No. 849,142. PATENTED APR. 2, 1907.

F. A. LANGEN.

APPARATUS FOR EXACTLY PRINTING OR IMPRESSING TYPE.

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Fig.1.

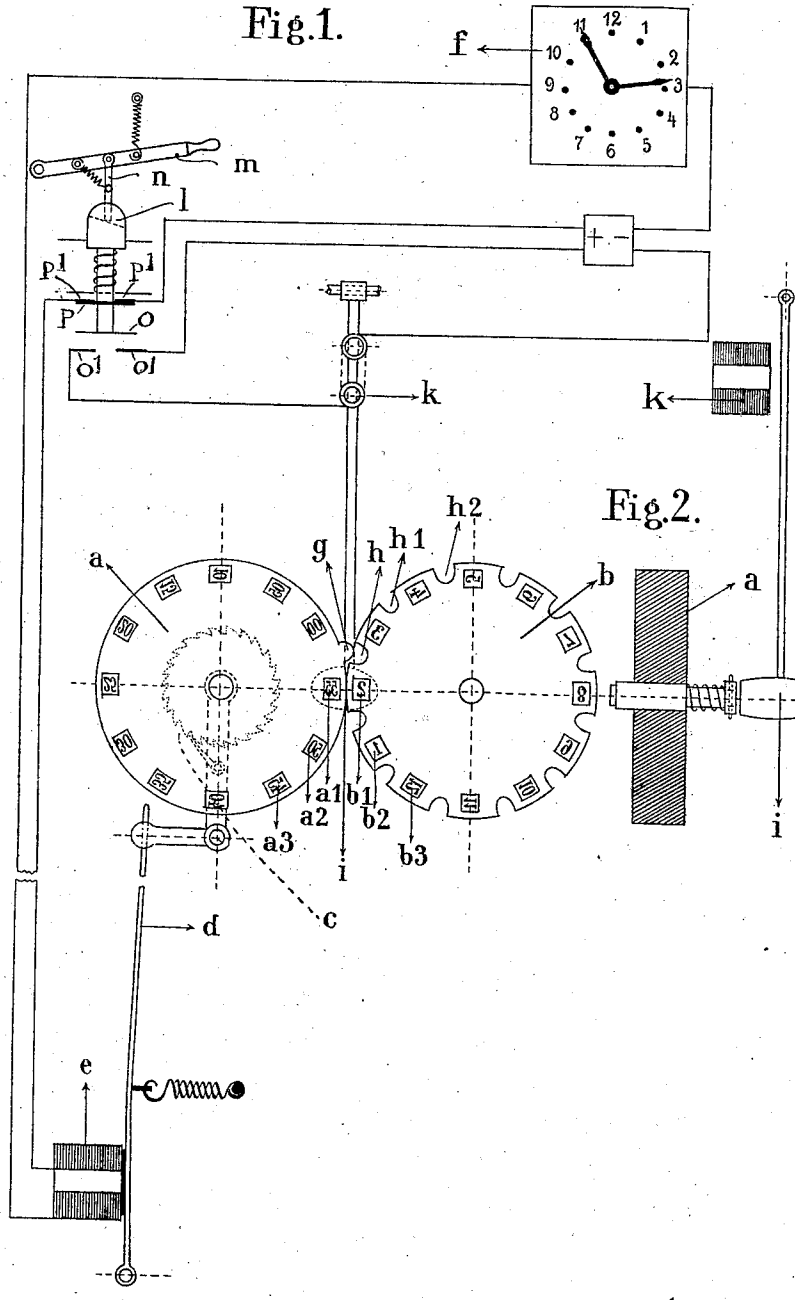

Fig.2.

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APPARATUS FOR EXACTLY PRINTING OR IMPRESSING TYPE.

No. 849,142. Specification of Letters Patent. Patented April 2, 1907.

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To all whom it may concern:

Be it known that I, FRIEDRICH ADOLF LANGEN, a subject of the Emperor of Germany, residing at Cologne-Riehl, Germany, have invented certain new and useful Improvements in Apparatus for Exactly Printing or Impressing Type, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to apparatus for exactly printing or impressing types on paper or cards in stamping apparatus, calculating-machines, and the like.

The invention consists principally in the arrangement of type-wheels suddenly and intermittently turned and carrying in the known manner types movable in a vertical direction to the plane of the wheel in such a manner beside each other that the adjacent types with numbers of higher and lower denominations can be driven forward simultaneously by a single blow from one hammer without the intermittent advance of the type-wheels and the movement of the hammer interfering with each other.

The solution of the problem of setting type-wheels independently of the driving mechanism for the purpose of printing an exact impression has been attempted before—for instance, by stopping the type-wheels during the printing; but as the type-wheels were always in geared connection with the driving apparatus this arrangement frequently caused interruptions in the motion of the clock, which rendered the exact reproduction questionable.

The invention therefore starts with another already-known means—that is to say, suddenly and intermittently advanced type-wheels with type movable vertically to the plane of the wheels. These wheels being arranged in the same plane, the two adjacent types, or when several such type-wheels are arranged concentrically the several adjacent types, can be pushed forward by one hammer onto printing-surface, (paper,) while at the same time a device is provided which prevents the advance of the type-wheels and the blow of the hammer taking place at the same time. This problem is solved by such forms of construction by which either the blow required for actuating the types is prevented during the advance of the wheels, so that it can take place only after the advance, or by which the intermittent sudden advance of the type-wheels is disengaged at the moment of the blow and takes place quickly after the blow has been given without affecting the time at which the next advance has to be made, which consequently takes place at the right time.

On the drawings appended hereunto a type-printing apparatus constructed in this manner is shown applied to a time-registering apparatus, by which the time can be registered at intervals of five minutes.

a and b are two type-wheels having equal diameters. The types a' a^2 a^3 and b' b^2 b^3 are movably arranged, as shown by the section Figure 2. The number to be printed on the line connecting the centers of the two shafts consists in the position shown of the numeral "2" on one wheel and the number "55" on the other. The minutes are printed by the types a' a^2 a^3, the hours by the types b' b^2 b^3. The rotation is produced by an electric current, which is put into action every five minutes by the contact-clock f. The advance of the type-wheel a is effected by the electromagnet e, which, excited by the closure of the current, attracts the lever d, which by means of the ratchet-wheel c turns the type-wheel in the direction of a watch-finger by one type. The compulsory transfer of the motion from the minute-wheel a to the hour-wheel b takes place through the tooth g, which during each revolution of the wheel a engages into one of the notches h' h^2 h^3, and so on, and turns the hour-wheel b by one-twelfth of a revolution.

The printing is effected by the hammer i (shown on Fig. 1 with an elliptical head in dotted lines) striking against the movable types a' and b', whereby both types are pressed against a paper or card, the backing of which is parallel with the type-wheels and rendered visible in any known manner. The hammer is brought into action by closing an electric circuit by depression of the lever m, which actuates the pusher l and by bringing the bridge o into contact with the terminals o' closes an electric circuit, and thereby excites an electromagnet k, which attracts the hammer i, while simultaneously the bridge p is removed from the contacts p' and the circuit from the clock is opened. On the drawing a sliding strut n is shown hinged to the lever m, which slides off the pusher-button l as soon as the circuit actuating the hammer is closed by the contacts o o'. This arrangement therefore renders it impossible for the current which is actuated automatically by

the clock and that put optionally into action by the lever *m* to act at the same time. It is obvious that the hammer *i* may be actuated by a mechanical connection to the lever *m* instead of by an electric current.

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—

In apparatus for exactly printing a plurality of characters, the combination with a plurality of type-wheels, each provided with types movable at right angles to the plane of the wheel, the types of one wheel being arranged in close proximity to the types of the other wheel, a single hammer adapted to simultaneously strike a plurality of adjacent types, of means for actuating said hammer, means for preventing movement of the type-wheels while the hammer is in motion, and means for preventing the motion of the hammer, while the type-wheels are moving.

In witness whereof I have hereunto signed my name this 11th day of August, 1905, in the presence of two subscribing witnesses.

FRIEDRICH ADOLF LANGEN.

Witnesses:
GEORG MEISSET,
FRITZ HEINZER.