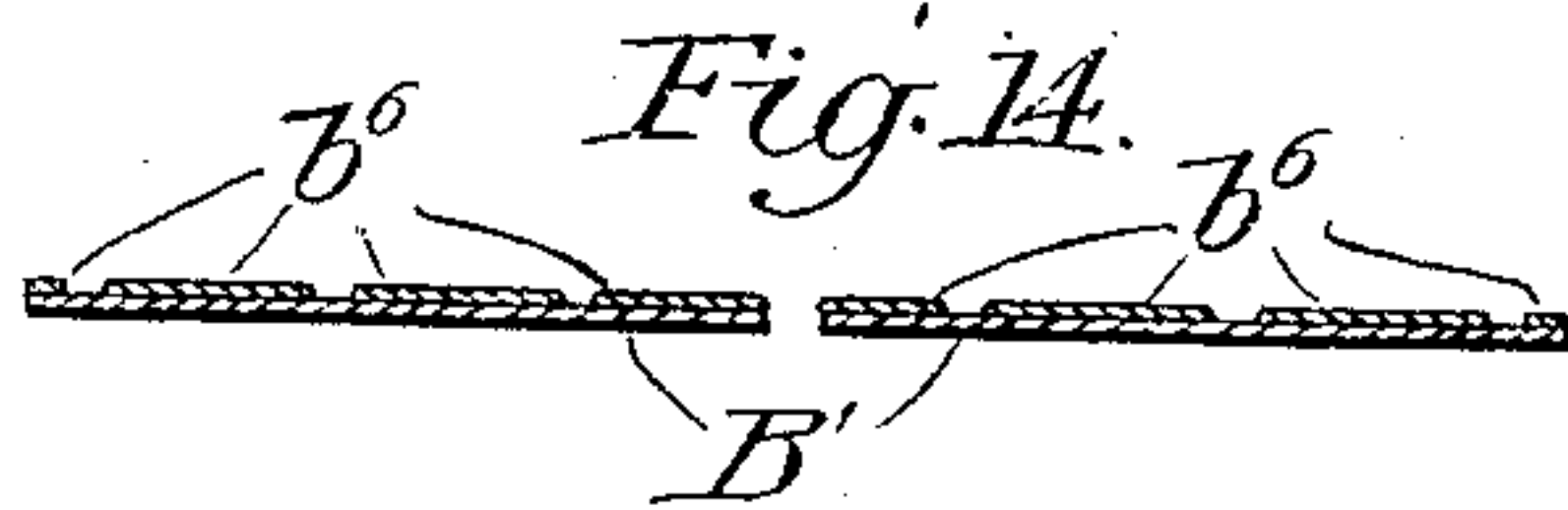
969,370.

Patented Sept. 6, 1910.

8 SHEETS—SHEET 7.



WITNESSES:  
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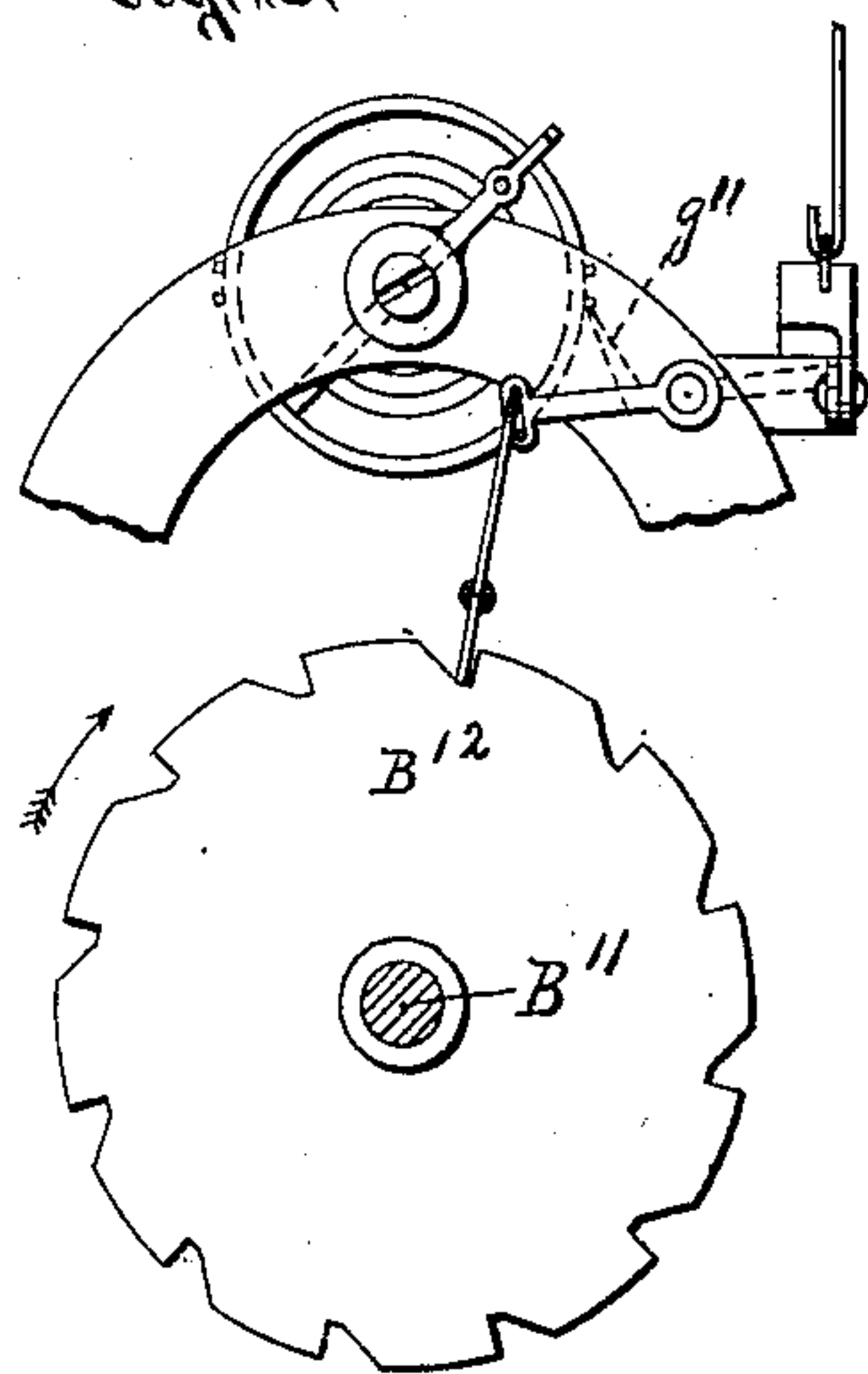
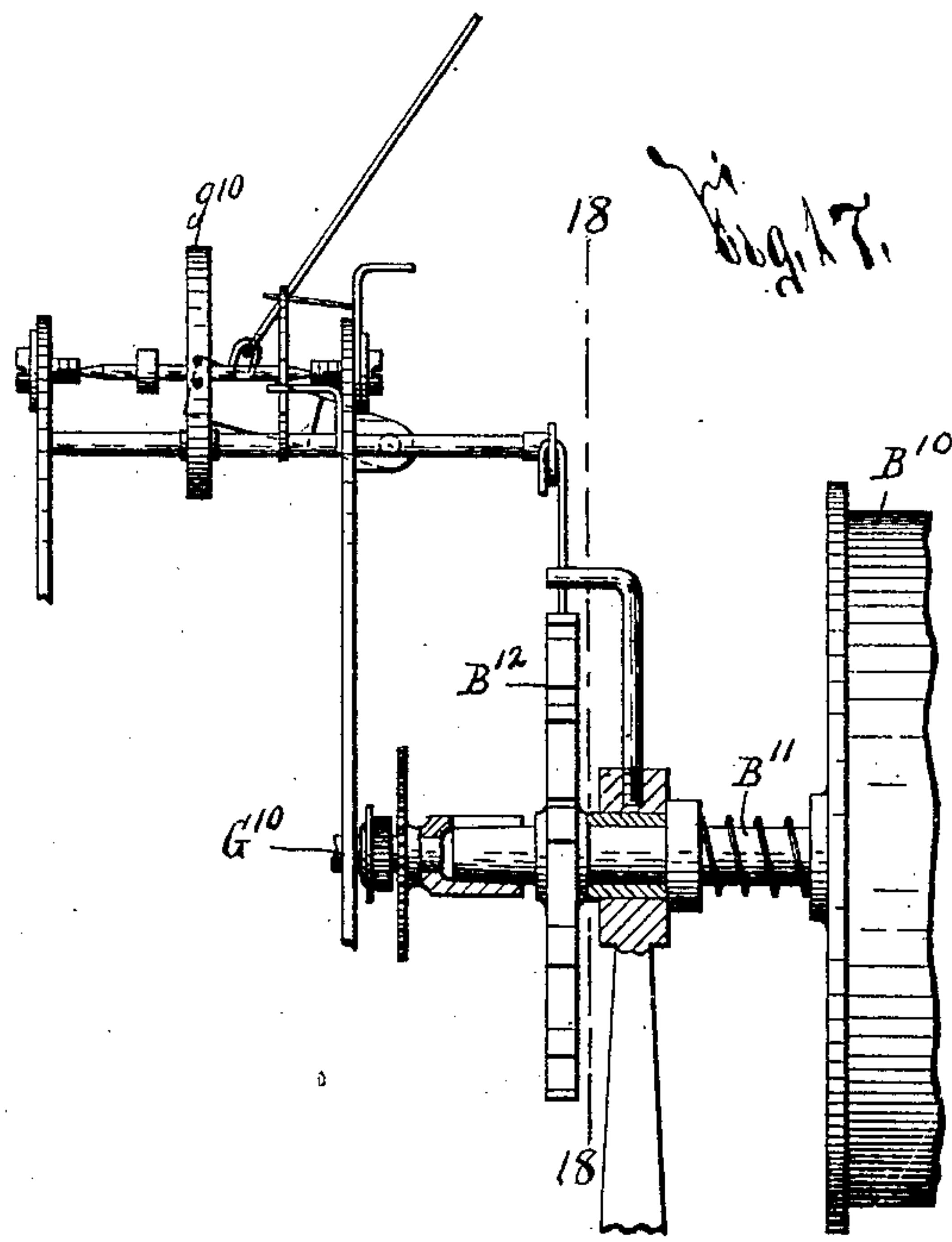
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8 SHEETS—SHEET 8.



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# UNITED STATES PATENT OFFICE.

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## TIME-RECORDER.

969,370.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed December 18, 1899, Serial No. 740,720. Renewed November 6, 1908. Serial No. 461,424.

*To all whom it may concern:*

Be it known that I, WILLIAM D. HAWLEY, of Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Time-Recorders, of which the following is a specification.

My invention relates to time-recorders, and has for its object the production of an apparatus for the desired purpose which is simple in construction, is particularly accurate, and forms a record which can be read with maximum rapidity and convenience; and to this end, it consists in the combination, construction and arrangement of the component parts of a time-recorder, as hereinafter fully described and pointed out in the claims.

In describing this invention, reference is had to the accompanying drawings, forming part of this specification, in which like letters indicate corresponding parts in all the views.

Figure 1 is a face view, partly broken away, of one embodiment of my time-recorder. Fig. 2 is an enlarged vertical sectional view, partly broken away and in elevation, taken on line 2—2, Fig. 1, the movable portion or door of the frame being shown in its normal position in full lines, and as opened or rocked backwardly in dotted lines. Fig. 3 is an elevation, partly in section, of the detached minute-hand shaft seen in Figs. 1 and 2. Fig. 4 is an enlarged face view, partly broken away and in section, of the lower part of my time-recorder, the movable portion or door of the frame being illustrated in its position indicated by dotted lines in Fig. 2. Figs. 5 and 6 are enlarged vertical sectional views, taken on line 5—6, Fig. 1, the marker being shown in its inoperative position in Fig. 5 and in its operative position in Fig. 6, and the hand-piece being illustrated in Fig. 6, as in its position assumed when actuating the marker. Fig. 7 is an enlarged horizontal sectional view, partly broken away and in elevation, taken on line 7—7, Fig. 4. Figs. 8 and 9 are enlarged vertical sectional views, taken on line 8—9, Fig. 4, looking in the direction indicated by the arrow, the movable cam for effecting the endwise movement of a support provided with record-receiving means, being shown in Fig. 8 as engaged with the stationary pawl cooperating therewith, and

being illustrated in Fig. 9 as advanced a single tooth or step from its position assumed in Fig. 8. Figs. 10, 11 and 12 are diagrammatic views illustrating means which controls the movement of the motor for rotating the support. Fig. 13 is a face view, partly broken away, of the detached record-receiving means provided on the support. Fig. 14 is a sectional view taken on line 14—14, Fig. 13. Fig. 15 is a face view of the scale or graduated surface for indicating the position of the revoluble support provided with the record-receiving means relatively to the markers and the clock-mechanism, said scale or graduated surface being shown as disposed in a flat plane. Fig. 16 is a detail face view, partly in section, of the arm provided upon said revoluble support and the movable cam cooperating with the arm to move the support endwise, said cam being shown as disposed in a flat plane. Fig. 17 is a detail elevation, partly in section, of portions of said support, the motor for revolving the support, and a modified means for controlling the movement of the motor. Fig. 18 is a sectional view, taken on line 18—18, Fig. 17.

The illustrated embodiment of my time-recorder consists essentially of a frame A, a support B provided with record-receiving means, a marker C, an indicator D, an alarm E, means for actuating the marker, indicator and alarm, means for moving the support B endwise, a motor G for rotating the support B, a clock-mechanism H, means for controlling the operation of the motor, and means for indicating the position of the support B relatively to the marker and the clock-mechanism. It will be obvious, however, to those skilled in the art, that one or more of said parts may be dispensed with, if desired.

The frame A is of any desirable form, size and construction, and is preferably provided with a transparent front portion *a* and a lower portion or door *a'* arranged beneath said transparent portion and hinged at its lower end for permitting said lower portion or door to move outwardly, as seen by dotted lines in Fig. 2.

The support B usually consists of a horizontal cylinder arranged at the rear of the lower portion or door *a'* and mounted on a revoluble shaft *b* which is journaled in bearings *b'* fixed to the base *a<sup>2</sup>* of the frame A.



Said support B is revolved on its longitudinal axis by any desirable means, as the motor G, hereinafter described, and supports record-receiving means consisting preferably of a record-sheet B' which is wound upon the periphery of the support B, is secured in position by any suitable fastening means, as peripheral projections or spurs  $b^2$  fixed to said support, and is provided with perforations  $b^3$  extending through inner and outer faces of the record-sheet, and with transverse and longitudinal series of indicating characters  $b^4$   $b^5$ , and longitudinal indicating surfaces  $b^6$  upon said outer face. The perforations  $b^3$  receive the projections or spurs  $b^2$  and may be dispensed with providing other fastening means is used for securing the record-receiving means or sheet to the support B. The transverse series of indicating characters  $b^4$  generally consists of consecutive numbers 1, 2, 3, &c., corresponding to the numbers designating the employees using my recorder, and the initials or letters, S, M, T, &c., one for each of the days of the week, all of said initials or letters being used in connection with each of said numbers 1, 2, 3, &c. Said longitudinal series of indicating characters  $b^5$  represents intervals of time and is here illustrated, as consisting of numbers as 6, 7, 8, &c., indicating twelve consecutive hours commencing with the sixth hour, and numbers, as 10, 20, 30, &c., representing the subdivisions of the hours. The indicating surfaces  $b^6$  Figs. 13 and 14, are arranged parallel with the longitudinal series of indicating characters  $b^5$ , as illustrated in Fig. 13, one directly beneath each of the numbers, 1, 2, 3, &c., of the transverse series of indicating characters  $b^4$ , and are usually formed of a coating of different color than the surface beneath said coating, as for instance, a black coating on a white surface, as disclosed in my divisional Patent, No. 680,145, dated Aug. 6, 1901, said coating being non-removable by handling and being removable in narrow lines by points, or other suitable marking surfaces provided on the markers C, presently described, and engaged with said indicating surfaces. A series of time-indicating lines  $b^7$ , Fig. 13, may thus be readily formed in the outer face of the record-sheet by the markers so as to extend substantially in alinement with the initials or letters, S, M, T, &c., between transverse planes on said record-sheet which may be alined with the numbers of the longitudinal series of indicating characters  $b^5$ , and may, if desired, be represented by lines  $b^8$  extending transversely across the record-sheet.

The marker C generally consists of a stylus which is provided with suitable means, as a point, for removing or scraping off a narrow line of the overlying coating or portion of one of the indicating surfaces  $b^6$  of the record-sheet B' from above the under-

lying surface of said sheet. Said marker C is actuated by any desirable means, presently described, and is here illustrated as fixed to a supporting part  $c$  which is loosely mounted on a pivotal bar  $c'$  arranged beneath the marker, and is formed with an extension or arm  $c^2$  depending beneath said pivotal bar, and with relatively fixed diverging arms  $c^3$   $c^4$  extending beyond opposite sides of the pivotal bar  $c'$ , one arm being extended above the bar  $c'$  and provided with the marker, and the other being provided with an indicator D, presently described. The pivotal bar  $c'$  is arranged substantially parallel with the support B and is supported by the movable portion or door  $a'$  of the frame A. Said arm provided with the marker C, is weighted for causing the marker to move automatically into engagement with the support B, and its free end is movable in a guide formed in a bar  $c^5$  arranged substantially parallel with the support B and the pivotal bar  $c'$ , and also supported by the movable portion or door  $a'$ . I preferably use a number of the markers C and a corresponding number of independently movable supporting parts  $c$  mounted on the pivotal bar  $c'$  and each provided with an indicator. It will be understood, however, that the markers may be unprovided with indicators, if desired.

The indicators D are each provided with characters for indicating the attendance and absence of the workmen and the engagement and non-engagement of the marker with the record-sheet, said characters usually consisting of the words "In" and "Out." The portions of the indicators D provided with said words are moved successively into alinement with perforations  $a^3$  in the movable portion or door  $a'$  of the frame A, so that when the marker is in its operative and inoperative positions, the words "In" and "Out" are respectively displayed through said perforations.

In the embodiment of my invention here illustrated, the means for actuating the markers also actuates the indicators D and is composed of independently movable actuating members  $C'$ , a hand-piece  $C^2$ , and means for transmitting motion to the actuating members  $C'$  from the hand-piece. Each of said actuating members  $C'$  preferably consists of a revoluble cam journaled beneath the axis of the corresponding supporting part  $c$  and provided with alternately arranged projections  $c^6$ , and depressions  $c^7$ , and with teeth  $c^8$ . The projections  $c^6$  are formed with engaging faces arranged substantially equidistant from the axis of said actuating members and movable successively in the same direction into and out of engagement with the extension or arm  $c^2$  of the corresponding supporting part  $c$  for holding the marker on said supporting part



in its inoperative position; and the depressions  $c^7$  which alternate with the projections  $c^6$  are successively registered with said extension or arm  $c^2$  for permitting the marker to automatically assume its operative position. Said depressions  $c^7$  are so constructed and arranged that from the time the extension or arm  $c^2$  is disengaged from one of the projections  $c^6$  at the commencement of the automatic movement of the supporting part  $c$ , said extension or arm  $c^2$  is not again engaged with the corresponding actuating member  $C'$  until after the supporting part is in its operative position and, consequently, the automatic movement of the supporting part to its operative position is unaffected by the actuating member. The teeth  $c^8$  are equal in number to the combined number of the projections and depressions  $c^6$   $c^7$ . Said actuating members  $C'$  are prevented from retrograde movement by a stop-bar  $c^9$ , Figs. 4, 5 and 6, which is arranged substantially parallel with the pivotal bar  $c'$  and is provided with independently movable spring arms or fingers engaged with the teeth  $c^8$ .

The hand-piece  $C^2$  consists of a rocking lever which is mounted on a pivotal bar or guide  $c^{10}$  arranged substantially parallel with the pivotal bar  $c^1$ , and is movable lengthwise of the pivotal bar  $c^{10}$ . Said hand-piece is provided with a projection  $c^{11}$  movable into a series of guides  $a^4$  arranged in the frame A beneath the perforations  $a^3$ . The means for transmitting motion to the actuating members  $C'$  from the hand-piece  $C^2$  is here illustrated as consisting of reciprocating plungers  $c^{12}$  having corresponding ends movable into and out of engagement with the teeth  $c^8$  and their opposite ends arranged in the path of movement of the projection  $c^{11}$  of the hand-piece  $C^2$ . Said plungers are forced to their normal positions by springs  $c^{13}$  having corresponding ends engaged with shoulders fixed to the plungers and their opposite ends engaged with shoulders  $c^{14}$  which are arranged at an angle with the former shoulders, are fixed to the front portion or door  $a'$  of the frame A and are provided with elongated openings for permitting a limited vertical movement of the free ends of the plungers.

In the operation of my time-recorder, the hand-piece  $C^2$  is arranged with its projection  $c^{11}$  in alinement with one of the guides  $a^4$ , and is rocked on the bar  $c^{10}$  into its operative position, whereupon the adjacent end of one of the plungers  $c^{12}$  is detachably engaged by said projection and the opposite end of said plunger detachably engages one of the teeth  $c^8$  and advances the corresponding actuating member  $C'$  a single step, so that one of its projections  $c^6$  or depressions  $c^7$  is registered with the extension or arm  $c^2$  of the corresponding supporting part  $c$ .

When a projection  $c^6$  of one of the actuating members  $C'$  is registered with the extension or arm  $c^2$  of one of the supporting parts  $c$ , the marker  $C$  carried by said supporting part is held away from the revolving record-sheet in its inoperative position, and when a depression  $c^7$  in said actuating member is registered with the arm or extension  $c^2$ , said marker  $C$  moves automatically independently of said actuating member into operative position in engagement with the record-sheet and remains in this position until the corresponding member  $C'$  is again operated. It thus follows that the markers  $C$  are held out of engagement with the revolving record-sheet during the intervals of absence or non-attendance of the workmen and are engaged with said record-sheet during the intervals of attendance of said workmen, and that corresponding spaces and lines in the record-sheet indicate these intervals. Moreover, as the markers  $C$  move automatically into their operative position, any differences in the force used in operating the hand-piece  $C^2$  do not vary the movement or operation of the markers  $C$ .

The alarm  $E$  usually consists of a bell or gong  $e$ , a hammer  $e'$ , and a movable part  $e^2$  fixed to said hammer and engaged with the teeth  $c^8$  of all of the actuating members  $C'$  by a spring  $e^3$ . Consequently, whenever one of the actuating members  $C'$  is operated by the hand-piece  $C^2$ , one of the teeth of said actuating member  $C'$  engages the part  $e^2$  and operates the alarm.

The means for moving the support  $B$  endwise preferably consists of a cam  $F$ , a pawl  $F'$  and a spring  $F^2$ , the parts  $F$   $F'$  coöperating to automatically move the support  $B$  endwise step by step in one direction as toward the motor  $G$ , and thereby aline different portions of the indicating surfaces  $b^6$  of the record-sheet  $B'$  with the markers  $C$ , and the part  $F^2$  operating to move the support  $B$  endwise in the opposite direction into its normal position. The endwise steps or advances of the support  $B$  usually take place after the close of a working day or other predetermined interval or division of time and correspond in number to the days or other divisions of time, as for instance, days and nights during which the workmen are employed. Said cam  $F$  is revoluble with the support  $B$  and independently thereof and is interposed between the support  $B$  and a disk  $b^9$ , fixed to the shaft  $b$ , is journaled on said disk at one side of its axis, and is provided with peripheral ratchet-teeth  $f$ , spirally arranged concave shoulders  $f'$  on its face adjacent to the support  $B$ , and an engaging surface  $f^2$  on its opposite face. The number of the teeth  $f$  is substantially equal to the number of the shoulders  $f'$ , and also to the number of endwise steps made by the support  $B$  in one direction before



returning to its initial position, and said teeth are engaged by the free end of the pawl  $F'$  as the support  $B$  is rotated, and serve, in connection with said pawl  $F'$ , to  
 5 advance the cam  $F$  a single tooth or step upon each revolution of the support  $B$ ; the shoulders  $f'$  engage a convex bearing face of an arm  $b^{10}$  projecting from the adjacent  
 10 end of the support  $B$  and coöperate with said arm to move the support endwise along the shaft  $b$  upon each advance movement of the cam  $F$  and to hold the support  $B$  in its adjusted position; and the face  $f^2$  is engaged by antifriction balls  $f^3$  which also engage  
 15 the adjacent face of the disk  $b^9$  and serve to reduce to a minimum the friction incidental to the movement of the cam  $F$ .

The pawl  $F'$  is fixed to the base  $a^2$  of the frame  $A$ , is adjustable toward and away  
 20 from the support  $B$ , and engages the peripheral ratchet-teeth  $f$  of the cam  $F$  as the support  $B$  is revolved. The spring  $F^2$  is arranged in a chamber in the support  $B$  and is interposed between a shoulder  $b^{11}$  on  
 25 said support and a second shoulder  $b^{12}$  on the shaft  $b$ . As the support  $B$  is moved endwise by the cam  $F$ , this spring is additionally compressed between the shoulders  $b^{11}$   $b^{12}$  until the cam  $F$  has made a complete  
 30 revolution, whereupon the arm  $b^{10}$  is disengaged from the last shoulder  $f'$  of the cam  $F$ , and the spring  $F^2$  moves the support  $B$  endwise in the opposite direction until said arm is engaged with the first shoulder  $f'$ .  
 35 The record-sheet is then removed, a fresh record-sheet is secured in position, and the support  $B$  is revolved and moved endwise as before for completing the records on said fresh sheet.

40 It will be understood by those skilled in the art, that the means just described, for moving the support  $B$  endwise may be dispensed with providing the record-receiving means, as the record-sheet  $B'$  is removed at  
 45 the close of a working day or other predetermined division of time during which the workmen are employed.

The motor  $G$  for rotating the support  $B$  preferably consists of a clock-mechanism  
 50 which is frictionally connected to the revoluble shaft  $b$ , is adjusted to rotate said shaft a twelfth of a revolution or other predetermined distance, in a period of time slightly less than a predetermined division of  
 55 time, as an hour, and is provided with a balance-wheel or other movable governing part  $g$ , a stop  $g'$ , and means for automatically controlling the movement of the stop into its operative position. The means for frictionally connecting the motor  $G$  to the shaft  
 60  $b$  usually consists of a split sleeve  $g^2$  frictionally engaged with one end of said shaft and rotated by the movable parts of the motor. The balance-wheel  $g$  is provided  
 65 with a peripheral shoulder  $g^3$  which is en-

gaged by the stop  $g'$  for preventing the action of the balance-wheel and thereby stopping the operation of the motor. Said stop  $g'$  is movable into its operative position  
 70 independently of the clock-mechanism  $H$  and the cam  $g^6$ , presently described, and generally consists of an arm projecting upwardly from the intermediate portion of a lever  $g^4$  having said intermediate portion  
 75 pivoted and one end weighted and formed with a slot  $g^5$ . Said means for automatically controlling the movement of the stop  $g'$  into its operative position consists of a cam  $g^6$  mounted on a movable shaft  $g^7$  of the motor  
 80  $G$  and actuated thereby, and a rod  $g^8$  having one end movable through a suitable guide  $g^9$  and engaged with said cam and its other end movable in the slot  $g^5$  independently of the lever  $g^4$ . The shaft  $g^7$  completes a revolution  
 85 in a period of time slightly less than a predetermined division of time, as an hour and during the revolution of the shaft  $b$  a twelfth of a revolution or other predetermined distance. As said shaft  $g^7$  completes  
 90 each revolution, a cutout in the cam  $g^6$  permits the rod  $g^8$  and the adjacent weighted end of the lever  $g^4$  to automatically drop downwardly into the position seen in Fig. 10, whereupon the stop  $g'$  engages the shoulder  $g^3$  of the balance-wheel  $g$  and the operation  
 95 of the motor ceases. The lever  $g^4$  and the rod  $g^8$  remain in their position assumed to effect the stoppage of the motor  $G$  until the starting of the motor, which is effected by means, presently described, for controlling the operation of the motor  $G$ , said means  
 100 serving to rock the lever  $g^4$  independently of the rod  $g^8$  into its position seen in Fig. 11, and this movement of the lever  $g^4$  independently of the rod  $g^8$  being permitted by the slot  $g^5$ . I have here shown but one support  $B$  as actuated by the motor  $G$ , but it is obvious that a plurality of supports may be actuated by said motor. It will also be obvious that the motor  $G$  is only one exemplification of means which may be used for rotating the support  $B$ .

The clock-mechanism  $H$  is of any desirable form, size and construction, is provided with a dial  $h^4$  having graduations and  
 115 numbers corresponding to those of the longitudinal series of indicating characters  $b^5$  on the record-sheet, and may, if desired, be controlled by a second clock or time-mechanism, as one maintained by a commercial  
 120 service which controls a number of clock-mechanisms from a single clock-mechanism or other suitable device.

The means for controlling the operation of the motor  $G$  consists of the stop  $g'$ , the  
 125 means previously described for controlling the movement of the stop  $g'$  into its operative position, and suitable means actuated by the clock-mechanism for forcing the stop  $g'$  from its operative position, and effecting  
 130



the starting of said motor. Said latter means preferably consists of a cam  $h$  mounted on the minute-hand shaft  $h'$  of said clock-mechanism, a pivoted lever  $h^2$  having one end weighted and movable into engagement with the lever  $g^4$ , and a rod  $h^3$  connected to said cam  $h$  and lever  $h^2$  and operating to normally elevate the weighted end of the lever  $h^2$  from engagement with the lever  $g^4$  and to permit said end of the lever  $h^2$  to automatically descend and engage the lever  $g^4$  when the minute-hand shaft of the clock-mechanism H completes a revolution. The movement of the lever  $g^4$  effected by the lever  $h^2$ , in addition to forcing the stop from its operative position, moves the balance-wheel  $g$  a sufficient distance to effect the starting of the motor G. Moreover, the lever  $h^2$  holds the lever  $g^4$  in its inoperative position until the rod  $g^8$  is elevated sufficiently by the cam  $g^6$  to prevent downward movement of the adjacent end of said lever  $g^4$ , whereupon the cam  $h$  rotated by the shaft  $h'$  elevates the rod  $h^3$  and the weighted end of the lever  $h^2$ . It will be apparent to one skilled in the art that the clock-mechanism H operates with great accuracy, as the only work required of the same in addition to that necessary for keeping accurate time, is to revolve the cam  $h$  and hold the lever  $h^2$  out of its operative position. It will also be apparent that a single clock-mechanism may control a number of motors G each actuating one or more supports B.

From the foregoing description of the motor G, the clock-mechanism H, and the means for controlling the operation of the motor G, it will be noted that the support B is revolved one-twelfth of a revolution or other predetermined distance with each revolution of the shaft  $g^7$  of the motor G, and in somewhat less time than the minute-hand shaft  $h'$  of the clock-mechanism H completes a revolution; that upon the completion of each revolution of the shaft  $g^7$ , the operation of the support B and said motor G is temporarily restrained by the stop  $g^7$ , the operation of which is controlled by the motor G; that at the completion of each revolution of the shaft  $h'$ , said stop is forced from its operative position, and the support B and motor G again commence their advance movement. It will, therefore, be understood that the support B moves slightly faster during each advance movement than said support would move if connected to the shaft  $h'$ . By accelerating the movement of the support B, as described, effecting the stoppage of said support by the motor G, and starting the support as the shaft  $h'$  completes each revolution, said support reaches the limit of each advance movement before the completion of each rotation of the shaft  $h'$ , and always commences each advance

movement in exact unison with said shaft  $h'$ . The control of the movement of the support B by the clock-mechanism, is obviously advantageous, particularly, as the support is subjected to a more or less variable load when different numbers of the markers are engaged with said support. It will be understood, however, that the described clock- or time-mechanism, and the means connecting the same to the motor G is only one exemplification of mechanism suitable for controlling the rotation of the support B.

The means for indicating the position of the support B relatively to the markers and clock-mechanism preferably consists of a scale or graduated surface I and an indicator  $i$ . The scale or graduated surface I consists of a series of graduations and numbers provided on the periphery of the disk  $b^9$ , or other part revoluble with the support B, the graduations and numbers of said scale corresponding to those of the longitudinal series of indicating characters  $b^5$  on the record-sheet and to those of the dial  $h^4$  of the clock-mechanism H. The indicator  $i$  is fixed to the base  $a^2$  of the frame A and is formed with an indicating portion or laterally bent end arranged in proximity to the graduations of the scale I and in alinement with the markers C when in operative position. When setting the support B with the clock-mechanism, said support is rotated by hand independently of the shaft  $g^7$  frictionally connected thereto until the graduation of the scale I, corresponding to the hour indicated by the hour-hand  $h^5$  of the clock-mechanism H is in advance of the indicator  $i$ , and the graduation, immediately succeeding said hour-indicating graduation of the scale I and corresponding to the graduation alined with the minute-hand  $h^6$  of said clock-mechanism is in alinement with said indicator  $i$ . This adjustment of the support B is greatly facilitated by the frictional connection between said support and the motor G. Said means for indicating the position of the support B relatively to the markers and clock-mechanism, although particularly applicable for use with the preferable construction of my invention, may be dispensed with, providing the cam for controlling the movement into its operative position of the stop for the motor which revolves the support B is mounted on the shaft for said support, as illustrated in Figs. 17 and 18, instead of on the shaft of the motor. In said Figs. 17 and 18,  $B^{10}$  represents the support for the record-sheet,  $B^{11}$  the shaft carrying said support,  $G^{10}$  the motor-shaft connected to the shaft  $B^{11}$ ,  $g^{10}$  the balance-wheel of the motor,  $g^{11}$  the stop for said motor, and  $B^{12}$  the cam mounted on the shaft  $B^{11}$  for controlling the movement of said stop into its operative position. It is thought, how-



ever, that it is unnecessary to further describe the construction and arrangement of said parts seen in Figs. 17 and 18.

My improved time-recorder may be easily changed for use as a watchman's clock, it being merely necessary to actuate the plungers by push-buttons or other devices connected to said plungers and located at predetermined parts of a building. The record-sheet would then indicate by lines and spaces the times when the watchman operated the push-buttons of other devices.

The construction and operation of my improved time-recorder will now be readily understood upon reference to the foregoing description and the accompanying drawings, and it will be particularly noted that more or less change may be made in the construction and arrangement of its component parts without departing from the spirit of my invention.

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

1. In a time-recorder, the combination with a support for a record-receiving means; of a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, an actuating member having means for holding the supporting part in an inoperative position, said means being arranged in an inoperative position relatively to the supporting part during the automatic movement of said supporting part for permitting such automatic movement to take place unaffected by the actuating member, means for moving one of the foregoing parts relatively to the other when said parts are in the position assumed during the formation of the record, and time-mechanism for governing the operation of the means for moving one of said foregoing parts, substantially as and for the purpose set forth.

2. In a time-recorder, the combination of a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, and an actuating member provided with a plurality of means movable in the same direction for successively forcing the supporting part into its inoperative position and for permitting said supporting part to automatically assume its operative position independently of the actuating member, substantially as and for the purpose described.

3. In a time-recorder, the combination of a movable support for a record-receiving means, a rocking supporting part having one end extended upwardly above the axis of the supporting part and provided with

a marker for engaging the record-receiving means, and having its other end provided with an arm or extension projecting beneath the axis, said supporting part being movable automatically into its operative position, and an actuating member provided with a plurality of means movable in the same direction for successively engaging said arm or extension and forcing the supporting part into its inoperative position and for permitting said supporting part to automatically assume its operative position independently of the actuating member, substantially as and for the purpose specified.

4. In a time-recorder, the combination of a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, a movable actuating member provided with alternately-arranged means for forcing the supporting part into its inoperative position and for permitting said supporting part to automatically assume its operative position independently of the actuating member, said actuating member being provided with a number of teeth equal to the combined number of said alternately-arranged means, and means for successively engaging the teeth and operating the actuating member, substantially as and for the purpose set forth.

5. In a time-recorder, the combination of a frame, a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, and a revoluble actuating member provided with alternately-arranged projections and depressions for forcing the supporting part into its inoperative position and for permitting said supporting part to automatically assume its operative position independently of the actuating member, substantially as and for the purpose described.

6. In a time-recorder, the combination of a frame, a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, a revoluble actuating member provided with alternately-arranged projections and depressions for forcing the supporting part into its inoperative position and for permitting said supporting part to automatically assume its operative position independently of the actuating member, said actuating member being provided with a number of teeth equal to the combined number of said projections and depressions, and means for successively engaging the teeth



and operating the actuating member, substantially as and for the purpose specified.

7. In a time-recorder, the combination of a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, an actuating member provided with means movable in one direction for forcing the supporting part into its inoperative position and for permitting said supporting part to automatically assume and remain in its operative position, and a plunger movable into and out of engagement with the actuating member for successively operating said actuating member, substantially as and for the purpose set forth.

8. In a time-recorder, the combination of a frame, a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, an actuating member provided with alternately-arranged projections and depressions for forcing the supporting part into its inoperative position and for permitting said supporting part to automatically assume its operative position, and a reciprocating plunger movable into and out of engagement with the actuating member for successively moving the projections and depressions into operative position, substantially as and for the purpose described.

9. In a time-recorder, the combination of a frame, a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, a movable actuating member provided with alternately-arranged projections and depressions for forcing the supporting part into its inoperative position and for permitting the supporting part to automatically assume its operative position, said actuating member being provided with a number of teeth equal to the combined number of said projections and depressions, and a reciprocating plunger movable toward and away from said teeth for moving the actuating member, substantially as and for the purpose specified.

10. In a time-recorder, the combination of a frame, a movable support for a record-receiving means, a rocking supporting part provided with a marker arranged above the axis of the supporting part for engaging the record-receiving means, said supporting part having an arm or extension projecting beneath the axis of the supporting part, a revolvable actuating member provided with alternately-arranged projections and depres-

sions movable successively into registration with the arm or extension of the supporting part for controlling the position of the marker, said actuating member being provided with a number of teeth equal to the combined number of said projections and depressions, and a reciprocating plunger for successively engaging said teeth and rotating the actuating member, substantially as and for the purpose set forth.

11. In a time-recorder, the combination of a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, an actuating member provided with means movable in one direction for forcing the supporting part into its inoperative position and for permitting said supporting part to automatically assume and remain in its operative position, a plunger movable into and out of engagement with the actuating member for successively operating said actuating member, and a spring for returning the plunger, substantially as and for the purpose described.

12. In a time-recorder, the combination of a frame, a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, a movable actuating member provided with alternately-arranged projections and depressions for forcing the supporting part into its inoperative position and for permitting the supporting part to automatically assume its operative position, said actuating member being provided with a number of teeth equal to the combined number of said projections and depressions, a reciprocating plunger movable toward and away from said teeth for moving the actuating member, and a spring for returning the plunger, substantially as and for the purpose specified.

13. In a time-recorder, the combination of a frame, a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, means for forcing the supporting part to its inoperative position, and a hand-piece movable into and out of engagement with the last-mentioned means for operating the same, substantially as and for the purpose set forth.

14. In a time-recorder, the combination of a frame, a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its



operative position, a reciprocating plunger for forcing the supporting part into its inoperative position, and a hand-piece movable into and out of engagement with said plunger for operating the same, substantially as and for the purpose described.

15. In a time-recorder, the combination of a frame, a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, a movable actuating member provided with alternately-arranged means for forcing the supporting part into its inoperative position and for permitting the supporting part to automatically assume its operative position, said actuating member being provided with a number of teeth equal to the combined number of said alternately-arranged means, a reciprocating plunger movable toward and away from said teeth for moving the actuating member, and a hand-piece movable into and out of engagement with said plunger for operating the same, substantially as and for the purpose specified.

16. In a time-recorder, the combination of a frame having a guide, a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, means for forcing the supporting part to its inoperative position, and a hand-piece movable in the guide into and out of engagement with the last-mentioned means for actuating the same, substantially as and for the purpose set forth.

17. In a time-recorder, the combination of a frame having a guide, a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, a reciprocating plunger for controlling the position of the marker, and a hand-piece movable into and out of the guide toward and away from the plunger for actuating the same, substantially as and for the purpose described.

18. In a time-recorder, the combination of a frame having a guide, a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, a reciprocating plunger for moving the supporting part, a spring for moving the plunger, and a hand-piece movable into and out of the guide toward and away from the plunger for actuating the same, substantially as and for the purpose specified.

19. In a time-recorder, the combination of a frame having a guide, a movable support for a record-receiving means, a movable sup-

porting part provided with a marker for engaging the record-receiving means, a reciprocating plunger for controlling the position of the marker, a hand-piece movable into and out of the guide for forcing the plunger into operative position, and a spring for forcing the plunger into its inoperative position, substantially as and for the purpose set forth.

20. In a time-recorder, the combination of a frame, a movable support for a record-receiving means, a plurality of independently-movable supporting parts provided with markers for engaging the record-receiving means, and a hand-piece for actuating each of said supporting parts independently of the others, substantially as and for the purpose described.

21. In a time-recorder, the combination of a frame, a revoluble support for a record-receiving means, a pivotal bar arranged substantially parallel with the axis of the support, a plurality of independently-movable supporting parts mounted on the pivotal bar and provided with markers for engaging the record-receiving means, a plurality of independently-movable means for controlling the position of the markers, a second pivotal bar arranged substantially parallel with the first pivotal bar, and a hand-piece movable lengthwise of the second pivotal bar and rocking thereon for actuating each of said movable means independently of the others, substantially as and for the purpose specified.

22. In a time-recorder, the combination of a movable support for a record-receiving means, a plurality of independently-movable supporting parts provided with markers for engaging the record-receiving means, said supporting parts being movable automatically into their operative positions, independently-movable actuating members each provided with a plurality of means movable in the same direction for successively forcing the corresponding supporting part into its inoperative position and for permitting said supporting part to automatically assume its operative position, and a hand-piece for actuating each of the actuating members independently of the others, substantially as and for the purpose set forth.

23. In a time-recorder, the combination of a frame, a movable support for a record-receiving means, a plurality of independently-movable supporting parts provided with markers for engaging the record-receiving means, said supporting parts being movable automatically into their operative positions, independently-movable actuating members each provided with alternately-arranged means for forcing the supporting parts into their inoperative positions and for permitting the supporting



parts to automatically assume their operative positions, each of said actuating members being provided with a number of teeth equal to the combined number of the alternately-arranged means thereof, reciprocating plungers movable toward and away from said teeth for moving the actuating members, and a hand-piece for actuating each of the plungers independently of the others, substantially as and for the purpose described.

24. In a time-recorder, the combination of a frame having a plurality of guides, a movable support for a record-receiving means, a plurality of independently-movable supporting parts provided with markers for engaging the record-receiving means, independently-movable means for controlling the position of the markers, and a hand-piece movable in the guides for actuating each of said movable means independently of the others, substantially as and for the purpose specified.

25. In a time-recorder, the combination of a frame having a plurality of guides, a movable support for a record-receiving means, a plurality of independently-movable supporting parts provided with markers for engaging the record-receiving means, independently-reciprocating plungers movable in the guides for controlling the position of the markers, springs for holding the plungers in their inoperative positions, and a hand-piece for forcing each of the plungers into its operative position independently of the others, substantially as and for the purpose set forth.

26. In a time-recorder, the combination of a frame having a plurality of guides, a movable support for a record-receiving means, a plurality of independently-movable supporting parts provided with markers for engaging the record-receiving means, independently-reciprocating plungers for controlling the position of the markers, springs for holding the plungers in their inoperative positions, and a hand-piece movable in the guides for forcing each of the plungers into its operative position independently of the others, substantially as and for the purpose described.

27. In a time-recorder, the combination of a frame having a movable portion, a movable support for a record-receiving means, a movable supporting part supported by the movable portion of the frame and provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position when the movable portion of the frame is in its normal position, an actuating member supported by the movable portion of the frame and provided with a plurality of means movable in the same direction for successively forcing the supporting part

into its inoperative position and for permitting said supporting part to automatically assume and remain in its operative position, and means supported by the movable portion of the frame for successively operating said actuating member, substantially as and for the purpose specified.

28. In a time-recorder, the combination of a frame having a movable portion provided with a lengthwise guide, a movable support for a record-receiving means, a plurality of independently-movable supporting parts mounted on the movable portion of the frame and provided with markers for engaging the record-receiving means, a plurality of independently-movable actuating means supported on the movable portion of the frame for controlling the position of the markers, and a hand-piece movable lengthwise of the guide and toward and away from the actuating means for forcing the same into their operative positions, substantially as and for the purpose set forth.

29. In a time-recorder, the combination of a frame, a movable support for a record-receiving means, a plurality of independently-movable supporting parts provided with markers for engaging the record-receiving means, independently-movable actuating members for the movable supporting parts, and a stop-bar having independently-movable spring-arms for preventing the retrograde movement of the actuating members, substantially as and for the purpose described.

30. In a time-recorder, the combination of a frame, a movable support for a record-receiving means, a plurality of independently-movable supporting parts provided with markers for engaging the record-receiving means, said supporting parts being movable automatically into their operative positions, independently-revoluble actuating members each provided with alternately-arranged means for forcing the supporting parts into their inoperative positions and for permitting the supporting parts to automatically assume their operative positions, each of said actuating members being provided with a number of teeth equal to the combined number of the alternately-arranged means thereof, and a stop-bar having independently-movable spring arms for preventing the retrograde movement of the actuating members, substantially as and for the purpose specified.

31. In a time-recorder, the combination of a frame having a perforation, a movable support for a record-receiving means, a marker for engaging the record-receiving means, and a movable supporting part provided with an indicator having a plurality of indicating surfaces movable successively into registration with the perforation for indicating the engagement and non-engagement



ment of the marker with the record-receiving means, substantially as and for the purpose set forth.

32. In a time-recorder, the combination of  
5 a frame, a movable support for a record-receiving means, and a movable supporting part provided with relatively-fixed diverging arms, one arm being provided with a marker for engaging the record-receiving  
10 means and the other arm being provided with an indicator, substantially as and for the purpose described.

33. In a time-recorder, the combination of  
15 a frame, a revoluble support for a record-receiving means, a pivotal bar arranged substantially parallel with the axis of the support, and a plurality of independently-movable supporting parts mounted on the pivotal bar and having relatively-fixed arms  
20 diverging from opposite sides of said pivotal bar, one arm of each support being provided with a marker for engaging the record-receiving means, and the other arm being provided with an indicator for indicating  
25 the position of the marker, substantially as and for the purpose specified.

34. In a time-recorder, the combination of  
30 a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part being movable automatically into its operative position, an indicator for indicating the engagement and non-engagement of the  
35 marker with the record-receiving means, and an actuating member provided with a plurality of means movable in the same direction for successively forcing the supporting part into its inoperative position and for  
40 permitting said supporting part to automatically assume and remain in its operative position, substantially as and for the purpose set forth.

35. In a time-recorder, the combination of  
45 a frame, a movable support for a record-receiving means, a marker for engaging the record-receiving means, a movable supporting part provided with an indicator for indicating the engagement and non-engagement of the marker with the record-receiving  
50 means, an actuating member provided with alternately-arranged projections and depressions for controlling the position of the indicator, said actuating member being  
55 provided with a number of teeth equal to the combined number of said projections and depressions, and means for successively engaging the teeth and operating the actuating member, substantially as and for the  
60 purpose described.

36. In a time-recorder, the combination of  
65 a frame, a movable support for a record-receiving means, a movable supporting part provided with a marker for engaging the record-receiving means, said supporting part

being movable automatically into its operative position, an actuating member provided with alternately-arranged projections and depressions movable successively for  
70 forcing the supporting part into its inoperative position and for permitting said supporting part to automatically assume its operative position, said actuating member being provided with a number of teeth equal to the combined number of said projections  
75 and depressions, and an alarm having a movable member engaged by said teeth, substantially as and for the purpose specified.

37. In a time-recorder, the combination  
80 of a frame, a revoluble support for a record-receiving means, a marker for engaging the record-receiving means, a cam journaled at one side of the axis of the support and revoluble independently thereof for moving  
85 the support endwise, and means for engaging the cam and rotating the same independently of the support, substantially as and for the purpose set forth.

38. In a time-recorder, the combination  
90 of a frame, a revoluble support for a record-receiving means, a marker for engaging the record-receiving means, a cam journaled at one side of the axis of the support and revoluble independently thereof, said cam being  
95 provided with spirally-arranged shoulders for moving the support endwise and holding the same in its adjusted position, and means for engaging the cam and rotating the same independently of the support and thereby successively moving said shoulders  
100 into operative position, substantially as and for the purpose described.

39. In a time-recorder, the combination  
105 of a frame, a revoluble support for a record-receiving means, said support being provided with an arm, a marker for engaging the record-receiving means, a cam journaled at one side of the axis of the support and revoluble independently thereof, said cam  
110 being provided with spirally-arranged shoulders engaging said arm for moving the support endwise and holding the same in its adjusted position, and means for engaging the cam and rotating the same independently  
115 of the support and thereby successively moving said shoulders into operative position, substantially as and for the purpose specified.

40. In a time-recorder, the combination  
120 of a frame, a support for a record-receiving means revoluble step by step, a marker for engaging the record-receiving means, a cam revoluble with the support and revoluble independently thereof for moving the support endwise step by step, said cam being  
125 provided with a number of peripheral teeth equal to the number of endwise steps made by the support before returning to its initial position, and stationary means for successively engaging said teeth and automatically  
130



rotating the cam independently of the support, substantially as and for the purpose set forth.

41. In a time-recorder, the combination of a frame, a revoluble support for a record-receiving means, a marker for engaging the record-receiving means, a cam revoluble with the support and revoluble independently thereof, said cam being provided with peripheral teeth and with a number of spirally-arranged shoulders equal to the number of said teeth for moving the support endwise and holding the same in its operative position, and a stationary pawl for successively engaging the teeth and rotating the cam independently of the support, substantially as and for the purpose described.

42. In a time-recorder, the combination of a frame, a revoluble support for a record-receiving means, said support being provided with an arm, a marker for engaging the record-receiving means, a cam journaled at one side of the axis of the support and revoluble independently thereof, said cam being provided with peripheral teeth and having its face adjacent to the support formed with a number of shoulders equal to the number of peripheral teeth and engaging with said arm, and a stationary pawl for engaging the peripheral teeth and rotating the cam independently of the support, substantially as and for the purpose specified.

43. In a time-recorder, the combination of a frame, a revoluble shaft, a disk fixed to the shaft, a support for a record-receiving means, said support being mounted on the shaft and movable toward and away from the disk, a cam journaled on the disk at one side of its axis and having its face adjacent to the support provided with shoulders for moving the support endwise in one direction, means for rotating the cam independently of the support, and a spring for moving the support endwise in the opposite direction, substantially as and for the purpose set forth.

44. In a time-recorder, the combination of a frame, a revoluble shaft, a disk fixed to the shaft, a support for a record-receiving means, said support being mounted on the shaft and movable toward and away from the disk, an arm projecting from the support toward the disk and provided with a convex bearing face, a cam journaled on the disk at one side of its axis and having its face adjacent to the support formed with spirally-arranged concave shoulders for engaging said bearing face, said cam being provided with a number of peripheral teeth equal to the number of said shoulders, and a stationary pawl for successively engaging the teeth as the support is revolved and rotating the cam independently of the support, substantially as and for the purpose described.

45. In a time-recorder, the combination of a movable support for a record-receiving means, a motor for actuating the support, means for automatically stopping the motor, and means operated by a moving part of the motor for controlling the movement into operative position of said means for stopping the motor, substantially as and for the purpose specified.

46. In a time-recorder, the combination of a movable support for a record-receiving means, a motor for actuating the support, means for automatically stopping the motor, means operated by a moving part of the motor for controlling the movement into operative position of said means for stopping the motor, and a clock-mechanism for forcing from its operative position said means for stopping the motor, substantially as and for the purpose set forth.

47. In a time-recorder, the combination of a movable support for a record-receiving means, a motor for actuating the support, means movable automatically for stopping the motor, means operated by a moving part of the motor for permitting the movement into operative position of the means for stopping the motor, and a clock-mechanism for forcing from its operative position said means for stopping the motor, substantially as and for the purpose described.

48. In a time-recorder, the combination of a clock-mechanism having a part thereof movable a predetermined distance in a predetermined time, a movable support for a record-receiving means, a motor for moving the support a predetermined distance in less time than said part of the clock-mechanism moves its predetermined distance, and means movable independently of the movable part of the clock-mechanism for stopping the movement of the support when the same moves its predetermined distance, substantially as and for the purpose specified.

49. In a time-recorder, the combination of a movable support for a record-receiving means, a motor for actuating the support, said motor being provided with a movable shaft, a stop movable automatically independently of the shaft for preventing the operation of the motor, and means actuated by the shaft for controlling the automatic movement of the stop into its operative position, substantially as and for the purpose set forth.

50. In a time-recorder, the combination of a movable support for a record-receiving means, a motor for actuating the support, said motor being provided with a movable shaft, a clock-mechanism, a stop movable automatically independently of the shaft for preventing the operation of the motor, means actuated by the shaft for controlling the automatic movement of the stop into its operative position, means movable inde-



pendently of a movable part of the clock-mechanism for automatically forcing the stop from its operative position, and means actuated by said movable part of the clock-mechanism for forcing the latter means from its operative position, substantially as and for the purpose described.

51. In a time-recorder, the combination of a movable support for a record-receiving means, a motor for actuating the support, said motor being provided with a rotary cam, a clock-mechanism provided with a rotary cam, a stop movable automatically independently of said cams for preventing the operation of the motor, means connected to the cam of the motor for controlling the automatic movement of the stop into its operative position, and means connected to the cam of the clock-mechanism for forcing said stop from its operative position, substantially as and for the purpose specified.

52. In a time-recorder, the combination of a movable support for a record-receiving means, a motor for actuating the support, said motor being provided with a rotary cam, a clock-mechanism provided with a rotary cam, a pivoted lever movable automatically independently of the cams, said lever being provided with a stop for preventing the operation of the motor, means between one end of the lever and the cam of the motor for controlling the movement of the stop into its operative position, and means between the cam of the clock-mechanism and the other end of the lever for controlling the movement of said stop from its operative position, substantially as and for the purpose set forth.

53. In a time-recorder, the combination of a movable support for a record-receiving means, a motor for actuating the support, said motor being provided with a movable shaft and with a balance-wheel having a peripheral projection, a clock-mechanism, a

stop for engaging the peripheral projection of the balance-wheel and preventing the operation of the motor, said stop being movable independently of the shaft, means actuated by the shaft for controlling the movement of the stop into its operative position, and means connected to a movable part of the clock-mechanism for forcing said stop from its operative position, substantially as and for the purpose described.

54. In a time-recorder, the combination of a movable support for a record-receiving means, a marker for engaging the record-receiving means, the marker being normally separated from said means, a part for holding the marker in its normal position, and means for releasing the marker from said part and thereby permitting the marker to move into engagement with the record-receiving means, substantially as and for the purpose specified.

55. In a time-recorder, the combination of a drum for carrying a record-sheet on its periphery, a plurality of markers, one for each workman, the markers being normally spaced apart from the drum and being movable automatically into engagement with the record-sheet on the drum, means for holding the markers in their normal position, and actuating means for releasing the markers from the holding means and thereby permitting the markers to move automatically into engagement with the record-sheet, substantially as and for the purpose described.

In testimony whereof, I have hereunto signed my name in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 11th day of December, 1899.

WILLIAM D. HAWLEY.

Witnesses:

S. DAVIS,

K. H. THEOBALD.