E. SCHUCH.

RECORDER.

APPLICATION FILED JULY 15, 1913.

1,103,691.

Patented July 14, 1914.

Fig. 1

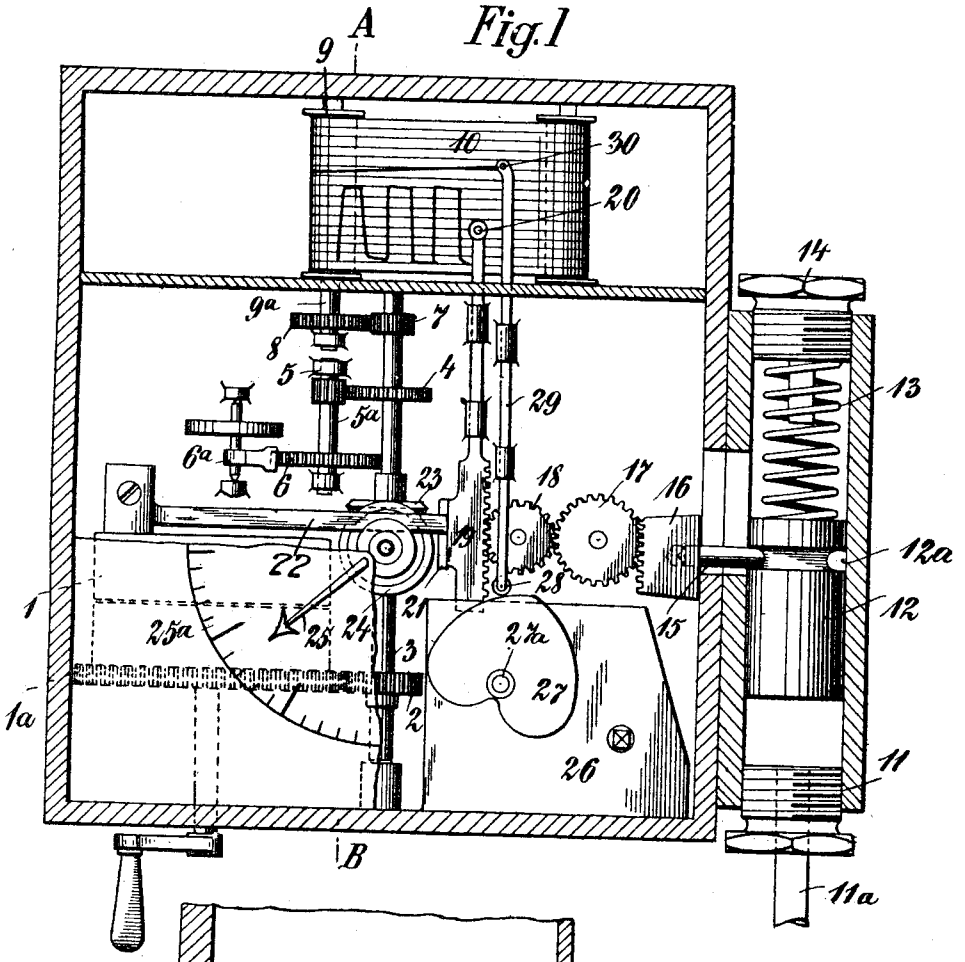


Fig. 2

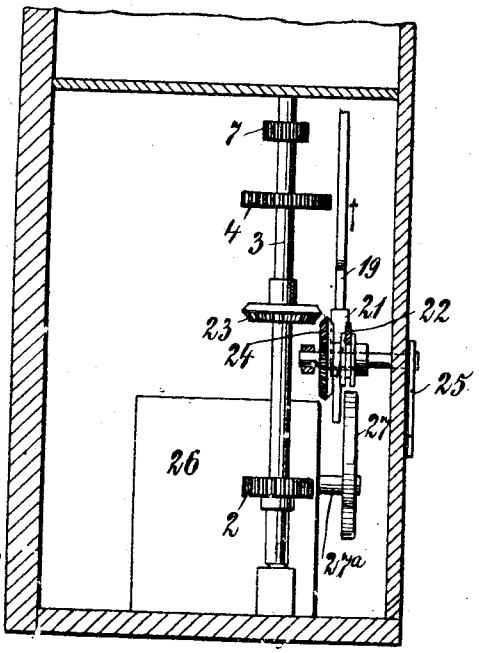
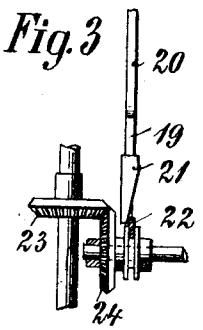


Fig. 3



WITNESSES

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RECORDER.

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To all whom it may concern:

Be it known that I, EMIL SCHUCH, a subject of the King of Bavaria, residing at 25 Giselastrasse, Munich, Bavaria, Germany, have invented certain new and useful Improvements in Recorders; and I do hereby declare the following to be a full, clear, and exact description of the invention.

The object of the invention is to provide a new and improved recorder more especially designed for use in connection with lifting machines, block presses, bending presses, forging machines and the like, and arranged to furnish a permanent record of the quality and quantity of the work and the work done by the machine and the workmen, at the same time enabling the workmen to accurately apply the pressure of the machine for a predetermined period of time.

In order to accomplish the desired result use is made of an actuating device connected with and controlled by the power medium of the machine, a driven indicator card, a stylus controlled by the said actuating device and marking on the said indicator card, and a second time-controlled stylus in contact with said indicator card for recording time thereon. Use is further made of a driven second hand, means for driving the said second hand, and a locking and releasing device controlled by the before mentioned actuating device and connected with the said second hand to lock or release the same.

A practical embodiment of the invention is represented in the accompanying drawing forming a part of this specification, in which—

The Figure 1 is a side elevation of the recorder, parts being shown in section, Figs. 2 and 3 show details of the locking and releasing device for the second hand in a section on lines A B.

The recorder, hereinafter more fully described in detail, is more especially intended for use on hydraulic and pneumatic presses and similar machines irrespective of whether the press or machine is driven by hydraulic or pneumatic power, by steam or by mechanical means. The recorder has a double function: (1) to provide a control during the working, and (2) to form a permanent record after the working. A principal factor during the use of a press or machine is the time in which the machine exerts a pressure on the material to be worked. This time is theoretically and practically fixed and the workman in charge of the machine is made acquainted with the time, but as the workman is not using a stop watch or similar means it is next to impossible for the workman to maintain the correct time especially as the workman's attention is required in manipulating the machine for performing certain work, and usually the time taken by the workman for doing the work is too short. The recorder is provided with a pointer indicating on a seconds dial and is normally locked against movement, but is unlocked the moment the full pressure of the machine is exerted on the material to be pressed. By this arrangement the workman is in a position to control the time as a glance at the now moving second hand indicates the correct time which the pressure is exerted, and consequently the workman can stop the pressure sooner or later as required by the nature of the material to be pressed. As before stated, a permanent record of the amount of work is obtained and the working of the machine together with the work of the workman, so that the desired calculations can be accurately made and the parts disposed, as the work of the machine and that of the workman can be readily determined. On a continually moving indicator card or paper strip are produced two diagrams, of which one represents the hours during which the workman manipulated the machine, and the second diagram indicates in proper sequence the single manipulations of the machine, and this second diagram represents successive phases of each pressing action of the machine, namely, (1) the gradual increase of the pressure, the maximum pressure and the decrease of the pressure; (2) the time in seconds of each of the three steps mentioned; and (3) the time of the day at which the action of the machine took place. The result of the two diagrams is (1) the quantity and quality of the work performed, (2) the work of the machine (3) the work of the workman, and (4) a permanent record for calculation and for questions involved relative to the machine or the work done by the workman. From the four points mentioned, it will be seen that the use of the apparatus is very important in the fabrication of various articles, and it is expressly understood that the recorder is not for only one particular class of machines but can be used for presses of all kinds.

The recorder consists essentially of three

principal devices, namely, a spring motor for moving the indicator card or paper strip forward and for actuating the second hand; a pressure cylinder controlling a stylus which indicates the pressure of the machine on the indicator card; and a timepiece actuating a stylus which records the time of the day on the indicator card.

A spring motor 1 is connected by a gear wheel 1^a and a pinion 2 with a vertically-disposed shaft 3 having a gear wheel 4 in mesh with a pinion 5 secured on a shaft 5^a carrying a balance wheel 6 of a timepiece 6^a of any approved construction. On the shaft 3 is secured a pinion 7 in mesh with a gear wheel 8 secured on the shaft 9^a of a drum or spool 9 for imparting traveling motion from the right to the left to the indicator card or paper strip 10. On this strip 10 indicate two styli 20 and 30, of which the stylus 20 is actuated by an actuating device controlled by the power of the machine on which the recorder is used, while the other stylus 30 is driven from a clockwork 26 of any approved construction. The actuating device mentioned is arranged as follows: A cylinder 11, is connected at one end by a pipe 11^a with the source of fluid pressure supply used for actuating the machine on which the recorder is used, and in the cylinder 11 is mounted to reciprocate a piston 12 pressed on by a spring 13 bearing against a screw plug 14 screwing into the upper end of the cylinder 11 to permit of regulating the tension of the spring 13. The piston 12 is provided with an annular groove 12^a into which projects a pin 15 provided with a rack 16 in mesh with an intermediate gear wheel 17 in mesh with a pinion 18 meshing with a rack 19 carrying at its upper end the stylus 20. Now when pressure is admitted to the machine to actuate the same then the pressure also passes into the lower end of the cylinder 11 to force the piston 12 upward therein against the tension of the spring 13. The upward movement of the piston 12 causes a like movement of the pin 15 and the rack 16 so that a rotary motion is given to the intermediate gear wheel 17 whereby the pinion 18 is rotated and by the rack 19 is moved upward to move the stylus 20 upward on the indicator card or strip of paper 10. When the pressure is cut off from the machine and the cylinder 11 then the piston 12 is forced downward back to normal position by the action of the spring 13, whereby the stylus 20 is caused to move downward.

The stylus 30 is held on the upper end of a rod 29 provided on its lower end with a friction roller 28 in contact with the peripheral face of a heart-shaped cam 27 secured on a shaft 27^a forming part of the clockwork 26 and driven by the same. The clockwork 26 is so arranged that the stylus 30 makes its upward stroke during six hours, and in a corresponding number of hours the stylus is caused to travel downward.

On the rack 19 is secured a lug 21 engaging one end of a flat spring 22 fixed at the other end on a suitable support. The spring 22 engages an annular groove of the hub of a bevel gear wheel 24 normally out of mesh with a bevel gear wheel 23 secured on the shaft 3 previously mentioned. On the bevel gear wheel 24 is secured a pointer 25 indicating on a seconds dial 25^a.

The operation is as follows: When the workman opens the admission valve for admitting the motive agent to the machine then the motive agent also passes into the lower end of the cylinder 11 and pushes the piston 12 upward in the cylinder 11. The upward movement of the piston 12 causes the stylus 20 to rise so that the stylus marks a nearly vertical line on the forwardly-moving indicator card or paper strip 10, and after the piston in the machine reaches the resistance of the material to be pressed then the stylus 20 marks a longitudinally-extending line on the indicator card or paper strip 10, and which line is in the form of a large or small segment which finally terminates in a horizontal line, all according to the amount of resistance encountered in the machine. From this time on the full pressure of the motive agent is exerted by the machine on the material to be pressed and at this time the lug 21 releases the free end of the spring 22 so that the gear wheel 24 moves into mesh with the rotating gear 23 whereby the pointer 25 begins to turn. From the foregoing it will be seen that the time for maintaining the pressure of the material is indicated by the advancing pointer 25, and when the prescribed time has elapsed the operator closes the admission valve for the motive agent so that the latter is shut off both from the machine and from the cylinder 11. The piston 12 now moves downward by the action of the spring 13 as previously described and the stylus 20 descends and marks a nearly vertical line on the indicator card or paper strip 10. During the downward movement of the stylus 20 and the rack 19 the lug 21 acts on the spring 22 so as to move the bevel gear wheel 24 out of mesh with the gear wheel 23 so that the pointer 25 returns to its zero position by the action of its spring. From the foregoing it will be seen that each pressing action of the machine is marked on the indicator card 10 in the manner above set forth.

In case the machine performs uninterrupted work the line marked onto the indicator card 10 by the stylus 30 rises continually. In case the operation is interrupted for a longer period the clockwork 1 to 6^a is run off so that the indicator card remains

stationary and the stylus 30 marks a vertical line thereon. At the beginning of the next working period the indicator card 10 is again caused to travel so that the stylus 30 again marks an inclined upwardly or downwardly-extending line on the indicator card. By the arrangement described the period of rest, that is, the one during which the machine is at a standstill, is indicated in hours and subdivisions thereof.

I claim as my invention:

1. In an indicating and recording apparatus for hydraulic or pneumatic presses and the like, the combination with mechanism adapted to indicate and record on a traveling chart the pressure exerted during each pressing operation and the duration of such pressure, of clockwork mechanism adapted to simultaneously record the time on the said chart, the said time recording mechanism continuing to make a record when the chart is stationary substantially as described for the purpose specified.

2. In a recorder for power-actuated machines, the combination with an actuating device connected with and controlled by the power medium of the machine, a driven indicator card, a stylus controlled by the said actuating device and marking on the said indicator card, a second time-controlled stylus in contact with the said indicator card for recording time thereon, a timepiece, means for driving the indicator card from the time piece, said time piece having a second hand, and a locking and releasing device for the said second hand and controlled by the said actuating device.

3. In a recorder for power-actuated machines, the combination with a spring motor, an indicator card, means for driving the said indicator card from the said spring motor, a pressure cylinder connected with the actuating power of the machine, a spring-pressed piston slidable in the said cylinder, a stylus for indicating the work of the machine on the said indicator card, a gearing for actuating the said stylus from the said piston, a time stylus, a clockwork for actuating the said time stylus, a second hand adapted to be driven by the said motor, and a locking and releasing device for the said second hand and controlled by the said gearing for moving the said second hand in or out of driving connection with the said motor.

4. In a recorder for power-actuated machines, an actuating device connected with the actuating power of the machine, an indicator card, a time clock mechanism for driving said indicator card, a second hand, means for driving the said second hand from said clock mechanism, a locking and releasing device controlled by the said actuating device and connected with the said second hand to lock or release the latter, a time stylus indicating on the said indicator card, and a clock mechanism for actuating the said time stylus.

5. In a recorder for power actuated machines, an actuating device connected with and controlled by the power medium of the machine, a vertically movable rack controlled by said actuating device, a stylus carried by the said rack, a clock mechanism, an indicator strip, means for driving the indicator strip from the clock mechanism, a second hand adapted to indicate on a second dial, a gear wheel movable on the shaft of said second hand, and adapted to be driven by said clock mechanism, a spring for holding said gear wheel in driving engagement with said clock mechanism, and means on the said rack for engaging the spring to move the said gear wheel out of driving connection with the said clock mechanism.

6. In a recorder for power actuated machines, a spring motor, an indicator strip, means for driving the indicator strip from the spring motor, a pressure cylinder connected with the actuating power of the machine, a spring pressed piston slidable in the said cylinder, a stylus for indicating the work of the machine on the said indicator strip, a vertically movable rack carrying the said stylus at its upper end, means for actuating the rack from the said piston to move the stylus, a gear wheel, a second hand on the shaft of said gear wheel and indicating on a second dial, a spring for holding said gear wheel in driving connection with the motor, and a lug on the said rack for engaging the spring to move the said gear wheel out of driving connection with the motor, the said lug being adapted to release the said spring at the time the working pressure of the machine is reached.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EMIL SCHUCH.

Witnesses:
HENRI HIRSCH,
A. V. W. COYL.