N. T. FICKER.
APPARATUS FOR RECORDING AND COMPUTING MANUFACTURING COSTS,
APPLICATION FILED JAN. 26, 1915.

Patented Dec. 12, 1916.
2 SHEETS—SHEET 1.

Fig. 1

Fig. 2

INVENTOR.
Nicholas Thiel Ficher

Williamson, Guitera and Mackenzie
ATTORNEYS
Fig. 9

**THIS SIDE UP**

**DIRECTIONS FOR USING FICKER COMPUTING COST RECORDER**

*When starting*:
- Lever UP for IN and stamp card.
- Lever DOWN for OUT and stamp card.

*When finishing*:
- Lever UP for IN and stamp card.
- Lever DOWN for OUT and stamp card.

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**WITNESSES:**
- M. A. Sidon
- H. W. Upman

**INVENTOR:**
- Nicholas Thiel Ficker

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**ATTORNEYS:**
- McNew, Bisetti and MacKay
**Fig. 10**

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| FINISHED | 3:10 | 1.50 | 0.37 | 0.22 |

| No. 4 | 2:10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **1-1-1914** |
| STARTED | 3:00 | 1.50 | 0.37 | 0.22 | 7.50 | 1.57 | 0.94 |
| FINISHED | 3:10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **1-1-1914** |

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| FINISHED | 5:00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **1-1-1914** |

**WITNESSES:**
- A.A. Sidon
- M. Nelson

**INVENTOR:**
- Nicholas Thiel Ficker

**ATTORNEY:**
- M. W. L. F. F. F.
To all whom it may concern:

Be it known that I, Nicholas Thiel Ficker, a citizen of the United States, residing at New York, in the county of New York, and State of New York, have invented certain new and useful Improvements in Apparatus for Recording and Computing Manufacturing Costs; and I do hereby declare, the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to apparatus for facilitating factory computations, and more particularly to an inexpensive and reliable device which can be placed on the bench of every journeyman in a factory by which he may provide an accurate account of the time he works on the different jobs of that time on various jobs with a minimum expense of time and trouble.

Certain features of my invention have further relation to accurate and speedy computation and job distribution of wages and overhead charges, as well as to simultaneous computation of daily totals of wages and overhead charges.

It has been found essential for efficient factory management to be able to obtain a ready and certain record of time, wages and overhead charges, not only with respect to their totals in given periods of time, but also with regard to the proportions of such totals properly assignable to each job worked upon. Only in this manner is it possible to obtain such data as will facilitate making intelligent bids upon work offered, and such as will give a clear idea of the relative profit found in different kinds of work.

My improved individual workman’s indicator makes it possible to gather these data without any material appeal to the intelligence or care of the workman, and by the use of sturdy, cheap and reliable mechanism.

While the full benefit of my invention is derived from the use of printing wheels bearing types, these are not absolutely essential, since indicating wheels may be used whose indications at proper times may be copied. It is, therefore, to be understood that the term “indicating wheel” in my claims applies either to a wheel bearing 55 characters intended only for inspection or to one carrying types capable of impressing characters.

An example of an embodiment of my invention is illustrated in the accompanying 60 drawings, wherein—

Figure 1 is a perspective view of the exterior, Fig. 2 is an end elevation of the same with one end of the casing removed, Fig. 3 is a plan view of the platen and top removed, showing only the location of the various supporting shafts, Fig. 4 is an elevation showing a portion of the indicating wheels and cams in vertical section, Fig. 5 is a perspective diagrammatic view showing the principal elements so separated as better to exhibit their functional relations, Figs. 6, 7 and 8 show various positions of cams, ratchets, pawls, etc., in perspective and Figs. 9 and 10 show opposite sides of a specimen coupon card especially designed for receiving the necessary impressions from the machine when printing wheels are used.

In using my improvement each workman’s bench should be provided with one 80 machine which will have substantially the appearance shown in Fig. 1, having a casing 10, with a printing opening 11 over which a platen 12 is placed, being mounted on a stem 13, adapted to slide in a bearing 14 suitably supported over said opening. All of these machines are controlled from a master clock, for instance as shown at 15 in Fig. 5. This clock governs an electric circuit with which connection is made at each bench by a cable 16 and socket 17, in a well known manner. The mechanism within the casing is adapted to running the minute hand and hour hands of a clock 18, at one end of the casing.

Inspection of Figs. 5 to 9 in connection with the following description will make the general features of my invention clear; but it is to be understood that the specific details about to be described are not essential to my invention, broadly considered.

Indeed the particular details of construction set forth in Fig. 5, for instance, differ in some respects with the preferred arrangement shown in Figs. 1 to 4.

I employ a group of indicating wheels,
and motive means therefor so arranged that the operative relation of said means to some of said indicating wheels is automatically controlled by movement of another. This

first controlling wheel preferably forms a part of a master wheel, and, in the preferred form shown, there is a master wheel for regular or normal operation and another master wheel which acts in cooperation with the first named for producing certain occasional operations.

In the form shown, the indicator wheels take the form of four printing wheels; namely, the hour wheel 19 and minute wheel 20 (the time wheels) the job wheel 21 and the totalizing wheel 22 (computing wheels). These are mounted to revolve in parallel planes side by side upon a common fixed supporting shaft 23. The computing wheels are driven by a spring 24 and 25, or equivalent devices tending constantly to return them to a pre-established zero. This zero position is assumed when the projections 26 and 27 on the wheels are brought against the fixed stops 28 and 29 respectively.

In the specific form shown in Figs. 1 and 2, the clock face 18 is produced by mounting the minute wheel upon a sleeve 30, carrying the minute hand 31 at its end; and mounting over this sleeve the sleeve 32 carrying the hour wheel and the hour hand 33.

The indicating wheels (except the minute wheel) are supplied with normally idle propelling means, and a master wheel (of which the minute wheel preferably forms a part) controls a governor which determines the occurrence of active movement of the propelling means. This arrangement or idea of means may take a great variety of forms, but I prefer to embody it, as shown, in a structure wherein the master wheel and indicating wheels are driven by a single common motive means, and wherein the normally idle propelling means for each wheel consists of a pawl moving uniformly, but normally out of contact with a ratchet on the wheel, while the governor is a device governing the engagement or disengagement of each pawl with its ratchet. This governor in turn is preferably controlled by a cam on one uniformly moving wheel. These ends are carried out as follows in the form shown.

A common pawl shaft 34 is revolvably mounted parallel to shaft 33 and runs across the planes of all the wheels. A motive lever 35 fixed to this shaft is physically connected with the movable core 36 of a solenoid 37, whose electromagnetic effect is resisted by a spring 38, or its equivalent. The electric circuit 39 is energized once a minute by contact of the minute hand 40 of the master clock 15 with suitable metallic terminals, one of which is shown connected by branches 41 to the main circuit. Some of the branch connections are omitted for greater clearness.

The four wheels, from left to right in Fig. 5, are furnished respectively with ratchet wheels 42, 43, 44 and 45, and opposite these are mounted the pawls 46, 47, 48 and 49. Each pawl is pivoted to an arm 50, 51, 52 and 53 respectively, on the main pawl shaft 34. To each pawl is fixed a spring, as shown, tending to draw it into engagement with its corresponding ratchet. It will thus be seen that once a minute a twist back and forth of the shaft 34 will be produced by the common motive device 37, whereby all the impelling pawls will move up and then down again. The only pawl acting uniformly and without interruption, however, is the pawl 47, which impels the minute wheel, and by means of this there is a new character or type brought into view opposite the opening 11 at the beginning of each minute. This character should, of course, be a number corresponding to the number of minutes past the hour. All of the other pawls normally move idly, and they become active at predetermined intervals, preferably one every hour and the others every ten minutes. The time of active movement of the pawls is determined by a governor or governor device operated. In the form shown there is one governor for the computing wheels and another for the hour wheel. Also a supplemental governor for another purpose, hereinafter described.

The hour wheel governor comprises a lifting shaft 54 revolvably mounted and provided with an arm 55 drawn by a spring against a cam 56 on the minute wheel; and also with a lifting lever 57 impinging against the inner or under edge of the paw 46. The minute wheel, and the cam 56 with it, revolves once in an hour, and at the end of each hour a suitable depression on the cam permits the arm 55 to move inward momentarily, so that the lever 57 yields and permits the pawl 46 to act upon its ratchet 42, and gives the hour wheel one twelfth of a turn, so as to make visible the number corresponding to the new hour. In order to insure only a single movement of the hour wheel at a given time, and restore the governor to the position shown in Fig. 5 with certainty after one such movement, I prefer to provide peculiarly shaped retaining pawls 58 and 59 on the hour and minute ratchets 115 respectively. These pawls are held down strongly against their ratchets by springs 60 and 61, and have their extreme ends shaped, as shown, that when a given tooth has made one half its travel for a given impulse, its point is brought under the pressure of the beveled under edge of the pawl and is thus assisted forward until it is stopped by contact with the extreme end of said pawl.
By employing this expedient, when the sixtieth impulse comes at the end of the hour, the depression in the cam is so placed and formed that release of the pawl 57 is half accomplished before the stroke commences, and on the other hand, the arm 55 is sufficiently pushed out to disengage the pawl 46 before said sixtieth stroke is completed. In this way the first stroke on the new minute number one finds the pawl 46 disengaged while, at the same time, and thanks to the assistance of the retaining pawl 58 which finishes the work started by the pawl 46, the exposure of the number corresponding to the new hour is displayed. It will be noted that, owing to the different purposes of the various wheels, the degree or throw is different for each. For instance the entire revolution of the hour wheel is accomplished in only twelve steps, while there are sixty steps in one turn of the minute wheel. Accordingly the offsets 59, 51, 52 and 53 vary in length, so that a given degree of revolution of the shaft 34 produces simultaneously the various lengths of throw desired for the different pawls.

The governor for the computing wheels is similar in its construction and operation to that just described. It comprises a lifting shaft 62, having an arm 63 whose end bears on a cam 64 next the ratchet 43. Under the pawls 48 and 49 are placed the lifting levers 65 and 66, fixed on the shaft 62. The dotted lines in Fig. 5 show the positions of the pawls and lifting levers during active movement, and these positions are determined by passage under the tip of the arm 63 of depressions ten minutes apart in the cam 64. As each computing wheel is moved forward one tooth against its returning spring by a movement of its pawl, it is held in the new position by a hooked restraining pawl, 67 or 68, which is spring pressed against the ratchet.

While, of course, the characters and figures upon the various wheels may be varied to suit the desired circumstances, I prefer to provide each computing wheel with three circular rows of figures denoting respectively successive periods of time, (in hours and minutes) successive sums in dollars and cents, increasing by uniform amounts corresponding to wages earned in such intervals of time, and successive sums increasing by increments representing overhead charges corresponding to the same time intervals. One composite computing wheel (preferably next the minute wheel) I call the job wheel, and is intended to be under control of the workman to permit its return to zero after each job. The other computing wheel is called the totalizer and does not return after each job, but adds up all the work of a given journeyman for each day. Both computing wheels return to zero after completion of the day's work. The automatic means for accomplishing this, as well as the manual control associated with the apparatus are described as follows.

The pawls 67 and 68 are mounted to swing loosely upon a common shaft 69 parallel to the main shaft 23. An operating shaft 70 runs also parallel to the main shaft the entire length of the machine and is provided with a lifting lever 71 for removing the pawl 68 from its ratchet. The operating arm 72 is also fast upon the shaft 70 and is pressed by a spring 73 against a cam 74 which turns with the hour wheel. A sleeve 75 is mounted to turn loosely on the shaft 70, and forms a portion of a train of manually operated mechanism for control of the machine. This manually operated mechanism preferably comprises a handle 76, which projects out of the casing (see Fig. 1) and is fastened to a plate 77 hanging from a sleeve 78 loose on the shaft 69. A projection 79 on this sleeve and plate impinges against the lug 80 on the sleeve 75, while a second lug 81, on the same sleeve presses under the pawl 67. For automatic operation, a pin 82, mounted upon an arm fast on the shaft 70, impinges against the front of said lug 81.

The operating lever 83 is loosely mounted on the shaft 69, and the lower end of the pawl 67 is turned under said lever, as shown, so that when said pawl is tilted back and away from its ratchet, it will lift the lever 83. This causes the end of said lever to strike the lever 84 on the lifting shaft 62, turning the same, and freeing the ratchet 44 from engagement with the pawl 48 at the same time that the pawl 67 is automatically lifted.

In order to be able to use the pawls 48 manually without disturbing the pawl 67, I provide the plate 77 with a pin 85 extending under the lever 83. This last is normally held down by a spring as shown. I prefer to supply the plate 77 with two notches either of which may be made to engage with a securing spring 86, whereby the handle 76 and plate 77 are held in the middle or lowered position when so placed by hand.

The cam 74 is provided with a raised portion 87 whereby once in twelve hours (say at six o'clock) the operating arm 72 is pressed backward for automatic operation of the pawls.

The supplemental governor, whereby at a specified hour and minute, and for a predetermined fraction of an hour, the impelling pawls 48 and 49 are independently lifted, is preferably constructed as follows: Two spring pressed levers 88 and 89 are loosely mounted on a common shaft, and bear respectively upon the cams 90 and 91 (see Figs. 5 and 8). These levers act in-
dependently upon a common rod 92 carried by an arm 93 on a sleeve 94, turning loosely on the shaft which carries the levers 88 and 89. A spring 95 tends to draw the arm 93 and rod 92 forward. One end of the rod 92 rests in a wide fork at the top of the operating arm 68, so that said arm may move back and forth independently of said rod. At the same time, as soon as both levers 88 and 89 are pressed forward at the same time, the rod 92, being thus liberated, is drawn forward by its spring, and acts through the fork on the arm 63 to tilt said arm forward and free both impelling paws 48 and 49, in a manner already described. This separates the computing wheels from control of the minute wheel.

As best shown in Fig. 8, the shape of the cam 91 on the minute wheel is such that during a predetermined fraction of every hour (say three quarters of an hour) the cam is lifted forward. If this lever alone controlled the rod 92, said rod would hold the impelling paws for the computing wheels in idle position three quarters of the time. But, since the rod 92 is liberated only when both levers 88 and 89 are lifted, this action only takes place when the lever 88 is actuated by the projection 90 of the cam 90, on the hour wheel. By suitable location of the high portions of the cams 90 and 91, therefore, the rod 92 is only liberated during a portion of the noon hour (say from noon to twelve-forty-five).

The mechanism thus set forth may now be described as to its preferred mode of operation, that is to say, in its relation to a form of ticket to be printed by each workman, an example of which is shown in Figs. 9 and 10. In this connection it is to be understood that Fig. 6 shows ordinary momentary positions of certain parts when the operating handle 76 is lifted at the beginning of each job. Fig. 7 shows the positions of the same parts on automatic release of the computing wheels. Fig. 8 illustrates in dotted and full lines the movements which are automatically produced at the beginning and end of the noon recess, and Fig. 2 shows the normal working position, also shown in another form in Fig. 5.

Fig. 9 shows that face of the ticket which is kept uppermost when it is stamped, and here are printed the directions for use. On one side of this face, near the top are printed the expressions "Morning in," "Noon out," "Noon in," and "Evening out," or corresponding legends, under each other. Close to each of these is a line which is intended to guide the workman in suitably placing the ticket for printing on its under side. In using the ticket, he brings that portion of the line marked 93 under the blunted indenting projection 94 on the movable platen (see Figs. 1 and 4). When the platen is brought down it presses the under side of the ticket against the printing ribbon and type in a well known manner, and at the same time this projection 94 makes an indentation 93 by pressing the material into a depression under it, shown in Fig. 1. By this means the workman can see on the reverse of the ticket which coupons have been already used.

Beneath the top portion of the ticket which is designed to receive the records of times of arrival and departure of the workman, I prefer to attach coupons for the various jobs, which may be separated along the weakened lines, shown dotted in Figs. 9, 80 and 10.

On the reverse side of the ticket (Fig. 10) are written or stamped at the top the name and number of the workman and the date. Below these dates ruled spaces are provided for receiving the data to be recorded, substantially as about to be described.

Reference to Fig. 10 will give an example of the mode of using the ticket in connection with five jobs during a single day. The workman on reaching his bench, begins by recording his arrival, say at six fifty-eight, the time wheels showing 3629 and printing this hour in the left hand column, the other columns showing zero. The first job begins at seven-two and, as directed on the upper side of the ticket, the workman lifts the handle 76 as far as it will go and lets it drop into the position shown in Fig. 2, at the same time stamping the time of starting his job on the underside of the ticket. At the same time zero will be printed on all the computing columns. When this job is completed at ten thirty-two the handle 76 is pressed down, thus stopping further movement of the computing wheels, but as the restraining paws 48 and 49 are still in engagement, the computing wheels do not go back to zero. The workman again stamps his ticket opposite the words "Job finished" and at this time, the job wheel will print under "Elapsed time" the three hours and thirty minutes between seven-two and ten thirty-two, while printing under "Labor", the amount of seventy cents and one hundred fifty under "Overhead" the amount of forty two cents. As this is the first job of the day, the totalizing wheel will make the same record. When the next job commences and the handle 76 is again drawn to its top position, it will act as shown in Fig. 6 to free the job wheel from the pawl 67, while leaving the totalizing wheel unaffected. Consequently when the ticket for the second job is first stamped, immediately after this lifting of the handle, the time will be printed (ten thirty-five); the job wheel will again show zero while the totalizing wheel will repeat the record printed at the end of the first job. At the end of the second job the handle is
again thrown down to stop the wheels and the ticket again stamped under “Job finished.” The job wheel will show the elapsed time on job No. 2, the labor charge on the same, and the overhead charge on the same, while the totalizing wheel, not having gone back to zero, will show these data as applied to the sum of jobs 1 and 2. The same operations will be repeated with respect to each job.

It will be noticed with respect to job No. 3 that, although the job starts at eleven-twenty and finishes at two-ten, the elapsed time marked on the job wheel is only one hour and fifty minutes. This is owing to the fact that the noon hour has intervened and that this time has been subtracted from the total. This is accomplished as follows:

When the workman went out at noon he stamped his time as twelve o’clock as shown at the top in Fig. 10 and at the same time the job wheel showed an elapsed time of forty minutes which is the time between eleven-twenty, when the job No. 3 was started and twelve o’clock when the workman went out. The other data stamped correspond to this. When the workman came in at one o’clock, he again stamped his ticket, and the computing wheels repeated the same record as at twelve o’clock, there having been no progress, of course, in the meantime.

It is to be understood that on leaving at twelve o’clock, the job not having been finished, the workman did not manipulate his handle but that any further progress of the computing wheels during the noon hour was prevented by action of the supplemental governor in the manner hitherto explained with respect to Fig. 8. In the specific form shown in Fig. 8, the governor provides for interrupting action during a fraction of the hour. But, of course, the use of the ticket with a governor interrupting action during the entire hour, will be easily understood.

At the end of the day, the machine is stopped by the workman and at a predetermined time, for instance, six o’clock, the hour wheel acts automatically as hitherto described to produce the position of parts shown in Fig. 7, which frees the computing wheels and permits them both to return to zero in preparation of the following day.

Thus, the computing wheels can, of course, be supplied in a well known manner with removable printing rings corresponding to different rates of wages and of overhead charges and the details of construction whereby this is preferably carried out, need not be here described as they are well known in the art.

It is also to be understood that the action of the master clock as shown in Fig. 5, is merely an indication of the general combination and that various means well known in the art may be employed, whereby a single short impulse is sent over the line once a minute or at any suitable interval of time.

Many changes may be made in the structure without departing from the scope of my invention, and I am not to be understood as limiting myself to the details herein shown and described.

What I claim is—
1. In a workman’s time recorder, an indicating time wheel, a motive means therefore adapted to be continuously operated by a master clock, an indicating computing wheel, returning means tending continually to bring the same to zero, power transmitting means between said motive means and said computing wheel for driving the latter, automatic means controlled by movement of said time wheel for temporarily withdrawing said computing wheel from the influence of said power transmitting means and manually controllable means for controlling the action of said returning means whereby the computing wheel may be brought to zero at will.

2. In a workman’s time recorder, an indicating time wheel, a motive means therefore adapted to be continuously operated by a master clock, an indicating computing wheel, returning means tending continually to bring the same to zero, power transmitting means between said motive means and said computing wheel for driving the latter, automatic means controlled by movement of said time wheel for temporarily withdrawing said computing wheel from the influence of said power transmitting means, a holding device for normally restraining said returning means, and automatic means controlled by movement of said time wheel for rendering said holding device temporarily inoperative to return the computing wheel to zero.

3. In a workman’s time recorder, an indicating time wheel, an indicating computing wheel, a pawl and ratchet for each, a returning means adapted to bring the computing wheel to zero, a motive means for both pawls, adapted to be continually operated by a master clock, a cam associated with said time wheel, means controlled by said cam for lifting and dropping the computing wheel pawl automatically, and means for controlling at will the operation of said returning means.

4. In a workman’s time recorder, an indicating time wheel, an indicating computing wheel mounted parallel thereto, a ratchet on each wheel, a pawl shaft parallel to the common axis of said wheels, a pawl for each ratchet having offset mountings on said pawl shaft, a cam associated with said time wheel, and means controlled by said cam for lifting and dropping the computing wheel pawl automatically.
5. In a workman's time recorder, an indicating job wheel, an indicating totalizer wheel movable independently thereof, separate returning means for each wheel tending to return them to zero, a master wheel, a motive device for all of said wheels adapted to be continuously operated by a master clock, automatic means controlled by said master wheel for simultaneously stopping and starting said job wheel and totalizer wheel, and separate automatic means controlled by said master wheel for controlling the return to zero of said last named wheels.

6. In a workman's time recorder, an indicating job wheel, a totalizer wheel, and a master wheel, separate returning means for bringing said job wheel and totalizer wheel singly to zero, a common pawl shaft, driving pawls mounted thereon, ratchets on said wheels cooperating with said pawls, a motive means for said pawl shaft adapted to be continually operated by a master clock, restraining pawls normally opposing said ratchets and turning means, automatic means controlled by said master wheel for simultaneously lifting said driving pawls, and manual means for freeing said job wheel alone from its pawl.

7. In a workman's time recorder, a computing wheel, a minute wheel, an hour wheel, a common motive device adapted for continuous operation by a master clock and separate power transmitting devices whereby said motive device drives each of said wheels; in combination with disconnecting means adapted to free said computing wheel from its appropriate power transmitting device, and means adapted to be operated by joint action of said minute and hour wheels for actuating said disconnecting means.

8. In a workman's time recorder, a computing wheel having a ratchet wheel, a minute wheel having a cam and a ratchet wheel, an hour wheel having a cam and a ratchet wheel, a separate pawl for operating each of said wheels, and a common motive device for all of said wheels; in combination with a lifting device for the computing wheel pawl, a rod adapted to move said lifting device and two separately swinging levers bearing upon the cams on the minute and hour wheels respectively and adapted jointly to control movement of said rod.

9. In a workman's time recorder, a computing wheel having a ratchet wheel, means for returning the same to zero, a restraining pawl, a driving pawl, means for actuating the driving pawl, and a handle adapted to free the restraining pawl when moved in one direction, and to free the driving pawl when moved in the opposite direction.

10. In a workman's time recorder, a computing wheel having a ratchet wheel, means for returning the same to zero, a restraining pawl, on one side of the ratchet, a driving pawl on the opposite side of the ratchet, means for operating the driving pawl, a swinging lever adapted to lift the driving pawl, and a swinging handle having means for engaging said swinging lever when the handle is swung in one direction and also having means for lifting the restraining pawl when swung in the opposite direction.

11. In a workman's time recorder, an indicating minute wheel, an indicating hour wheel, an additional indicating wheel, motive means for all of said wheels, a principal governor automatically controlled by said minute wheel for governing normal action of said additional wheel and a supplemental governor controlled by joint action of said minute and hour wheels for occasionally governing operation of said additional wheel.

12. In a workman's time recorder, an indicating minute wheel, an indicating hour wheel, an indicating computing wheel, two cams turning with said minute wheel, means controlled by one of said cams for governing the operation of said computing wheel, and means controlled by the other cam for governing operation of said hour wheel.

13. In a workman's time recorder, a series of indicating wheels bearing characters separated by spaces of different lengths, ratchet wheels associated with said indicating wheels and having teeth spaced in accordance with the corresponding spaces between characters, separate impelling pawls for said ratchet wheels, a common shaft for said pawls and levers of varying lengths uniting said pawls respectively to said shaft so as to impart a throw to each proportional to the spacing of the corresponding ratchet wheel.

14. In a workman's time recorder, a minute wheel having thereon a ratchet and two cams, an hour wheel and a computing wheel each having a ratchet; in combination with a common pawl shaft for said hour wheel and computing wheel, pawls mounted offset thereon, separate lifting shafts for the hour wheel and computing wheel each having a lifting lever and levers on said two shafts respectively engaging said two cams on the minute wheel.

15. In a workman's time recorder, a computing wheel having a ratchet, a pawl therefor, a lifting shaft having a lifting lever, an arm on said shaft having a forked end, a pivoted supplemental governor having a part resting in said fork, two master cams, and two controlling levers cooperating with said cams and each acting independently to control the position of said supplemental governor.

16. In a workman's time recorder, a computing wheel, propelling means therefor, a controlling device for said means, two master cams, a swinging supplemental governor,
having a rod engaging said controlling device, means tending to draw said governor in
one direction, independent levers bearing against said rod and each against one of said
3 cam, and separate means on said levers for holding them against their respective cams.
17. In a device of the class described, a computing wheel having a ratchet, a pawl
therefor, a lifting shaft having a lifting lever, a forked arm on said shaft and a
10 principal master cam against which said arm rests; in combination with a pivoted
supplemental governor having a part resting in the fork of said arm, two supplemental
master cams and two controlling levers cooperating with said cams and each acting
independently to control the position of said supplemental governor.
18. In a workman's time recorder, a computing wheel, two time wheels, a ratchet on
each wheel, a main impelling shaft, a pawl for each ratchet pivoted in offset position
on said shaft, motive means for said shaft, a lifting lever for the pawl of the computing
15 wheel, a cam on one time wheel adapted to act alone to control said lifting lever, co-
operating cams on said two time wheels, and a supplemental governor controlled by said
cooperating cams for operating said lifting lever independently of said first named cam.
19. In a workman's time recorder, a minute wheel, an hour wheel, a computing wheel
adapted to return to zero when released, a restraining pawl therefor, an impelling pawl
therefor, lifting means for the restraining pawl automatically controlled by movement
of the hour wheel, and lifting means for the impelling pawl automatically controlled by
movement of the minute wheel.
20. In a workman's time recorder, a minute wheel, an hour wheel, two computing
wheels adapted to return to zero when released, a restraining pawl for each, a common
lifting shaft for both, lifting levers thereon, impelling pawls, for said wheels, an
hour wheel governing said lifting shaft, and a minute wheel governing both said impelling
pawls and said hour wheel.

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

NICHOLAS T. FICKER.

Witnesses:
H. S. MACKAYE.
KATHARINE C. MEAD.