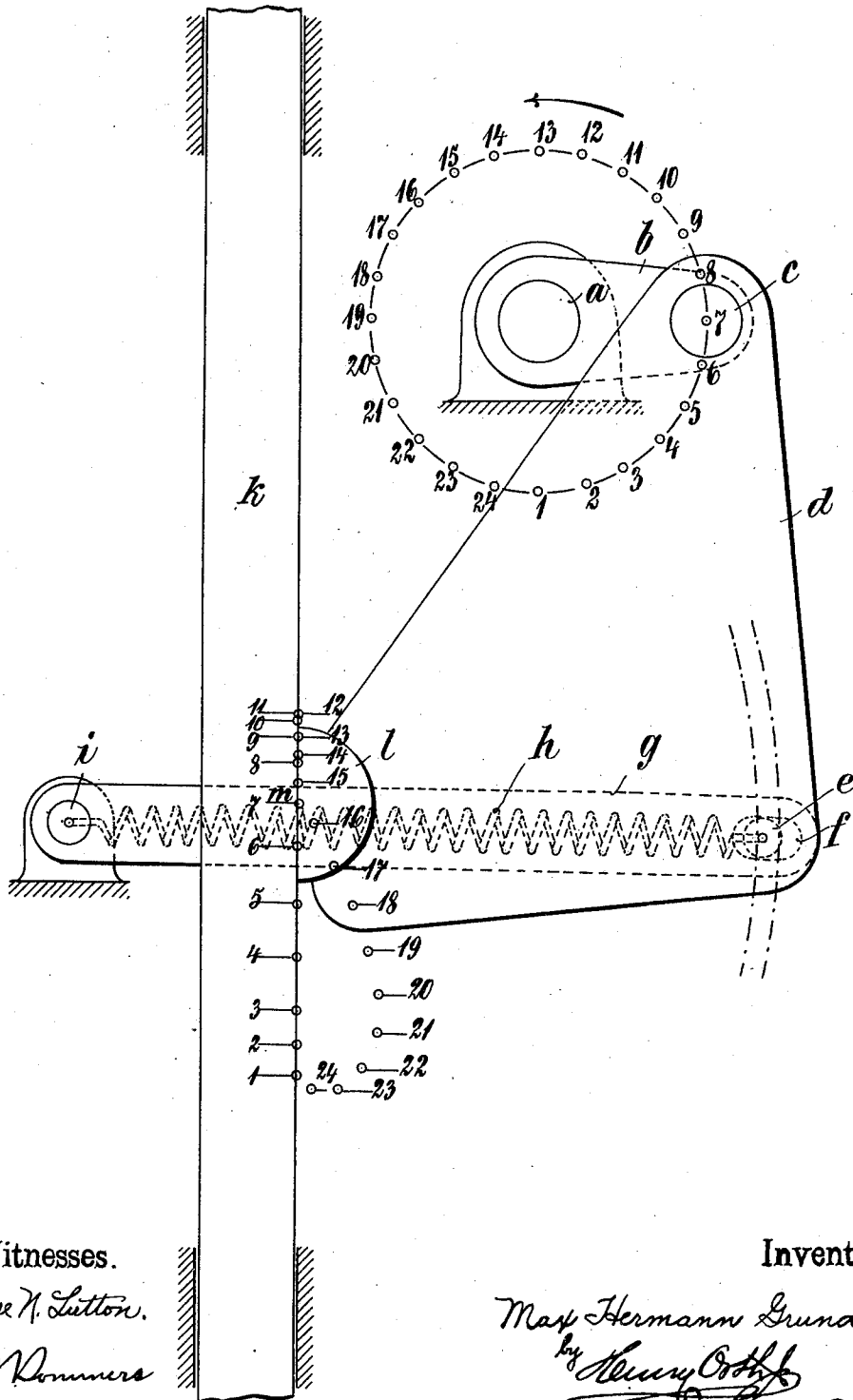


M. H. GRUNDIG.
MECHANICAL MOVEMENT.
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1,005,198.

Patented Oct. 10, 1911.



Witnesses.

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MECHANICAL MOVEMENT.

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To all whom it may concern:

Be it known that I, MAX HERMANN GRUNDIG, a subject of the King of Saxony, residing at 1 Mittelstrasse, Chemnitz, Germany, have invented certain new and useful Improvements in Mechanical Movements; 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The present invention relates to mechanical movements and has for its object to impart to a driving element both a reciprocating and a curvilinear movement whereby a driven member may be successively seized, lifted, pushed downward and allowed to fall freely.

In stamping devices in which the stamp falls freely, the number of strokes per minute is substantially dependent on the time which the fall of the stamp requires according to the height of the fall and the opposing resistances to motion in each case. If the stamp-rod is raised by a driver moved up and down by a crank rotating at a uniform speed, and if the driver in its bottom position seizes the stamp-rod and releases it in the top position, there remains for the fall less than half the time available for one cycle of the crank. Besides the time occupied in raising the stamp and the time during which the latter falls, there must be taken into consideration the time of retardation, namely the time required by the stamp-rod when it is released by the driver, until its reversal of motion, as well as the time during which the stamp rests on the material being stamped.

The invention consists in providing a driving mechanism by means of which a substantially larger number of blows are possible, and according to the invention the clutch does not release the stamp-rod in the upper position, but, on the contrary, moves it positively downward a certain distance and only allows it to fall freely in such manner that the distance through which the stamp falls freely is still sufficiently great to allow the stamp-rod to adapt itself automatically to the varying heights of the material which is being stamped, and further, that the stamp-rod at the commencement of

its free fall has a considerably greater velocity than it would have had if it had fallen freely through the distance through which it is moved downward positively.

If the motion of the clutch is such that the time necessary for positively moving the stamp-rod downward is also substantially less than that which would be required for the stamp-rod to fall freely through the same distance, keeping to the above given example, double the number of blows can be obtained with one stamp-rod by means of a uniformly revolving crank when the same final velocity of the freely falling stamp-rod is obtained and when the same time of rest is observed.

In order that the invention may be clearly understood reference will be made to the accompanying drawing which is a diagrammatical elevation of one embodiment of a driving device by which a reciprocable member may be seized, lifted, pushed downward and allowed to fall freely.

Referring to said drawing *a* designates a crank-shaft revoluble in the direction of the arrow; on the shaft *a* is fastened a crank *b*, the crank-pin *c* of which engages in a bearing provided near the power end of a driving angle-lever *d*. A fulcrum pin *e* mounted at the vertex of lever *d* is movable longitudinally in a slot *f* formed in a guide-rod *g* and said pin is pulled continuously by a spring *h* toward the pivot *i* of the guide-rod *g* mounted on the frame of the stamping machine. Between the pivot *i* and the lever *d* is mounted a vertically reciprocable rod *k*. At the load end of the lever *d* there is formed a bearing in which a clutch *l* is so attached that it can oscillate. For avoiding unnecessary strains the clutch *l* is so formed that its center of application on the rod *k* coincides with its center of motion *m*.

The device works in the following manner: The angle-lever is rocked up and down by the revolution of the crank-pin *c* around the shaft *a*. Owing to the action of the guide-rod *g* the pivot *e* is moved up and down in an arc as indicated by the dotted lines whereas the center of motion *m* of the driver *l* describes a loop-shaped path. The positions of the crank-pin *c* at equal distances from one another and denoted by numerals in the circle of the crank, correspond to the positions of the center of motion *m* denominated with like numerals. When the crank *b* and clutch *l* reach the points indi-

cated by the numerals 1 the pivot pin *e* owing to the spring *h* lies against the left hand end of slot *f*, but as soon as the clutch *l* contacts with rod *k* the pivot is moved toward the right and the spring *h* put under tension holding the clutch *l* against the rod *k*. During the movement of the crank *b* from the points 1 to 15 the pivot *e* cannot reach the left hand end of slot *f* so that said clutch is spring held against the rod until the point 15 is passed, during which time rod *k* has traveled its upward limit and has started down. As soon as the point 15 is passed by the crank *b* the pivot *e* reaches the left hand end of the slot and the spring can no longer draw the lever *d* to the left so that during the movement of the crank from points 15 to 24 said lever *d* is moved by the rod *g* away from rod *k* and in the direction indicated by the lower set of numerals 16 to 24. The rod *k* is lifted by the clutch elastically and without any severe jerk, since when seizing it at point 1 the pivot *e* under the tension of the spring *h* is moved to the right-hand before the stamp-rod is raised and the velocity of the clutch is small when it seizes the stamp-rod. On the contrary, the velocity of the clutch is comparatively great between the points 15 and 16 when it releases the stamp-rod, so that accordingly the initial velocity of the freely falling rod *k* is correspondingly accelerated.

I claim—

1. In a mechanical movement adapted for general application, the combination of a reciprocable member, a driving member adapted to engage the reciprocable member, a revolving member for operating the driving member, and means operated from the revolving member to reciprocate the driving member when in engagement with the reciprocable member and to impart a curvilinear motion to said driving member when out of engagement with said reciprocable member.

2. In a mechanical movement adapted for general application, the combination of a reciprocable member, a revolving member, an

angle lever having its load arm adapted to engage the reciprocable member and its power arm pivotally connected to the revolving member, a guide, a fulcrum pin at the vertex of the angle lever slidable in said guide, and a spring to urge the fulcrum pin toward the reciprocable member whereby the load arm is in engagement with the latter during a portion of the downward movement thereof.

3. In a mechanical movement adapted for general application, the combination of a reciprocable rod, a revolving member, an angle lever having its load arm adapted to engage the reciprocable rod and its power arm pivotally connected to the revolving member, a guide rod pivoted at one end and having a longitudinal slot in its free end, a fulcrum pin at the vertex of the angle lever slidable in said slot in the guide rod, and a spring connecting the pin and guide rod, whereby the load arm is in engagement with said rod during the upward movement of the latter and a portion of its downward movement.

4. In a mechanical movement adapted for general application, the combination of a revoluble crank, an angle-lever having its power end pivotally connected to the latter, a clutch member adapted to oscillate in the load arm of the lever, a fulcrum pin at the vertex of the latter, a pivoted guide rod having a longitudinal slot in its free end to receive said pin, a spring connecting the pin with the pivot of the guide rod, and a reciprocable rod mounted between the clutch and pivoted end of the guide rod, said spring and slot adapted to cause the clutch to engage the reciprocable rod during its upward movement and a portion of its downward movement.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

MAX HERMANN GRUNDIG.

Witnesses:

WILLIAM J. KORYCTZUY,
HERBERT APPLEBYARD.