N° 14,268 A.D. 1904

Date of Application, 25th June, 1904

Complete Specification Left, 25th Mar., 1905—Accepted, 1st June, 1905

PROVISIONAL SPECIFICATION.

"Improvements in and appertaining to Employees' Time Recorders and like Apparatus".

I, FRANK BROOK of 7 Wellington Street, Lindley, Huddersfield, in the County of York, Commercial Traveller, do hereby declare the nature of this invention to be as follows:—

This invention has reference to employees time recorders and like apparatus in which, by turning a hand lever or pointer or pointers around a dial or face plate to any desired number thereon indicating the person who desires to make a record, and then actuating certain mechanism, the time of entrance or departure of the employee, or of the commencement or completion of a piece of work, will be recorded by means of clockwork driven type wheels on the recording strip or sheet, opposite the number assigned to the employee.

The objects of my invention in the above type of time recorders are to provide on or in conjunction with the dial or face plate improved means for more easily centreing or guiding and correctly positioning the pointer or pin, or actuating lever or finger or fingers thereon, opposite any desired number on the dial; to apply improved means to the actuating lever or arm or pointer for actuating the hammer trip device, and to so arrange and construct certain of the parts of the recording apparatus that each record, when made, can be exhibited at the front of the case or dial.

For the purpose of my invention, I form on or apply to the dial around or close to the outer edge thereof and extending outwards from same at right angles a series of V or diamond or similar suitable shaped projections having corresponding recesses or depressions between them, or said shaped projections may extend radially beyond the edge of the dial. Instead of V or similar shaped projections and corresponding recesses, circular or like openings or recesses may be made having flaring mouths and converging on all sides to a small central opening.

Each depression is opposite a number printed, impressed or affixed on the dial, the numbers being arranged in progressive order from 1 up to any desired number in a circle or circles concentric with the axis of the dial or disc. I may arrange said numbers in sections of, say, ten, or other number fixed upon, and between the last and first section or the highest and lowest numerals on the circle or one of the circles, I apply a stop piece or abutment to prevent more than a single revolution of the lever or pointer.

The lever arm or swaife whether single or double to answer for one or two concentric circles of numerals, is made of suitable hollow section with a boss as usual to fit upon the ordinary hollow shaft for giving motion thereto and to the drum or recording strip, or it may be the type disc, to move same around to bring the numeral corresponding to the numeral on the dial plate opposite to which the pointer is moved, on to the printing line, and in said hollow arm or in each arm at each end thereof I mount two bell crank or angle levers which are connected together by a link or rod.

To one arm of the angle lever at the inner end of the arm or arms I attach one end of a flexible wire cord, or a length of stout wire, which is passed through

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the hollow shaft and its other end secured to the trip motion for actuating the printing hammer.

The angle lever or levers at the outer end of the hollow arm or arms has or have one member thereof extending outwards some distance beyond the end of the arm and provided with a suitable knob or handle and also with an extension projecting at right angles and passing through an opening or guide in the end of the arm or arms, the extremity of said extension being suitably shaped to register in the V shaped recesses or depressions on the dial plate.

The movement of the handle or arm around the dial plate actuates the drum carrying the recording strip to ensure the number printed thereon and brought on to the printing line being the same as the number on the dial to which the arm is advanced, and when the employee presses the knob on the outer angle lever to force the extension or pointer thereon towards the dial, the converging sides of the depression opposite the number to which the arm has been moved causes the pointer to centre itself accurately, or is guided to the desired position.

The same movement of the angle lever, through the link or connecting arm, actuates the inner angle lever on the said arm, or the respective arm, which draws the cord or wire outwardly and thereby secures the necessary movement to actuate the trip gear.

When more than one circle of numerals is required to adapt the machine for a larger number of workpeople, and the actuating lever employed is a double armed lever, each arm carrying its respective pointer, I arrange that the connecting links coupling each pair of angle levers together shall be slotted at their inner ends in order that when the levers and connecting link in one arm are actuated by the depression of the pointer into a recess or flaring opening, the inner lever in the other arm can move on its pivot centre without actuating the outer angle lever in said arm, and springs are also employed to return the pointers to or maintain them in normal position.

In lieu of the inner bell crank levers and connecting links I may transmit the motion from the lever or levers carrying the pointer or pointers direct to the lever for actuating the hammer trip device by means of a flexible wire or wires or chains guided around a pulley or pulleys located in a central position to guide the cord or wire direct to the trip motion. In one modification, the pointer may be attached to or formed with an extension or arm fast on a stud carrying a small pulley or to the pulley itself, which takes the place of the outer bell crank lever, the cord being attached to the periphery of the pulley which is partially rotated by the movement of the pointer and takes up the wire or cord to actuate the trip motion; or the pointer may be fast on a longitudinal shaft extending through the actuating lever and carrying at its inner end a pulley to which is secured a length of wire attached at its opposite end to the trip motion lever, the partial rotation of the shaft in forcing inwards and centreing the pointer causing the pulley to wind on a portion of the flexible wire or chain and thereby operating the trip motion.

I preferably provide a recess or opening at the bottom of each V shaped or equivalent centreing recess and form a nose on the pointer to enter said small recess so that the hammer trip motion cannot be actuated until the pointer has entered the V or similar shaped recess to such an extent as to be accurately centred therein whereby the corresponding number on the recording strip will be accurately aligned for receiving the impression before the hammer strikes the blow.

My invention further consists in making the impression on the paper in such manner that the record last made can be examined from the front of the machine.

For this purpose according to one arrangement, I employ a skeleton drum or framework to hold the recording strip or paper, said skeleton drum or cylinder comprising end portions and connecting cross bars or ribs spaced at equal distances apart and which may correspond in position to the divisions between each section of numerals on the dial.

Any suitable means may be provided for securing the ends of the paper strip on the cylinder.

I do not confine myself to the precise arrangement and construction of the cylinder as the same may be varied without affecting the object of this part of my invention which consists essentially in arranging the striking hammer within the cylinder to strike the paper against the type wheels from the inner side thereof and secure the impression being made on the outer surface of the paper. Any suitable trip lever or rod may be used to trip the hammer, the said lever or rod being actuated by the lever to which the flexible cord is attached.

The hammer may be placed horizontally or arranged to have a slight diagonal movement should the shaft of the cylinder not permit of a direct horizontal stroke.

The cylinder carrying the recording strip is adapted to be moved endwise on its shaft to present any desired section into which it is divided opposite the clock driven type wheels, this being effected by a sliding bar carrying a pivoted finger which engages with an annular groove in the boss of the cylinder or drum the said bar being moved endwise by means of a lever secured to a stud or shaft which extends through to the outside of the casing and has fast on its outer end a pointer lever adapted to be moved over an indicator divided into sections coinciding with the sections on the recording strip and denoting various periods of the day when the records are to be made, this pointer being moved by hand to set the cylinder in position to bring the required section opposite the printing wheels. Instead of a sliding bar, a system of levers or equivalent means could be employed to traverse the cylinder laterally. The cylinder shaft is suitably supported at one end in a bearing which is adapted to be moved outwardly away from the shaft to enable the cylinder to be withdrawn for the removal of the used record strip and the application of a fresh one thereto; the pivoted finger on the sliding bar also being movable clear of the cylinder for the same purpose.

As a modification, I may dispense with the striking hammer and press the type wheels against the paper on the cylinder to give the impression; or the skeleton drum or cylinder may be dispensed with and the paper strip caused to wind on to a take-up bobbin by ratchet, or step by step, motion, and to have the record printed thereon in chronological order by moving the type disc to bring the workman's number into alignment with the type presented by the minute and hour type wheels and striking the time by means of the hammer, the impression made thereon being exposed to view opposite an opening in the dial.

The paper on the cylinder is numbered in sections corresponding to the sections of numbers on the dial and the cylinder is rotated to the same relative extent as the arm in moving same over the dial to the number desired.

Dated this 23rd day of June 1904.

C. A. BARRON & LEWIN,
32 John William Street, Huddersfield,
Agents for the Applicants.

COMPLETE SPECIFICATION.

"Improvements in and appertaining to Employees' Time Recorders and like Apparatus".

I, FRANK BROOK of 7 Wellington Street, Lindley, Huddersfield, in the County of York, Commercial Traveller, do hereby declare the nature of this invention

and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has reference to employees' time recorders and like apparatus in which, by turning a hand lever or pointer around a dial or face plate to any desired number thereon indicating the person who desires to make a record, and then actuating certain mechanism, the time of entrance or departure of the employee, or of the commencement or completion of a piece of work, will be recorded by means of clockwork driven type wheels on the recording strip or sheet opposite the number assigned to the employee.

The objects of my invention in the above type of time recorders are to provide on or in conjunction with the dial or face plate, improved means for more easily centreing or guiding and correctly positioning the pointer or pin, or actuating lever or finger or fingers thereon, opposite any desired number on the dial; to apply improved means to the lever arm or pointer for actuating the hammer trip device, and to so arrange and construct certain of the parts of the recording apparatus that each record, when made, may be exhibited at the front of the case or dial.

In the accompanying drawings forming a part of this specification:—

Fig. 1 is front elevation of an employees time recorder embodying my improvements;

Fig. 2 is an enlarged front elevation of the dial and parts shewing clearly my improvements.

Fig. 3 is a sectional plan view of the recorder casing shewing the parts illustrated in Fig. 2.

Fig. 4 is elevation of a dial plate constructed according to my invention, having two concentric circles of numbers with centreing depressions to each;

Fig. 5 is sectional plan of same and compound lever employed.

Figs. 6, 7, and 8 shew modifications of the means for actuating the hammer trip device;

Figs. 9 and 10 are sections of a portion of the dial plate shewing the preferred form of depressions which may be adopted, with means for ensuring centreing of the pointer before the record can be made;

Fig. 11 is a perspective view of the skeleton drum or cylinder for carrying the recording strip, and,

Fig. 12 shews a fragment of the recording strip detached and on a larger scale.

Referring to the drawings, letter *a* represents the casing containing a clock *b* which is coupled by a flexible shaft in the usual way to mechanism (not shown) for actuating the type wheels *c*, the rotation of the minute and hour type wheels *c* being common to workpeoples time recorders.

The first part of my invention refers to the dial plate *d*, and to an improved construction of the said dial plate, whereby the pointer or pin *e* by which the required number of the workman is indicated and the corresponding number on the record strip brought opposite the type wheels, is more easily centred or guided, or correctly positioned, relatively to the desired number. This part of my invention consists in forming or applying around the outer edge of the dial *d* and extending outwards from same, a series of V or diamond or similar suitably shaped projections *f* having corresponding recesses or depressions f^1 between them; or the said shaped projections may extend radially beyond the edge of the dial.

Each depression f^1 is opposite a number printed, impressed or otherwise affixed on the dial, as illustrated in Figs. 1 and 2, the numbers being arranged in progressive order from 1 up to any desired number in a circle or circles concentric with the axis of the dial or disc. The said numbers are arranged in sections, of, say, ten or other number fixed upon, and between the last and first sections, or the highest and lowest numerals, there is a stop piece f^{11} to prevent more than a single revolution of the lever or pointer.

The lever arm or swaife *g* to carry the pointer *e* is made of suitable hollow

section with a boss g^1 as usual to fit upon the ordinary hollow shaft h which has mounted thereon a bevel or mitre wheel h^1 gearing with a bevel or mitre wheel i^1 fast on a shaft i supported in bearings i^{11} and through which said gears motion is conveyed from the hollow shaft h to the drum or cylinder k carrying the recording strip of paper l in order to rotate said drum to bring the numeral marked at the edge of the recording strip thereon corresponding to the numeral on the dial plate opposite to which the pointer is moved and depressed, on to the printing line. The drum or cylinder k is secured rotatively to the shaft i but, in this instance, is free to be slided endwise along said shaft to bring any desired marked off space or section on the paper strip l opposite the printing type wheels c.

In the hollow arm or lever g at each end thereof are bell crank or angle levers m, n mounted respectively on studs m^1, n^1 secured to the lever arm g.

One arm of each of said levers are connected together by a link or rod o, and to the other arm of the lever m is attached one end of a flexible wire cord p, or a length of stout wire, which is passed through the hollow shaft h and its opposite end secured to a double armed lever q to whose opposite arm is connected a rod or finger q^1 supported in a horizontal plane by any suitable bearing or platform, and having a hook or projection q^{11} at its free end which is adapted to engage with and trip a hammer r pivoted at r^1 on a stand or bracket r^{11}. The angle lever n at the outer end of the hollow arm g has one member thereof extending outwards some distance beyond the end of the said arm and provided with a suitable knob or handle n^{11} and also with an extension n^{111} projecting inwardly toward the dial plate and passing through and being guided in an opening g^{11} in the arm g, the extremity of said extension being suitably shaped to register in the V shaped recesses or depressions f^1 on the dial plate, and comprising the pointer or pin e.

The movement of the handle or arm g around the dial plate rotates the hollow shaft h and through bevel gears h^1 and i^1 gives a proportionate rotation to the shaft i and drum k to bring the number on the paper record strip l corresponding to that opposite the space f^1 to which the pointer has been moved, into alignment with or on the same horizontal plane as the hammer r, and when the pointer or pin is brought opposite the recess coinciding with the number required, the employee presses the knob n^{11} towards the dial plate whereby the pointer e, by means of the converging sides of the depressions or V shaped recesses, is caused to centre itself accurately in the proper recess.

The same inward pressure upon the handle or knob n^{11} through link o, bell crank lever m, wire connection p and lever q causes the rod or finger q^1 to be drawn sharply in the direction of the arrow (Fig. 3), whereby the hammer is moved on its pivot centre away from the paper record strip against the pressure of a spring s and when the hook or catch q^{11} at the free end of the rod or finger q^1 passes clear of the correspondingly shaped end of the hammer, the spring forces the latter back, and by a percussive blow, said hammer strikes the paper strip against the ink ribbon (not shown) and type wheels, whereby the hour and the minute or second or fraction of a minute or second are printed on the paper recording strip opposite the number thereon corresponding to the number on the dial to which the pointer or pin e has been moved.

A spiral spring holds the hammer actuating rod q^1 in engagement with the end of the hammer and admits of the hooked end riding over same on its return movement after each actuation.

The ink ribbon is traversed between the recording strip and the type wheels by any known mechanism.

When it is required to use a larger number of numerals and it is not desirable to increase the size of the dial plate or to decrease the space between the centreing depressions, I construct the machine with a dial plate as shown at Fig. 4, there being, say, an outer circle containing odd numbers, and an inner circle containing the even numbers, the lowest of which commences diametrically

opposite the numeral 1 in the outer circle, the numbers in the outer circle being arranged progressively from right to left and those on the inner circle from left to right. There are two concentric circles of centreing depressions f^1, these being made between the two circles of numerals as shown; or alternate of the circles of numerals; or one set on the outside of the outer circle of numerals and the other set within the inner circle of numerals respectively as may be preferred.

The actuating lever g is, in such case, a double armed lever having a pointer or pin e at each end, one being opposite the inner circle of depressions f^1 and the other opposite the outer circle of centreing depressions. In order that the depression of either pointer shall actuate the hammer trip motion without affecting the other pointer, the connecting links coupling each pair of angle levers m, n together are slotted, as at o^1, whereby when the levers m, n and connecting link in one arm of the lever are actuated the inner lever m in the other arm (each lever m being connected to the cord p) can move on its pivot centre without actuating the outer angle lever in said arm.

Springs are confined on the pointers e to maintain them in normal position. The two circles of numerals and the two arms of the compound lever may be painted in contrasting colours to avoid error in using the proper pointer.

More than two circles of numerals and centreing depressions may be employed if necessary, additional arms and pointers being provided in conjunction with same.

In lieu of the inner bell crank levers m, and connecting links o, motion may be transmitted from the lever n carrying the pointer, direct to the lever for actuating the hammer trip device by means of a flexible wire cord or chain connected to the lever n, or to a pulley taking the place of the lever n and to which the arm carrying the pointer is secured, and guided around a pulley located in a central position to guide the cord or wire direct to the trip motion, as illustrated at Figs. 6 and 7. Such alternative arrangements may be duplicated for a double arm and a light spring provided to take up the slack of the cord.

In another modification, the pointer may be secured on a longitudinal shaft o^{11}, see Fig. 8, extending through the lever g and carrying at its inner end a pulley to the periphery of which the cord or wire p is attached. The partial rotation of the shaft o^{11} in forcing the pointer inwardly causes the pulley to wind on a portion of the flexible wire or cord and thereby operate the trip motion.

I preferably provide a countersunk recess, opening or channel, at the bottom of each V or equivalent shaped centreing recess f^1, as indicated at f^{111} in Fig. 9 and form a nose on the pointer to enter said small recess, so that the hammer trip motion cannot be actuated until the pointer has entered the V or similar shaped recess f^1 to such an extent as to be accurately centred therein, that is to say, the nose of the pointer must enter the recess or channel f^{111} before the actual printing takes place, whereby the corresponding number on the recording strip will be accurately aligned for receiving the impression before the hammer strikes the blow.

Instead of V or similar angular shaped projections and corresponding recesses, circular or like openings or recesses may be made, as illustrated at Fig. 10, these having flaring mouths f^{1111} and converging on all sides to a small central opening f^{111}.

A hole or opening a^1, with glass let into same, is left in the front of the case to expose the record strip to view so that the impressions made thereon can be examined at any time from the outside.

The dial plate having V shaped recesses opposite each number thereon for facilitating and centreing of the pointer may be used in any other arrangement or make of dial and pointer machine in which a pointer is moved around a numbered dial to the number required and then pressed forward to force a stud

or finger into an opening in the dial plate to ensure the record being made opposite the corresponding number on the recording strip.

My invention further consists in making the impression on the surface of the paper secured on the drum or cylinder *k* by a hammer blow from the inside of the drum, and for this purpose I employ a skeleton drum or cylinder comprising end portions k^1, k^{11} and connecting cross bars or ribs k^{111} spaced at equal distances apart somewhat as shown at Fig. 11, the space occupied by each cross bar corresponding in position to the divisions d^1 between each section of numerals on the dial *d*.

The paper strip is passed around and its opposing ends secured by any suitable known means to the cylinder *k* so as to rotate therewith.

The said skeleton cylinder is employed in order that the hammer *r* may be located within the cylinder to strike against the rear face of the paper recording strip and cause the impression of the type presented by the type wheels to be made on the outer face of the paper to give a better impression than is produced by the pressure of the cylinder against the type wheels, or conversely.

For the purpose of bringing the various sections into which the recording strip is divided laterally, opposite the striking surface of the hammer and the type wheels, I have devised means for moving the drum or cylinder *k* longitudinally on its shaft instead of sliding the carriage or frame carrying the type wheels and the hammer laterally, as I find this to be the more convenient arrangement.

To move the cylinder *k* longitudinally to present the desired section of paper opposite the type wheels, I employ a lever *t* fast on a stud t^1 supported in bearings in the casing and projecting through said casing to the interior thereof and on the inner end of which is secured a second lever t^{11} carrying at its free end a stud or pin which enters and engages a slot in a projection on one end of a longitudinal sliding bar or rod *u* supported in bearings or brackets secured to the wall of the casing. To the end of said bar or rod is hinged a finger *v* which extends into an annular groove or recess in the boss of the drum or cylinder *k* and engages with the sides thereof.

The free end of the lever *t* forms a pointer and is adapted to be moved over a scale or indicator *w* which is marked with the times or periods during a working day at which it is required the workpeople shall register on entering and leaving the premises, and in setting the pointer opposite any of the marked spaces on the indicator *w*, the drum *k* through levers *t*, t^{11} rod *u* and finger *v*, is moved longitudinally on its axis to bring the corresponding section marked on the recording strip opposite the type wheels, as will be clearly seen from the drawings.

The recording strip is so marked that opposite each cross bar on the cylinder there is a blank space on which no record can be made and such blank spaces correspond to the spaces left between each section of numerals on the dial.

The outer end of the shaft *i* is mounted in a bearing in the hinged arm or stand *x*, which is adapted, when the door *y* is opened, to be swung outwardly clear of the shaft *i* in order that by elevating the finger *v* clear of the drum, the latter can be readily withdrawn from the casing to admit of the record strip being removed and another one attached in its place.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is;—

1. In time recorders and like apparatus in which, to record the time of arrival or departure, a lever or pointer is moved around a dial to the desired number marked thereon, the application to or formation on or around said dial of V or diamond shaped projections having corresponding recesses or depressions between them, or circular depressions, coinciding with the numbers on the dial to accurately centre the pointer when actuating same to make a record opposite a corresponding number on the recording strip, substantially as set forth.

2. In time recorders and like apparatus in which a lever or pointer is moved around a dial plate to any desired number, denoting the number assigned to the employee, the use of V or like angular shaped depressions, or circular depressions with flaring mouths each having at the base thereof an opening or recess to receive the nose of the pointer to accurately centre said pointer before actuating the hammer trip device, substantially as shewn and described with reference to Figs. 9 and 10.

3. The combination with a dial plate having V or similar shaped projections and depressions on its outer face or edge, of a pointer and the means for actuating the hammer trip device to trip the hammer, substantially as herein set forth and described with reference to Figs. 1 to 8.

4. In a time recorder, the combination of two or more circles of numerals, and pointers carried by two or more arms whose radial movement gives a proportionate rotation to a drum carrying the record strip of paper, said pointers being coupled by levers and flexible connection or connections to a hammer trip device for actuating same, as herein set forth.

5. In a time recorder the combination of one or more circles of numerals with respective centreing depressions and a chisel nosed pointer or pointers and means connected therewith for actuating a hammer trip device, as described and illustrated herein.

6. The combination of a hammer trip device, a skeleton drum or cylinder carrying a record strip of paper on its periphery and rotated relatively to the pointer, and a hammer located and operating within the cylinder to strike against the inner face of the record strip to obtain the impression on the outer face of said strip, substantially as herein set forth, and for the purpose specified.

7. The combination with a dial plate having at its outer diameter or edge one or more circles of V or similar projections and depressions, of the means for actuating the hammer, a skeleton drum or cylinder carrying the record paper strip and within which the hammer is located, and the means for moving the drum or cylinder laterally to present the different sections required opposite to the type wheels and hammer, all arranged and operating substantially as herein shown and described.

Dated this 24th day of March 1905.

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Agents for the Applicant.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1905.

A.D. 1904. JUNE 25. N° 14,268.
BROOK'S COMPLETE SPECIFICATION.

SHEET 1

fig. 1.

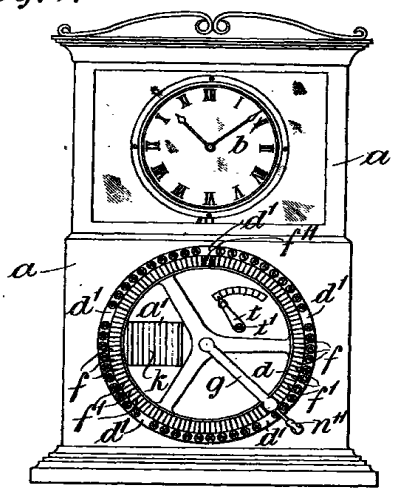


fig. 11.

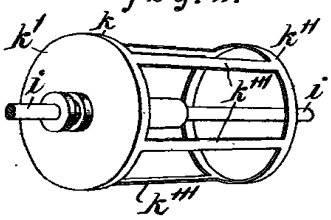
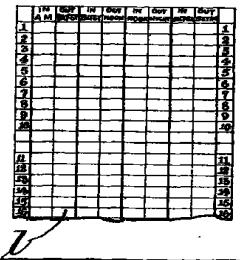


fig. 12.



4 SHEETS
SHEET 2

fig. 2.

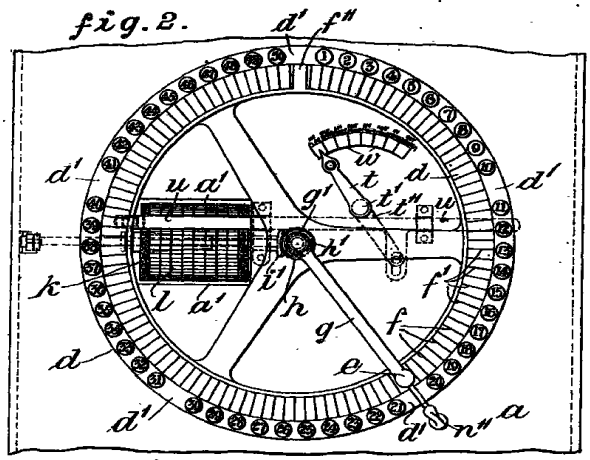
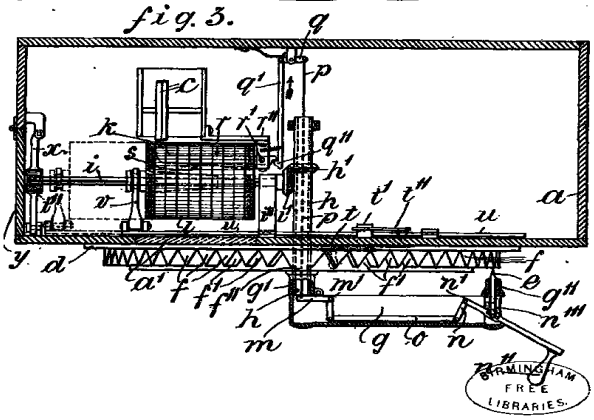


fig. 3.



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BROOK'S COMPLETE SPECIFICATION.

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fig. 1.

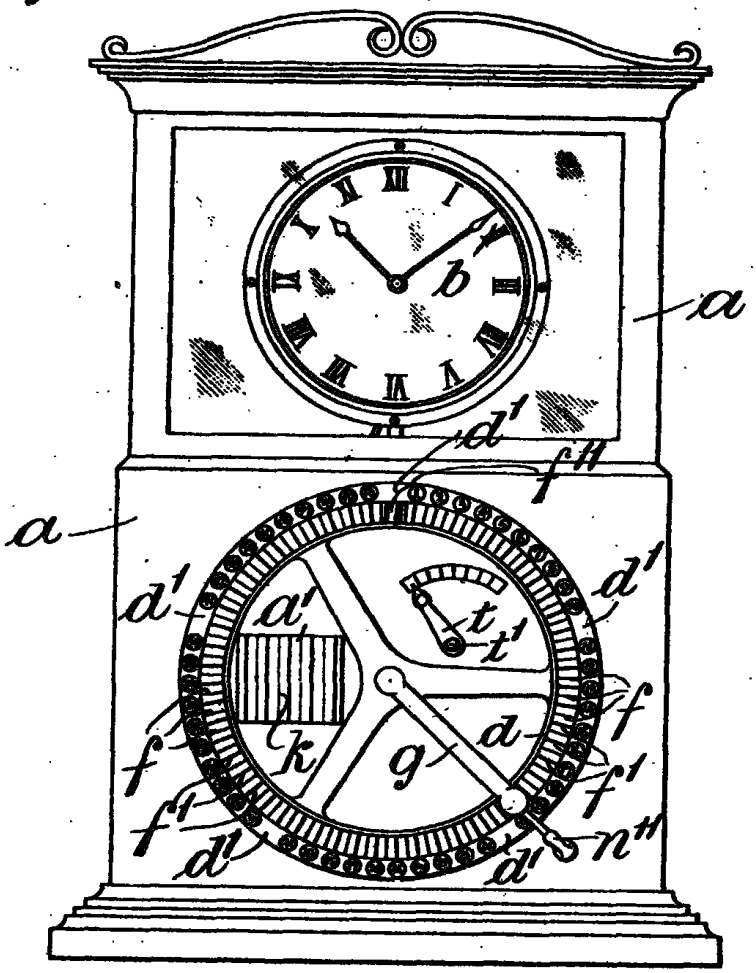


fig. 11.

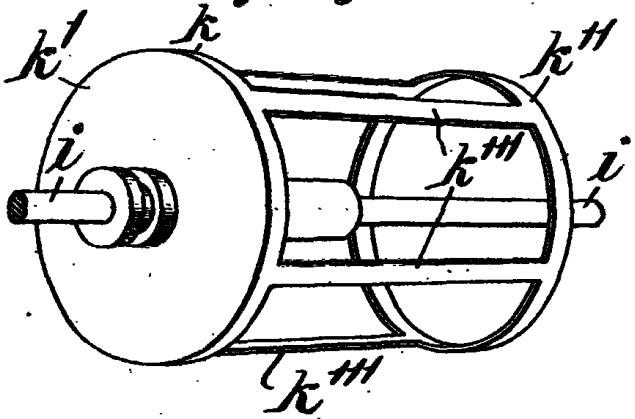


fig. 12.

	IN A M	OUT	IN	OUT	IN	OUT	IN	OUT	
1									1
2									2
3									3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16

l

fig. 2.

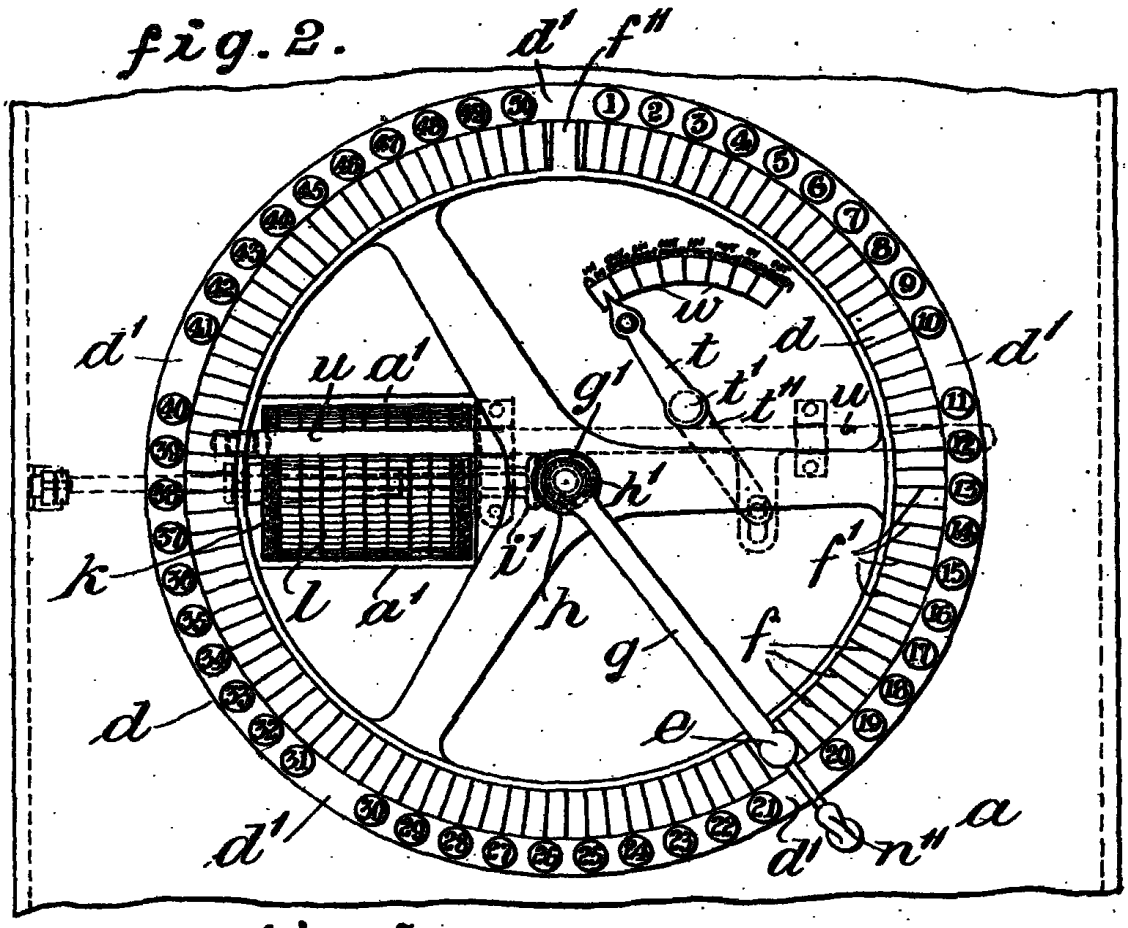
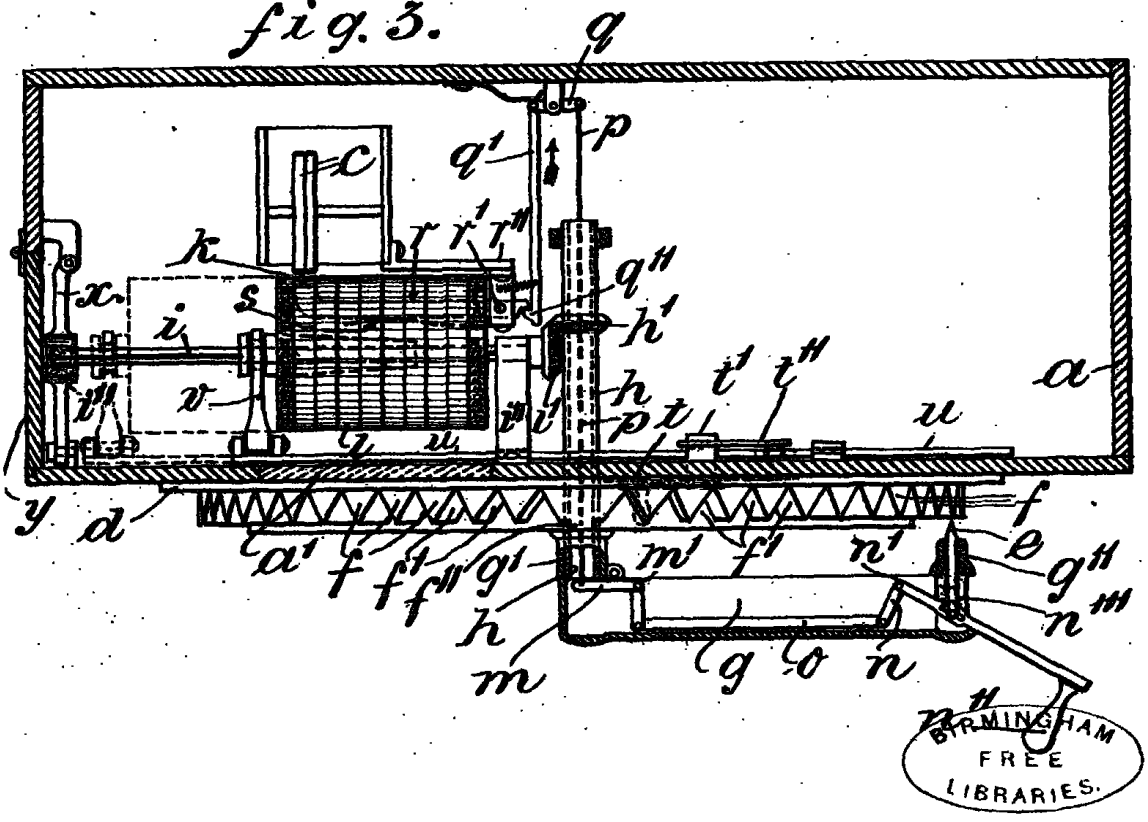


fig. 3.



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SHEET 3

fig. 4.

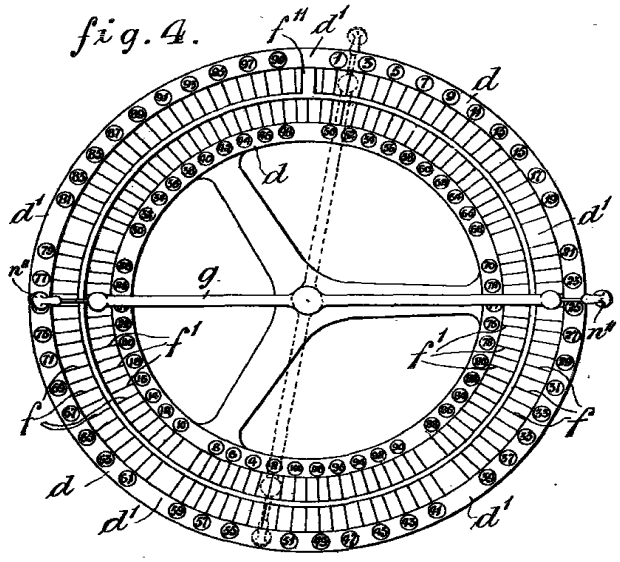
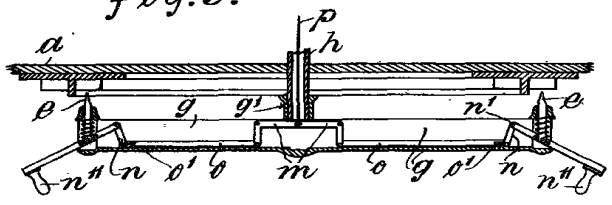
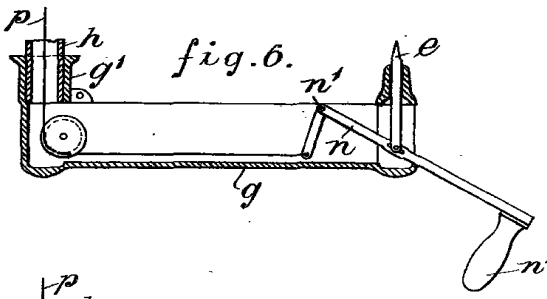
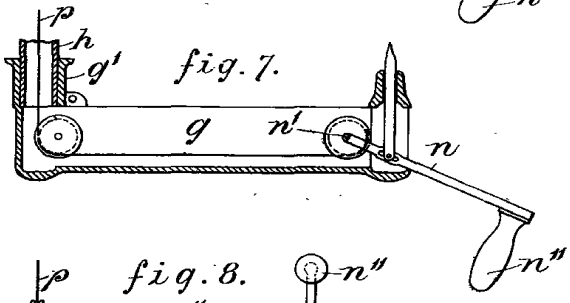


fig. 5.



SHEET 4





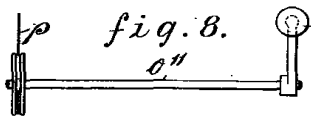


fig. 9.

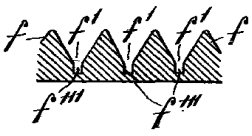
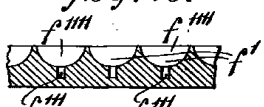


fig. 10.



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[This Drawing is a reproduction of the Original on a reduced scale.]

fig. 4.

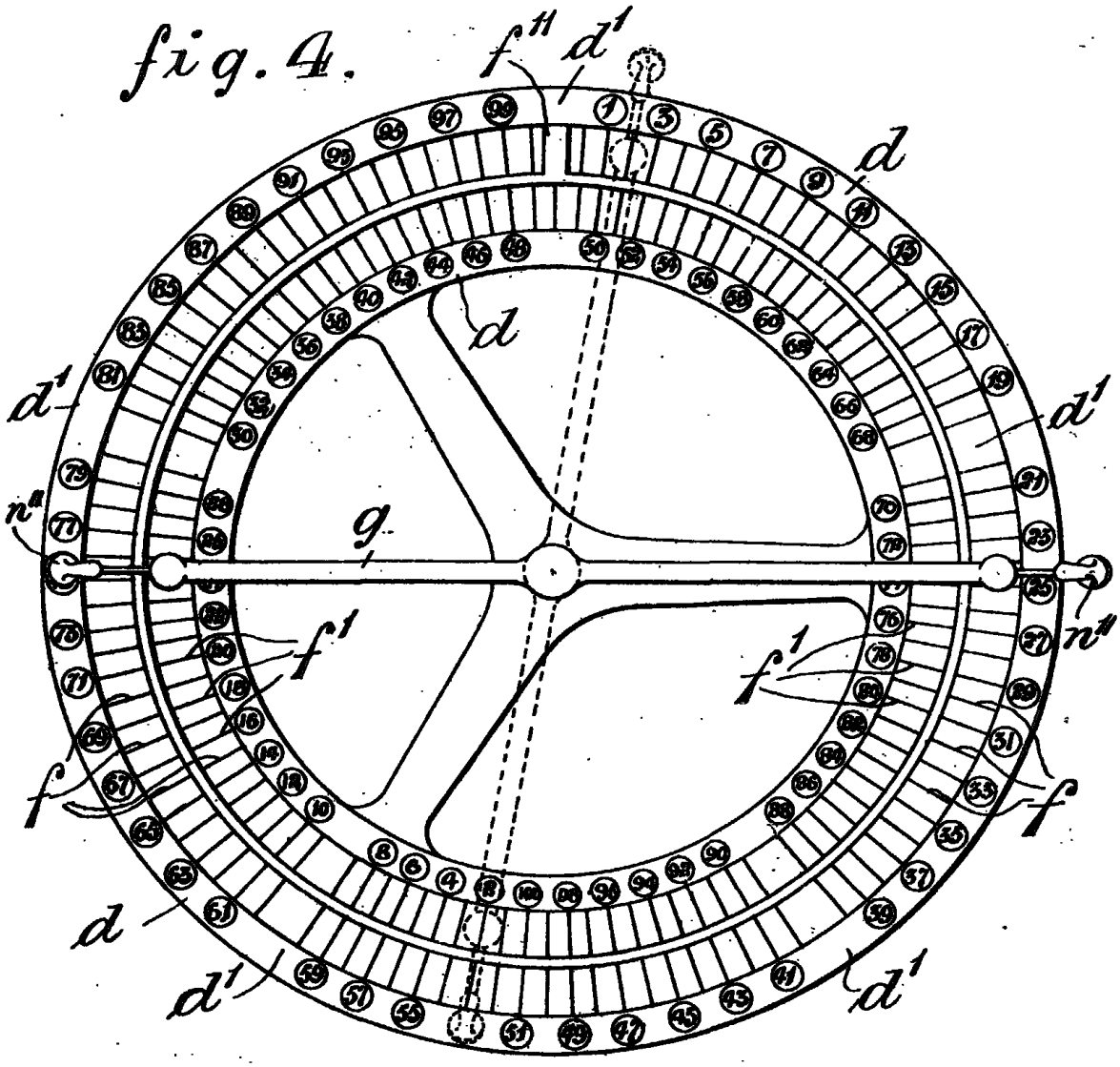


fig. 5.

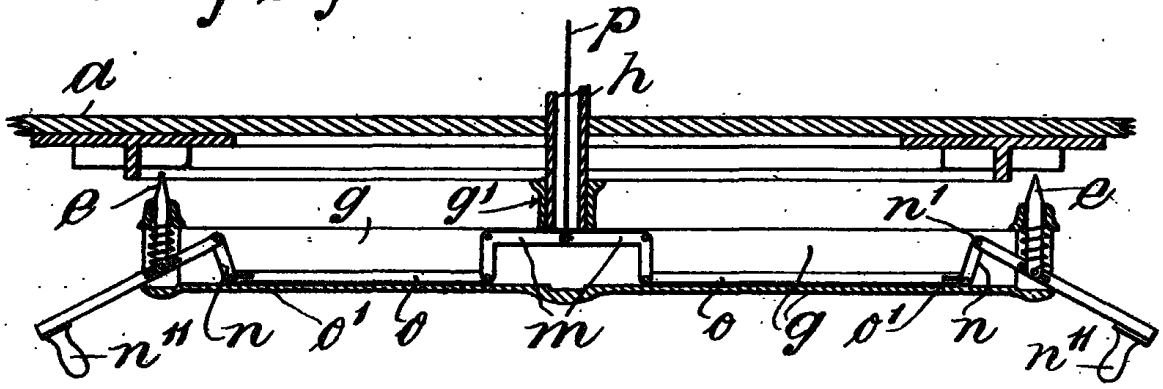


fig. 6.

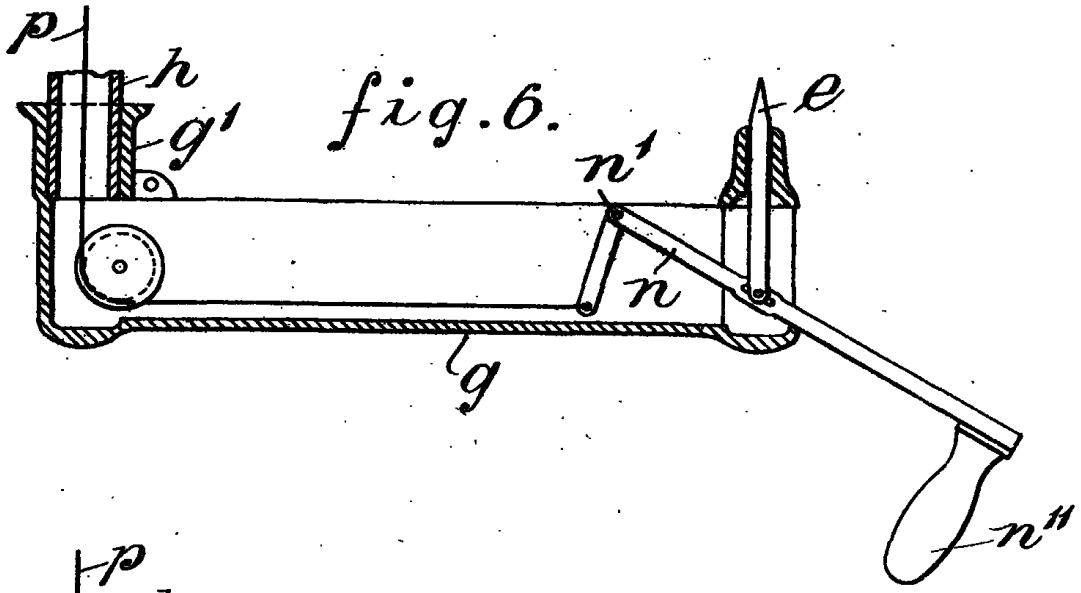


fig. 7.

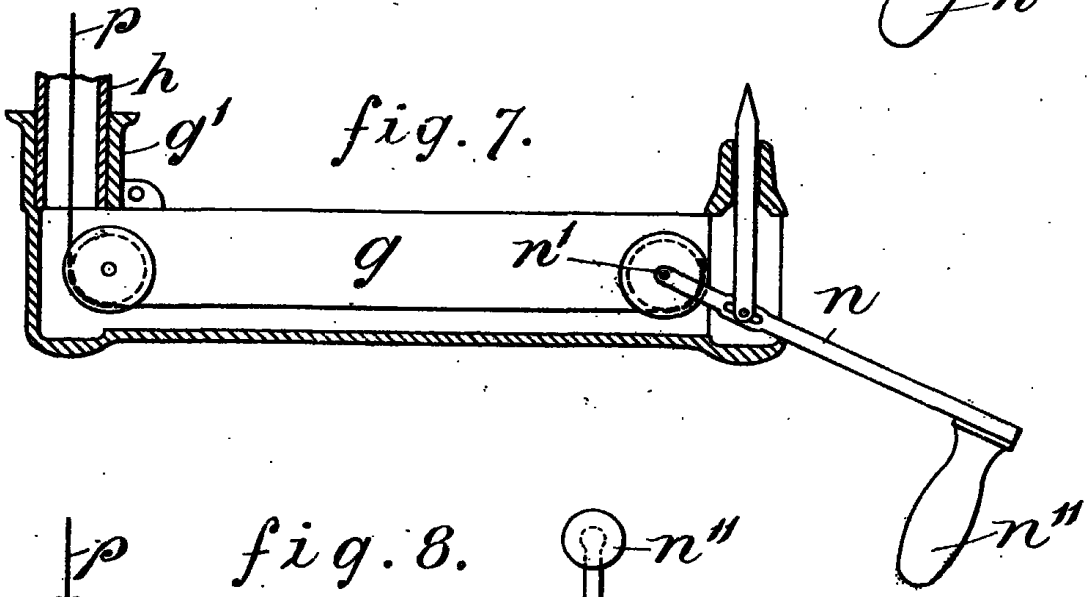


fig. 8.

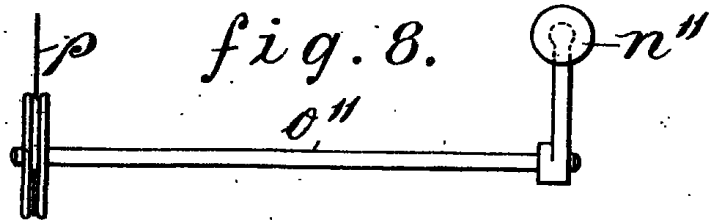


fig. 9.

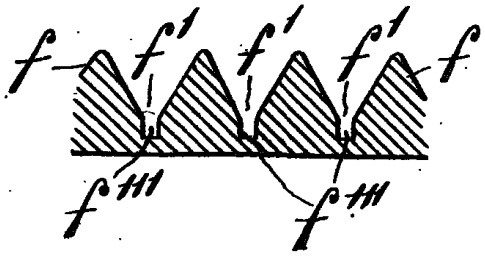
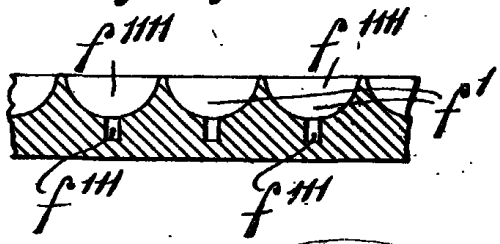


fig. 10.



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AMENDED SPECIFICATION.

Reprinted as amended in accordance with the decision of the Comptroller-General dated the 30th day of October 1905.

N° 14,268 **A.D. 1904**

Date of Application, 25th June, 1904

Complete Specification Left, 25th Mar., 1905—Accepted, 1st June, 1905

PROVISIONAL SPECIFICATION.

"Improvements in and Appertaining to Employees' Time Recorders and like Apparatus".

I, FRANK BROOK of 7 Wellington Street, Lindley, Huddersfield, in the County of York, Commercial Traveller, do hereby declare the nature of this invention to be as follows:—

This invention has reference to employees time recorders and like apparatus in which, by turning a hand lever or pointer or pointers around a dial or face plate to any desired number thereon indicating the person who desires to make a record, and then actuating certain mechanism, the time of entrance or departure of the employee, or of the commencement or completion of a piece of work, will be recorded by means of clockwork driven type wheels on the recording strip or sheet, opposite the number assigned to the employee.

The objects of my invention in the above type of time recorders are to provide on or in conjunction with the dial or face plate improved means for more easily centreing or guiding and correctly positioning the pointer or pin, or actuating lever or finger or fingers thereon, opposite any desired number on the dial; to apply improved means to the actuating lever or arm or pointer for actuating the hammer trip device, and to so arrange and construct certain of the parts of the recording apparatus that each record, when made, can be exhibited at the front of the case or dial.

For the purpose of my invention, I form on or apply to the dial around or close to the outer edge thereof and extending outwards from same at right angles, a series of V or diamond or similar suitable shaped projections having corresponding recesses or depressions between them, or said shaped projections may extend radially beyond the edge of the dial. Instead of V or similar shaped projections and corresponding recesses, circular or like openings or recesses may be made having flaring mouths and converging on all sides to a small central opening.

Each depression is opposite a number printed, impressed or affixed on the dial, the numbers being arranged in progressive order from 1 up to any desired number in a circle or circles concentric with the axis of the dial or disc. I may arrange said numbers in sections of, say, ten, or other number fixed upon, and between the last and first section or the highest and lowest numerals on the circle or one of the circles, I apply a stop piece or abutment to prevent more than a single revolution of the lever or pointer.

The lever arm or swaife whether single or double to answer for one or two concentric circles of numerals, is made of suitable hollow section with a boss as usual to fit upon the ordinary hollow shaft for giving motion thereto and to the drum or recording strip, or it may be the type disc, to move same around to bring the numeral corresponding to the numeral on the dial plate opposite to which the pointer is moved, on to the printing line, and in said hollow arm or in

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each arm at each end thereof I mount two bell crank or angle levers which are connected together by a link or rod.

To one arm of the angle lever at the inner end of the arm or arms I attach one end of a flexible wire cord, or a length of stout wire, which is passed through the hollow shaft and its other end secured to the trip motion for actuating the printing hammer.

The angle lever or levers at the outer end of the hollow arm or arms has or have one member thereof extending outwards some distance beyond the end of the arm and provided with a suitable knob or handle and also with an extension projecting at right angles and passing through an opening or guide in the end of the arm or arms, the extremity of said extension being suitably shaped to register in the V shaped recesses or depressions on the dial plate.

The movement of the handle or arm around the dial plate actuates the drum carrying the recording strip to ensure the number printed thereon and brought on to the printing line being the same as the number on the dial to which the arm is advanced, and when the employee presses the knob on the outer angle lever to force the extension or pointer thereon towards the dial, the converging sides of the depression opposite the number to which the arm has been moved causes the pointer to centre itself accurately, or is guided to the desired position.

The same movement of the angle lever, through the link or connecting arm, actuates the inner angle lever on the said arm, or the respective arm, which draws the cord or wire outwardly and thereby secures the necessary movement to actuate the trip gear.

When more than one circle of numerals is required to adapt the machine for a larger number of workpeople, and the actuating lever employed is a double armed lever, each arm carrying its respective pointer, I arrange that the connecting links coupling each pair of angle levers together shall be slotted at their inner ends in order that when the levers and connecting link in one arm are actuated by the depression of the pointer into a recess or flaring opening, the inner lever in the other arm can move on its pivot centre without actuating the outer angle lever in said arm, and springs are also employed to return the pointers to or maintain them in normal position.

In lieu of the inner bell crank levers and connecting links I may transmit the motion from the lever or levers carrying the pointer or pointers direct to the lever for actuating the hammer trip device by means of a flexible wire or wires or chains guided around a pulley or pulleys located in a central position to guide the cord or wire direct to the trip motion. In one modification, the pointer may be attached to or formed with an extension or arm fast on a stud carrying a small pulley or to the pulley itself, which takes the place of the outer bell crank lever, the cord being attached to the periphery of the pulley which is partially rotated by the movement of the pointer and takes up the wire or cord to actuate the trip motion; or the pointer may be fast on a longitudinal shaft extending through the actuating lever and carrying at its inner end a pulley to which is secured a length of wire attached at its opposite end to the trip motion lever, the partial rotation of the shaft in forcing inwards and centreing the pointer causing the pulley to wind on a portion of the flexible wire or chain and thereby operating the trip motion.

I preferably provide a recess or opening at the bottom of each V shaped or equivalent centreing recess and form a nose on the pointer to enter said small recess so that the hammer trip motion cannot be actuated until the pointer has entered the V or similar shaped recess to such an extent as to be accurately centred therein whereby the corresponding number on the recording strip will be accurately aligned for receiving the impression before the hammer strikes the blow.

My invention further consists in making the impression on the paper in such manner that the record last made can be examined from the front of the machine.

For this purpose according to one arrangement, I employ a skeleton drum or

framework to hold the recording strip or paper, said skeleton drum or cylinder comprising end portions and connecting cross bars or ribs spaced at equal distances apart and which may correspond in position to the divisions between each section of numerals on the dial.

Any suitable means may be provided for securing the ends of the paper strip on the cylinder.

I do not confine myself to the precise arrangement and construction of the cylinder as the same may be varied without affecting the object of this part of my invention which consists essentially in arranging the striking hammer within the cylinder to strike the paper against the type wheels from the inner side thereof and secure the impression being made on the outer surface of the paper. Any suitable trip lever or rod may be used to trip the hammer, the said lever or rod being actuated by the lever to which the flexible cord is attached.

The hammer may be placed horizontally or arranged to have a slight diagonal movement should the shaft of the cylinder not permit of a direct horizontal stroke.

The cylinder carrying the recording strip is adapted to be moved endwise on its shaft to present any desired section into which it is divided opposite the clock driven type wheels, this being effected by a sliding bar carrying a pivoted finger which engages with an annular groove in the boss of the cylinder or drum the said bar being moved endwise by means of a lever secured to a stud or shaft which extends through to the outside of the casing and has fast on its outer end a pointer lever adapted to be moved over an indicator divided into sections coinciding with the sections on the recording strip and denoting various periods of the day when the records are to be made, this pointer being moved by hand to set the cylinder in position to bring the required section opposite the printing wheels. Instead of a sliding bar, a system of levers or equivalent means could be employed to traverse the cylinder laterally. The cylinder shaft is suitably supported at one end in a bearing which is adapted to be moved outwardly away from the shaft to enable the cylinder to be withdrawn for the removal of the used record strip and the application of a fresh one thereto; the pivoted finger on the sliding bar also being movable clear of the cylinder for the same purpose.

As a modification, I may dispense with the striking hammer and press the type wheels against the paper on the cylinder to give the impression; or the skeleton drum or cylinder may be dispensed with and the paper strip caused to wind on to a take-up bobbin by ratchet, or step by step, motion, and to have the record printed thereon in chronological order by moving the type disc to bring the workman's number into alignment with the type presented by the minute and hour type wheels and striking the time by means of the hammer, the impression made thereon being exposed to view opposite an opening in the dial.

The paper on the cylinder is numbered in sections corresponding to the sections of numbers on the dial and the cylinder is rotated to the same relative extent as the arm in moving same over the dial to the number desired.

Dated this 23rd day of June 1904.

C. A. BARRON & LEWIN,
32 John William Street, Huddersfield.
Agents for the Applicants.

COMPLETE SPECIFICATION (AMENDED).

"Improvements in and Appertaining to Employees' Time Recorders and like Apparatus".

I, FRANK BROOK of 7 Wellington Street, Lindley, Huddersfield, in the County of York, Commercial Traveller, do hereby declare the nature of this invention

and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention has reference to employees' time recorders and like apparatus in which, by turning a hand lever or pointer around a dial or face plate to any desired number thereon indicating the person who desires to make a record, and then actuating certain mechanism by pressing the handle inward, the time of entrance or departure of the employee, or of the commencement or completion of a piece of work, will be recorded by means of clockwork driven type wheels on the recording strip or sheet opposite the number assigned to the employee.

The objects of my invention in the above type of time recorders are to provide on or in conjunction with the dial or face plate, improved means for more easily centreing or guiding and correctly positioning the pointer or pin, or actuating lever or finger or fingers thereon, opposite any desired number on the dial; to apply improved means to the lever arm or pointer for actuating the hammer trip device; and to so arrange and construct certain of the parts of the recording apparatus that each record, when made, may be exhibited at the front of the case or dial.

In the accompanying drawings forming a part of this specification:—

Fig. 1 is front elevation of an employees time recorder embodying my improvements;

Fig. 2 is an enlarged front elevation of the dial and parts shewing clearly my improvements.

Fig. 3 is sectional plan view of the recorder casing shewing the parts illustrated in Fig. 2.

Fig. 4 is elevation of a dial plate constructed according to my invention, having two concentric circles of numbers with centreing depressions to each;

Fig. 5 is sectional plan of same and compound lever employed.

Figs. 6, 7, and 8 shew modifications of the means for actuating the hammer trip device;

Figs. 9 and 10 are sections of a portion of the dial plate shewing the preferred form of depressions which may be adopted, with means for ensuring centreing of the pointer before the record can be made;

Fig. 11 is a perspective view of the skeleton drum or cylinder for carrying the recording strip, and,

Fig. 12 shews a fragment of the recording strip detached and on a larger scale.

Referring to the drawings, letter *a* represents the casing containing a clock *b* which is coupled by a flexible shaft in the usual way to mechanism (not shown) for actuating the type wheels *c*, the rotation of the minute and hour type wheels *c* being common to workpeoples time recorders.

The first part of my invention refers to the dial plate *d*, and to an improved construction of the said dial plate, whereby the pointer or pin *e* by which the required number of the workman is indicated and the corresponding number on the record strip brought opposite the type wheels, is more easily centred or guided, or correctly positioned, relatively to the desired number. This part of my invention consists in forming or applying around the outer edge of the dial *d* and extending outwards from same, a series of V or diamond or similar suitably shaped projections *f* having corresponding recesses or depressions f^1 between them; or the said shaped projections may extend radially beyond the edge of the dial.

Each depression f^1 is opposite a number printed, impressed or otherwise affixed on the dial, as illustrated in Figs. 1 and 2, the numbers being arranged in progressive order from 1 up to any desired number in a circle or circles concentric with the axis of the dial or disc. The said numbers are arranged in sections, of, say, ten or other number fixed upon, and between the last and first sections, or the highest and lowest numerals, there is a stop piece f^{11} to prevent more than a single revolution of the lever or pointer.

The lever arm or swaife *g* to carry the pointer *e* is made of suitable hollow

section with a boss g^1 as usual to fit upon the ordinary hollow shaft h which has mounted thereon a bevel or mitre wheel h^1 gearing with a bevel or mitre wheel i^1 fast on a shaft i supported in bearings i^{11} and through which said gears motion is conveyed from the hollow shaft h to the drum or cylinder k carrying the recording strip of paper l in order to rotate said drum to bring the numeral marked at the edge of the recording strip thereon corresponding to the numeral on the dial plate opposite to which the pointer is moved and depressed, on to the printing line. The drum or cylinder k is secured rotatively to the shaft i but, in this instance, is free to be slided endwise along said shaft to bring any desired marked off space or section on the paper strip l opposite the printing type wheels c.

In the hollow arm or lever g at each end thereof are bell crank or angle levers m, n mounted respectively on studs m^1, n^1 secured to the lever arm g.

One arm of each of said levers are connected together by a link or rod o, and to the other arm of the lever m is attached one end of a flexible wire cord p, or a length of stout wire, which is passed through the hollow shaft h and its opposite end secured to a double armed lever q to whose opposite arm is connected a rod or finger q^1 supported in a horizontal plane by any suitable bearing or platform, and having a hook or projection q^{11} at its free end which is adapted to engage with and trip a hammer r pivoted at r^1 on a stand or bracket r^{11}. The angle lever n at the outer end of the hollow arm g has one member thereof extending outwards some distance beyond the end of the said arm and provided with a suitable knob or handle n^{11} and also with an extension n^{111} projecting inwardly toward the dial plate and passing through and being guided in an opening g^{11} in the arm g, the extremity of said extension being suitably shaped to register in the V shaped recesses or depressions f^1 on the dial plate, and comprising the pointer or pin e.

The movement of the handle or arm g around the dial plate rotates the hollow shaft h and through bevel gears h^1 and i^1 gives a proportionate rotation to the shaft i and drum k to bring the number on the paper record strip l corresponding to that opposite the space f^1 to which the pointer has been moved, into alignment with or on the same horizontal plane as the hammer r, and when the pointer or pin is brought opposite the recess coinciding with the number required, the employee presses the knob n^{11} towards the dial plate whereby the pointer e, by means of the converging sides of the depressions or V shaped recesses, is caused to centre itself accurately in the proper recess.

The same inward pressure upon the handle or knob n^{11} through link o, bell crank lever m, wire connection p and lever q causes the rod or finger q^1 to be drawn sharply in the direction of the arrow (Fig. 3), whereby the hammer is moved on its pivot centre away from the paper record strip against the pressure of a spring s and when the hook or catch q^{11} at the free end of the rod or finger q^1 passes clear of the correspondingly shaped end of the hammer, the spring forces the latter back, and by a percussive blow, said hammer strikes the paper strip against the ink ribbon (not shown) and type wheels, whereby the hour and the minute or second or fraction of a minute or second are printed on the paper recording strip opposite the number thereon corresponding to the number on the dial to which the pointer or pin e has been moved.

A spiral spring holds the hammer actuating rod q^1 in engagement with the end of the hammer and admits of the hooked end riding over same on its return movement after each actuation.

The ink ribbon is traversed between the recording strip and the type wheels by any known mechanism.

When it is required to use a larger number of numerals and it is not desirable to increase the size of the dial plate or to decrease the space between the centreing depressions, I construct the machine with a dial plate as shown at Fig. 4,

there being, say, an outer circle containing odd numbers, and an inner circle containing the even numbers, the lowest of which commences diametrically opposite the numeral 1 in the outer circle, the numbers in the outer circle being arranged progressively from right to left and those on the inner circle from left to right. There are two concentric circles of centreing depressions f^1, these being made between the two circles of numerals as shown; or alternate of the circles of numerals; or one set on the outside of the outer circle of numerals and the other set within the inner circle of numerals respectively as may be preferred.

The actuating lever g is, in such case, a double armed lever having a pointer or pin e at each end, one being opposite the inner circle of depressions f^1 and the other opposite the outer circle of centreing depressions. In order that the depression of either pointer shall actuate the hammer trip motion without affecting the other pointer, the connecting links coupling each pair of angle levers m, n together are slotted, as at o^1, whereby when the levers m, n and connecting link in one arm of the lever are actuated the inner lever m in the other arm (each lever m being connected to the cord p) can move on its pivot centre without actuating the outer angle lever in said arm.

Springs are confined on the pointers e to maintain them in normal position. The two circles of numerals and the two arms of the compound lever may be painted in contrasting colours to avoid error in using the proper pointer.

More than two circles of numerals and centreing depressions may be employed if necessary, additional arms and pointers being provided in conjunction with same.

In lieu of the inner bell crank levers m and connecting links o, motion may be transmitted from the lever n carrying the pointer, direct to the lever for actuating the hammer trip device by means of a flexible wire cord or chain connected to the lever n, or to a pulley taking the place of the lever n and to which the arm carrying the pointer is secured, and guided around a pulley located in a central position to guide the cord or wire direct to the trip motion, as illustrated at Figs. 6 and 7. Such alternative arrangements may be duplicated for a double arm and a light spring provided to take up the slack of the cord.

In another modification, the pointer may be secured on a longitudinal shaft o^{11}, see Fig. 8, extending through the lever g and carrying at its inner end a pulley to the periphery of which the cord or wire p is attached. The partial rotation of the shaft o^{11} in forcing the pointer inwardly causes the pulley to wind on a portion of the flexible wire or cord and thereby operate the trip motion.

I preferably provide a countersunk recess, opening or channel, at the bottom of each V or equivalent shaped centreing recess f^1, as indicated at f^{111} in Fig. 9, and form a nose on the pointer to enter said small recess, so that the hammer trip motion cannot be actuated until the pointer has entered the V or similar shaped recess f^1 to such an extent as to be accurately centred therein, that is to say, the nose of the pointer must enter the recess or channel f^{111} before the actual printing takes place, whereby the corresponding number on the recording strip will be accurately aligned for receiving the impression before the hammer strikes the blow.

Instead of V or similar angular shaped projections and corresponding recesses, circular or like openings or recesses may be made, as illustrated at Fig. 10, these having flaring mouths f^{1111} and converging on all sides to a small central opening f^{111}.

A hole or opening a^1, with glass let into same, is left in the front of the case to expose the record strip to view so that the impressions made thereon can be examined at any time from the outside.

The dial plate having V shaped recesses opposite each number thereon for facilitating the centreing of the pointer may be used in any other arrange-

ment or make of dial and pointer machine in which a pointer is moved around a numbered dial to the number required and then pressed forward to force a stud or finger into an opening in the dial plate to ensure the record being made opposite the corresponding number on the recording strip.

My invention further consists in making the impression on the surface of the paper secured on the drum or cylinder k by a hammer blow from the inside of the drum, and for this purpose I employ a skeleton drum or cylinder comprising end portions k^{1}, k^{11} and connecting cross bars or ribs k^{111} spaced at equal distances apart somewhat as shown at Fig. 11, the space occupied by each cross bar corresponding in position to the divisions d^{1} between each section of numerals on the dial d.

The paper strip is passed around and its opposing ends secured by any suitable known means to the cylinder k so as to rotate therewith.

The said skeleton cylinder is employed in order that the hammer r may be located within the cylinder to strike against the rear face of the paper recording strip and cause the impression of the type presented by the type wheels to be made on the outer face of the paper to give a better impression than is produced by the pressure of the cylinder against the type wheels, or conversely.

For the purpose of bringing the various sections into which the recording strip is divided laterally, opposite the striking surface of the hammer and the type wheels, I have devised means for moving the drum or cylinder k longitudinally on its shaft instead of sliding the carriage or frame carrying the type wheels and the hammer laterally, as I find this to be the more convenient arrangement.

To move the cylinder k longitudinally to present the desired section of paper opposite the type wheels, I employ a lever t fast on a stud t^{1} supported in bearings in the casing and projecting through said casing to the interior thereof and on the inner end of which is secured a second lever t^{11} carrying at its free end a stud or pin which enters and engages a slot in a projection on one end of a longitudinal sliding bar or rod u supported in bearings or brackets secured to the wall of the casing. To the end of said bar or rod is hinged a finger v which extends into an annular groove or recess in the boss of the drum or cylinder k and engages with the sides thereof.

The free end of the lever t forms a pointer and is adapted to be moved over a scale or indicator w which is marked with the times or periods during a working day at which it is required the workpeople shall register on entering and leaving the premises, and in setting the pointer opposite any of the marked spaces on the indicator w, the drum k through levers t, t^{11} rod u and finger v, is moved longitudinally on its axis to bring the corresponding section marked on the recording strip opposite the type wheels, as will be clearly seen from the drawings.

The recording strip is so marked that opposite each cross bar on the cylinder there is a blank space on which no record can be made and such blank spaces correspond to the spaces left between each section of numerals on the dial.

The outer end of the shaft i is mounted in a bearing in the hinged arm or stand x, which is adapted, when the door y is opened, to be swung outwardly clear of the shaft i in order that by elevating the finger v clear of the drum, the latter can be readily withdrawn from the casing to admit of the record strip being removed and another one attached in its place.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In time recorders and like apparatus in which, to record the time of arrival or departure, a lever or pointer is moved around a dial to the desired number marked thereon, the application to or formation on or around said dial of V

or diamond shaped projections having corresponding recesses or depressions between them, or circular depressions, coinciding with the numbers on the dial to accurately centre the pointer when actuating same to make a record opposite a corresponding number on the recording strip, substantially as set forth.

2. In time recorders and like apparatus in which a lever or pointer is moved around a dial plate to any desired number denoting the number assigned to the employee, the use of V or like angular shaped depressions, or circular depressions with flaring mouths each having at the base thereof an opening or recess to receive the nose of the pointer to accurately centre said pointer before actuating the hammer trip device, substantially as shewn and described with reference to Figs. 9 and 10.

3. The combination with a dial plate having V or similar shaped projections and depressions on its outer face or edge, of a pointer and the means for actuating the hammer trip device to trip the hammer, substantially as herein set forth and described with reference to Figs. 1 to 8.

4. In a time recorder, the combination of two or more circles of numerals, and pointers carried by two or more arms whose radial movement gives a proportionate rotation to a drum carrying the record strip of paper, said pointers being coupled by levers and flexible connection or connections to a hammer trip device for actuating same, as herein set forth.

5. In a time recorder the combination of one or more circles of numerals with respective centreing depressions and a chisel nosed pointer or pointers and means connected therewith for actuating a hammer trip device, as described and illustrated herein.

6. The combination of a hammer trip device, a skeleton drum or cylinder carrying a record strip of paper on its periphery and rotated relatively to the pointer, and a hammer located and operating within the cylinder to strike against the inner face of the record strip to obtain the impression on the outer face of said strip, substantially as herein set forth, and for the purpose specified.

7. The combination with a dial plate having at its outer diameter or edge one or more circles of V or similar projections and depressions, of the means for actuating the hammer, a skeleton drum or cylinder carrying the record paper strip and within which the hammer is located, and the means for moving the drum or cylinder laterally to present the different sections required opposite to the type wheels and hammer, all arranged and operating substantially as herein shown and described.

Dated this 24th day of March 1905.

C. A. BARRON & LEWIN,
32 John William Street, Huddersfield
Agents for the Applicant.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1905.

A.D. 1904. JUNE 25. N° 14,268.
BROOK'S AMENDED SPECIFICATION.

(4 SHEETS)

SHEET 1

fig. 1.

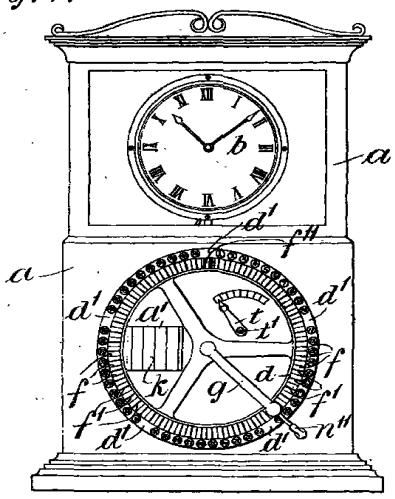

fig. 11.

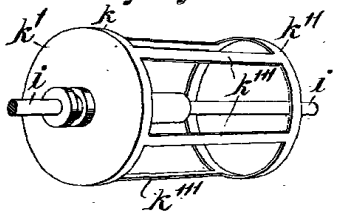

fig. 12.

	IN A M	OUT SEC	IN MIN	OUT MIN	IN HOURS	OUT HOURS	IN DATE	OUT DATE	
1									1
2									2
3									3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16

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SHEET 2.

fig. 2.

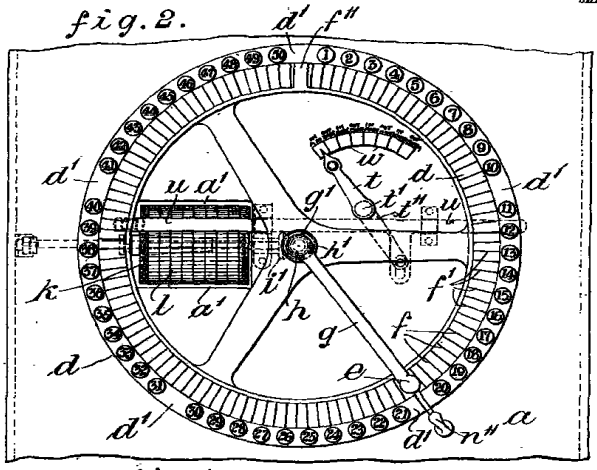

fig. 3.

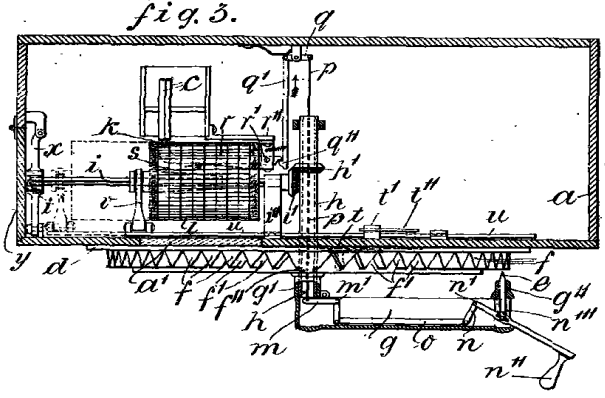

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fig. 1.

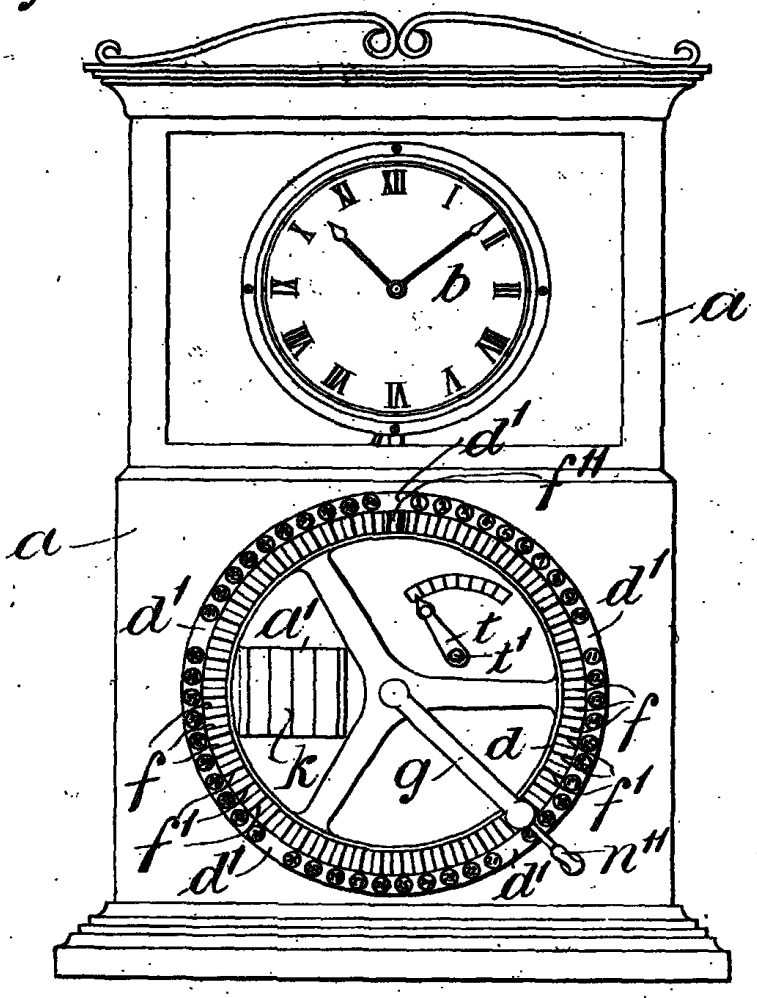


fig. 11.

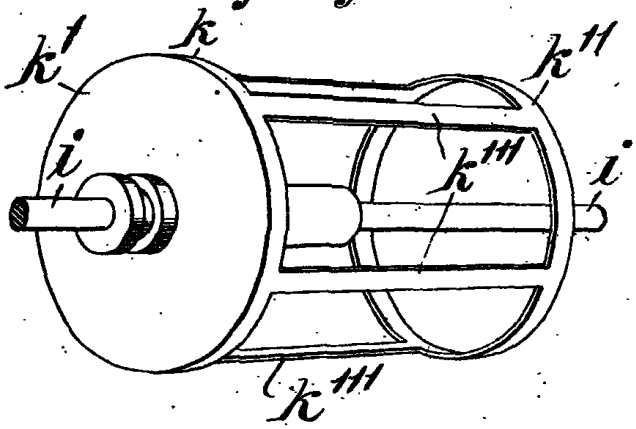


fig. 12.

	IN A M	OUT BKFST	IN BKFST	OUT NOON	IN NOON	OUT NIGHT	IN EXTRA	OUT EXTRA	
1									1
2									2
3									3
4									4
5									5
6									6
7									7
8									8
9									9
10									10
11									11
12									12
13									13
14									14
15									15
16									16

l

fig. 2.

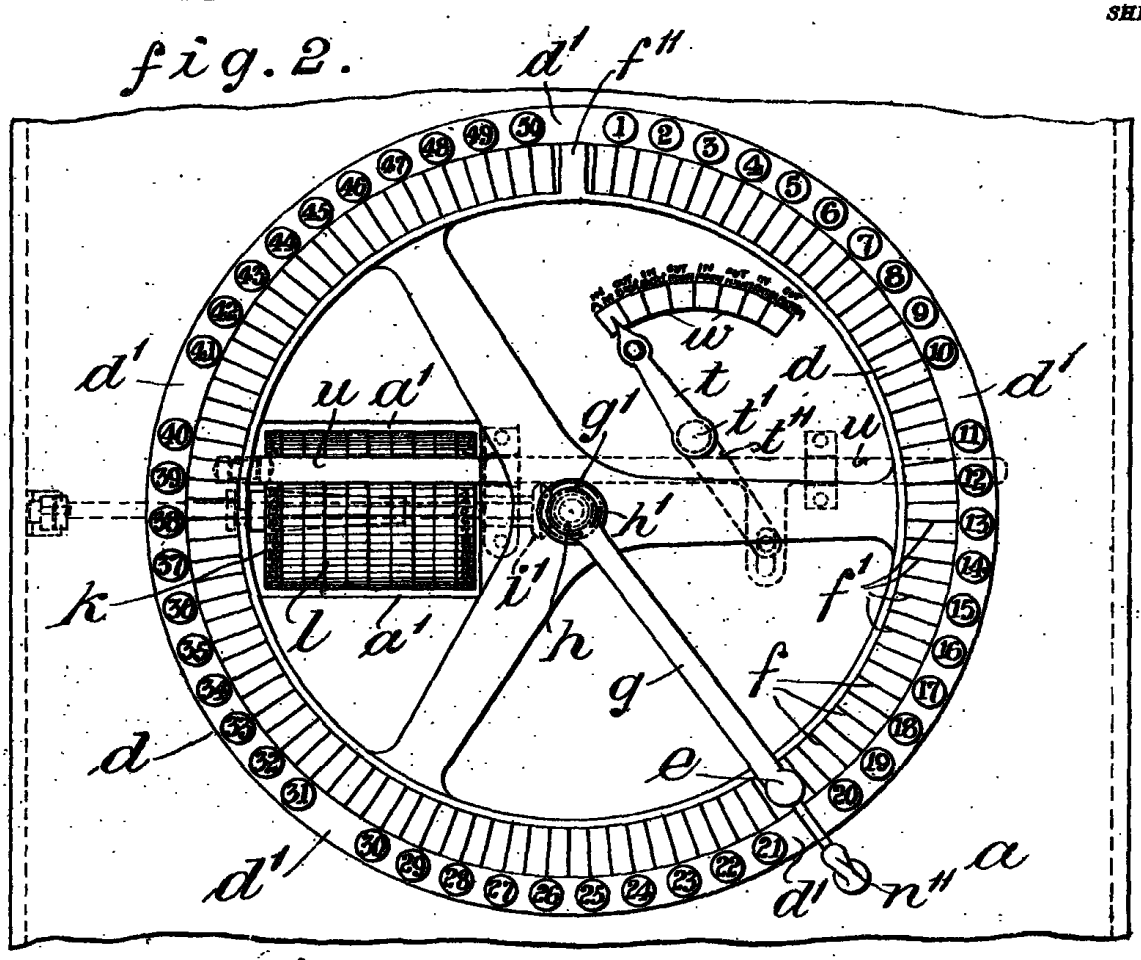
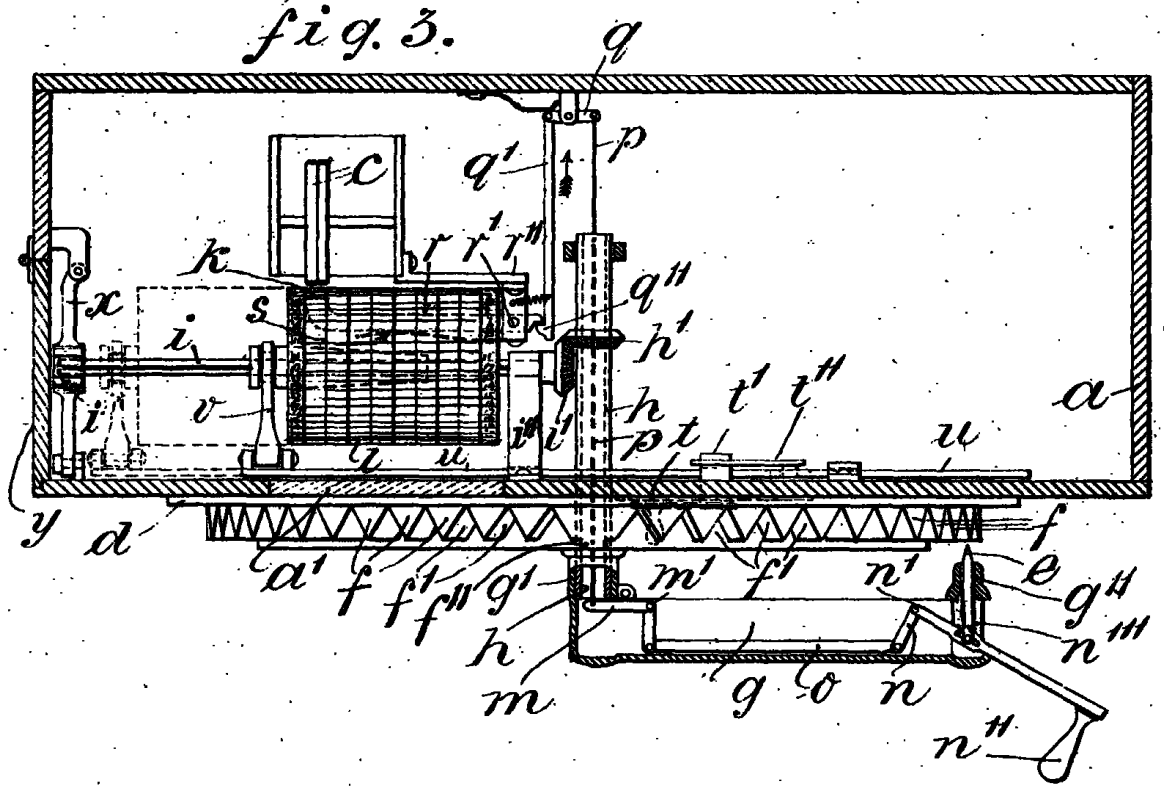


fig. 3.



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SHEET 3

fig. 4.

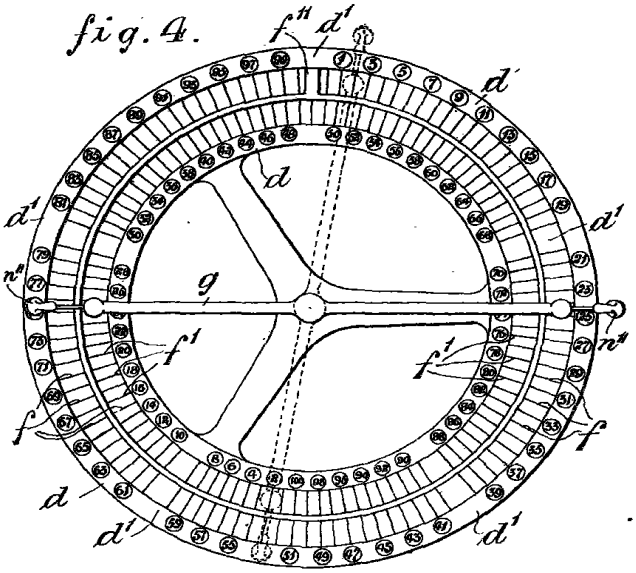
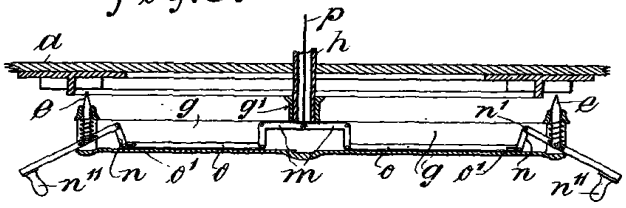


fig. 5.



(4 SHEETS)
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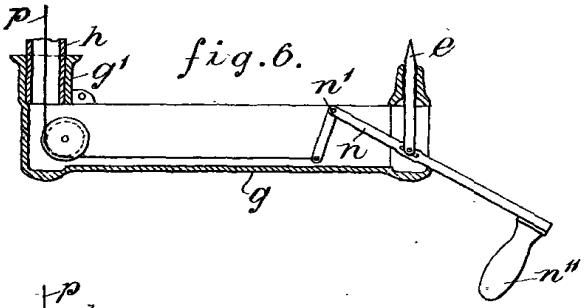

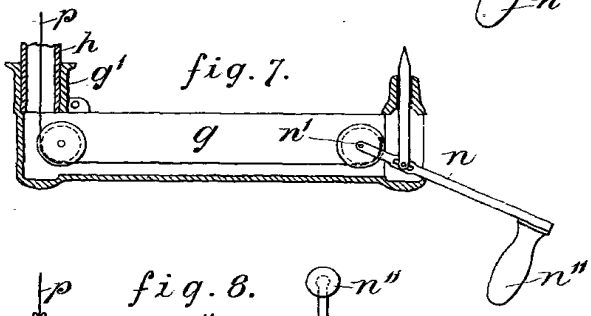

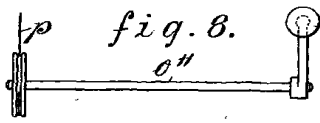

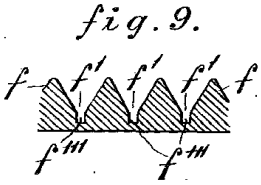

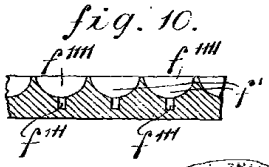

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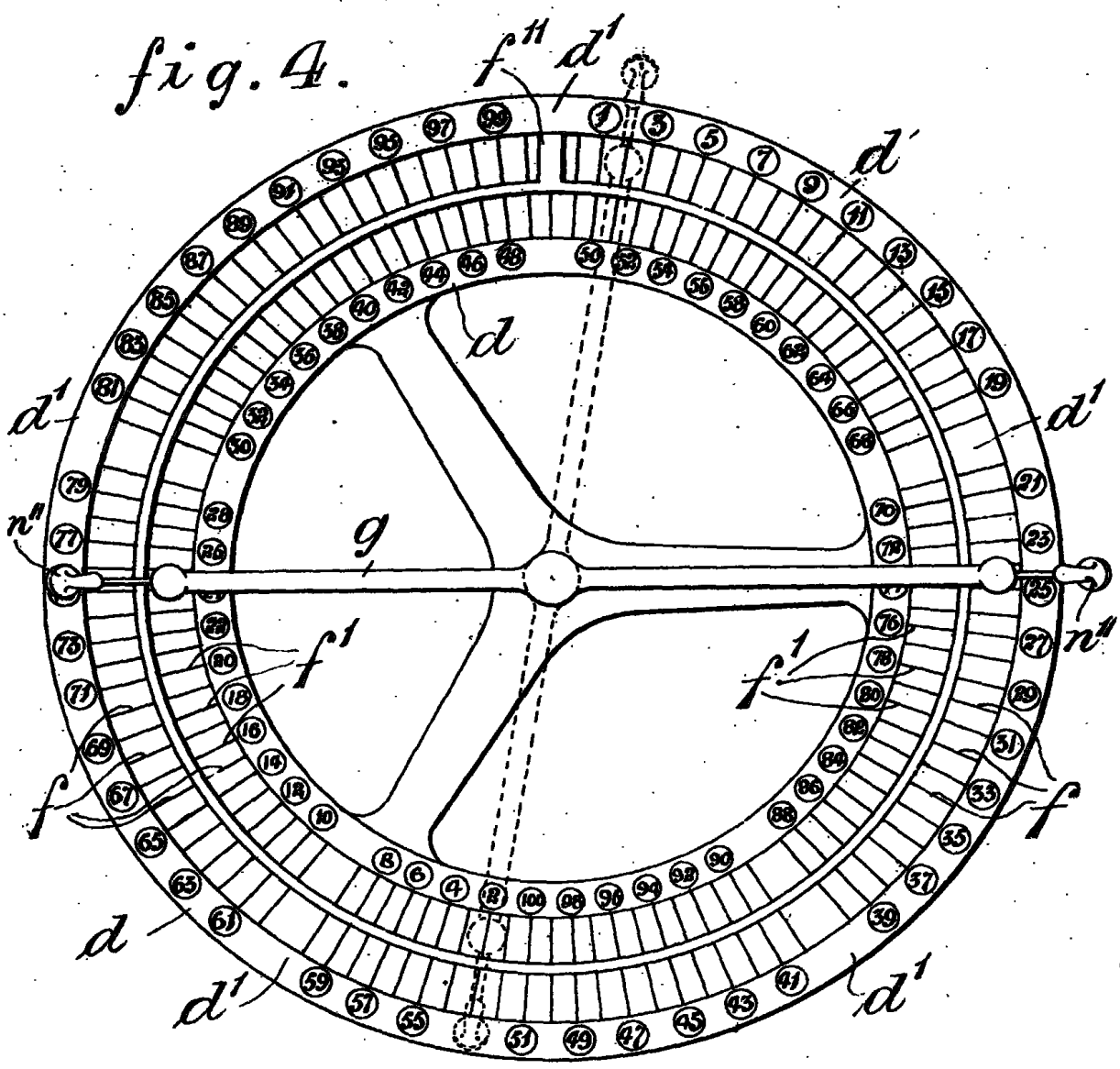
fig. 4.



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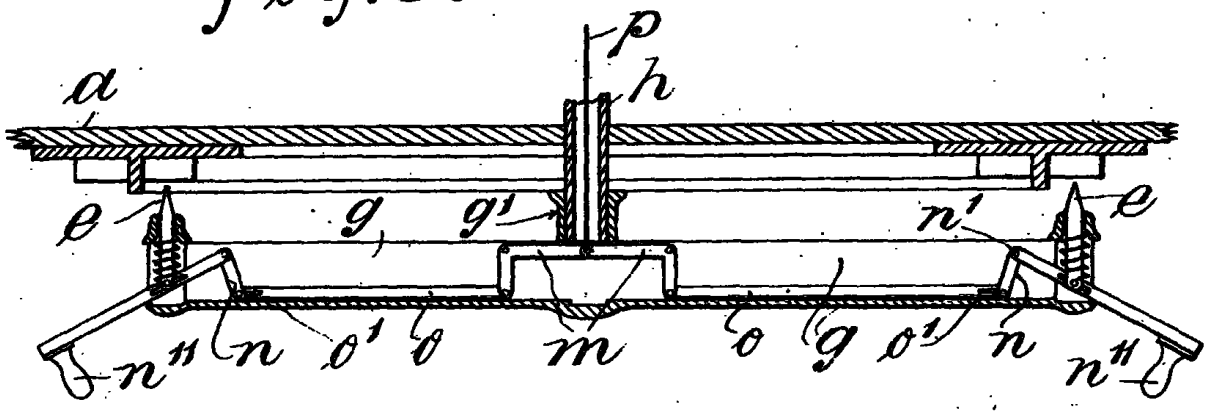


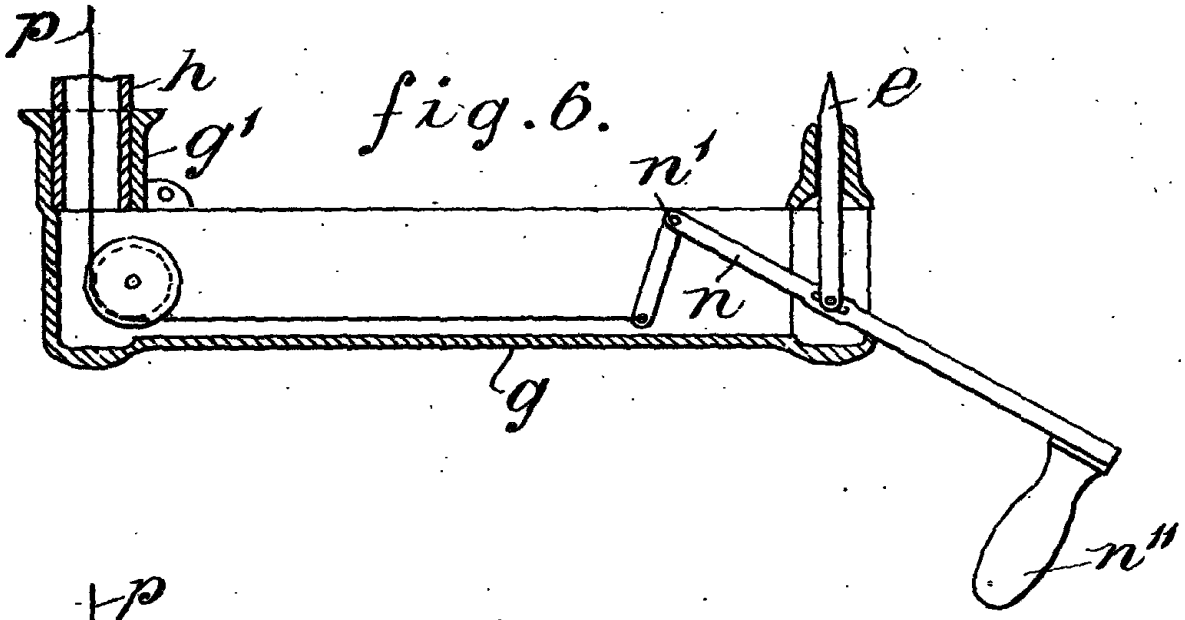
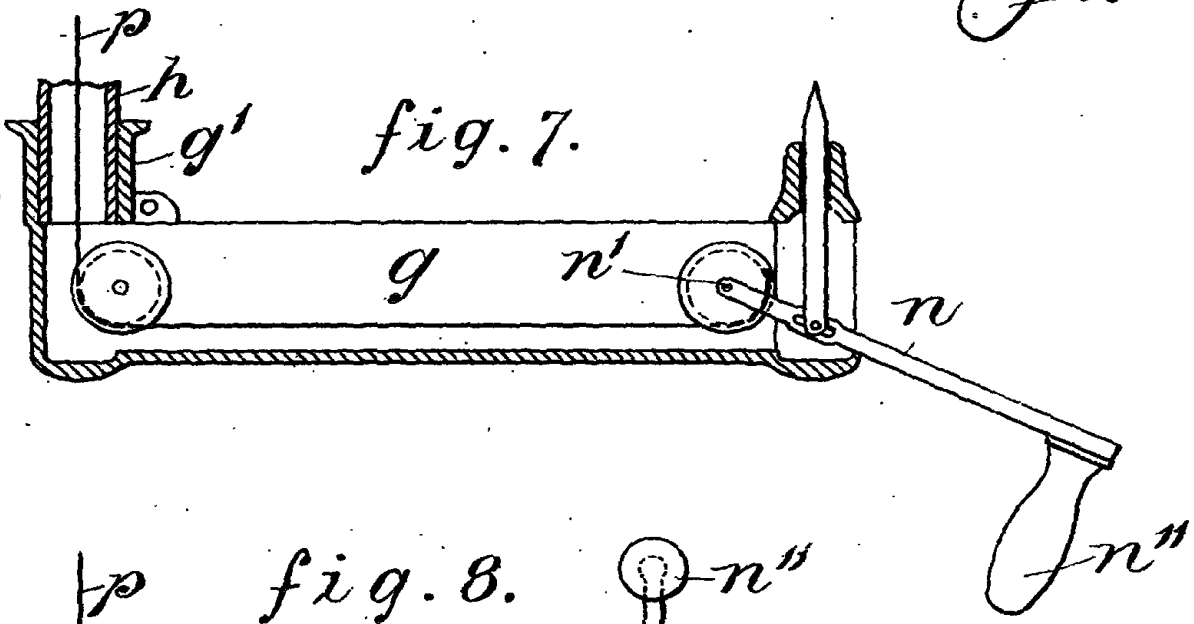


fig. 6.



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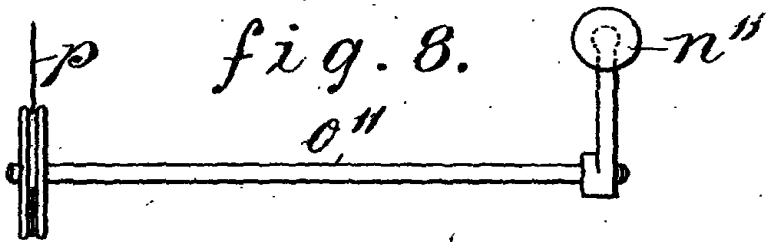
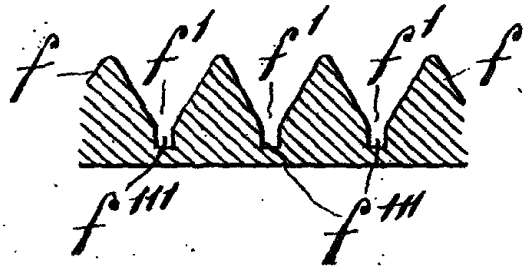


fig. 8.

fig. 9.



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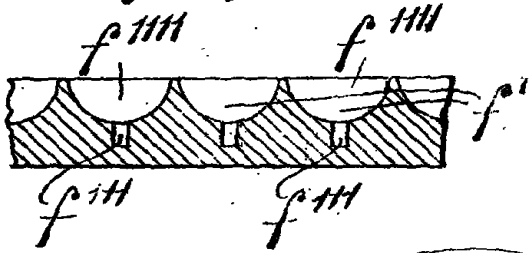

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