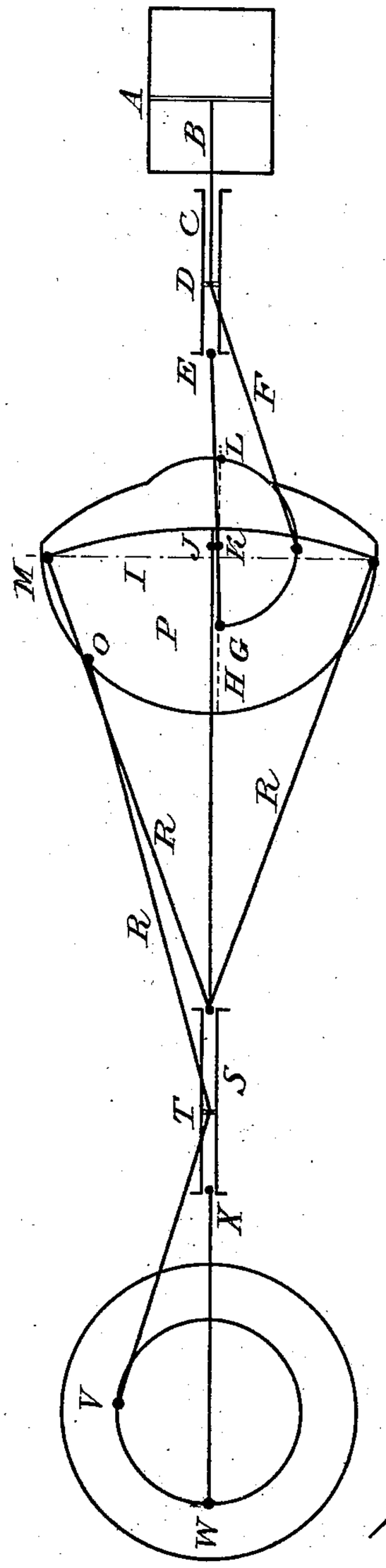
(No Model.)

M. B. KELLOGG.

DUPLICATING ENGINE.

No. 299,553. Patented June 3, 1884.



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MARMADUKE B. KELLOGG, OF SAN FRANCISCO, CALIFORNIA.

DUPLICATING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 299,553, dated June 3, 1884.

Application filed August 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, MARMADUKE B. KELLOGG, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Duplicating-Engines, of which the following is a description.

The object or purpose of such invention is to double the number of revolutions of the drive or pulley wheel of either locomotives or stationary engines without increasing the number of strokes of the piston in the cylinder, or to double the action of any part of the machine or engine, which may be used in lieu of a drive or pulley wheel without increasing the number of strokes of the piston in the cylinder, or the motion of other motive power, and to accomplish the same by means of levers or connecting-rods, slides and cranks, or crank-wheels, the same to be applied to engines, either locomotive or stationary, or to other motive power, for whatever purpose, and the machine therefore is herein and in such drawing designated "duplicating engine."

The figure on the drawing represents a sectional view.

The principle of such invention consists in applying the initial power in a direct line to a crank-pin located in a crank-wheel at right angles (or otherwise in some instances, if desired) to another crank-pin in the same wheel which communicates the power, such first-named pin being so located in the wheel that the first application of the motive power shall carry it a distance of or somewhat less than half the circle which would be described by it, and the reverse motion bring it back on the same track to the starting-point, thus carrying the second-named pin through or nearly through a half-circle of the same or larger radius and return; but the point which describes the last-named half-circle is usually to be a quadrant in advance of or behind the first-named crank-pin. Thus, with reference to the center and the horizontal diameter of the crank-wheel at each forward motion of the first-named crank-pin (carrying with it the wheel) the second-named crank-pin describes a forward and backward motion, and in like manner a forward and backward motion at each backward motion of the first-named crank-pin. To the second-named crank-pin a lever or arm is attached, the opposite extremity of which may work in a slide or guide, and thereto be attached another lever or arm, which shall connect with the drive or pulley wheel or other appliance. Thereupon each forward motion of the first-named crank-pin (carrying with it the wheel) will produce one complete revolution of such drive or pulley wheel or a forward and backward motion of such other appliance, and each reverse motion the same. Generally, when operated by a piston, the first-named crank-pin would be connected with the rod or lever from the piston-slide, and would move underneath the horizontal diameter of the crank-wheel in somewhat less than a half-circle, so that the one whole stroke of the piston would not carry it quite to the horizontal diameter at either end, thus preventing it from describing a whole circle and compelling its backward motion to be in the same track as the forward motion; and to suit the length of the cylinder or the desired amount of power applied, this pin would be correspondingly placed in the crank-wheel—that is, at a greater or less distance from the circumference of the crank-wheel—and the center of the circle described by it would be in the vertical diameter of the crank-wheel and a little below the center of that wheel. The second-named crank-pin would be placed in the crank-wheel on the side of the vertical diameter opposite to the location of the applied power and at a properly-proportionate distance on such side from the vertical diameter that the first-named pin is placed below the horizontal diameter, and at or as near the circumference as may be desired, according to the power required. Then one stroke of the piston applied to the first pin (carrying with it the wheel) would move the second pin outward from the vertical diameter to the extremity of the horizontal diameter, and backward thence toward the other extremity of the vertical diameter, giving (with each stroke of the piston) to the second crank-pin a forward-and-backward motion, which, being connected, as above set forth, by rod or lever with the slide and drive or pulley wheel or other appliance, would give such wheel a complete revolution or such other appliance a forward-and-backward motion for each stroke of the piston.

The machine to be connected with a piston

and cylinder or other power to be applied, as the case may be, consists (first) of a connecting-rod to the crank-pin in the (second) crank-wheel, which pin generally moves underneath the horizontal diameter of the wheel and gives it a little less than a half-revolution, and which wheel has another or second crank-pin generally near the extremity of the vertical diameter and on the side thereof opposite the applied power—that is, usually at the distance of about a quarter-circle from the first pin and in a direction from it opposite to the location of the applied power; (third) a connecting rod or lever from the second crank-pin to (fourth) a slide-block (or it may be to the drive or pulley wheel or other application direct) to be used for the purpose of steadying the applied power; (fifth,) a connecting rod or lever from the slide-block to the drive or pulley wheel or other appliance to which the power or motion is to be given, either circular or in direct lines. These appliances may be in direct lines from the power applied—that is, the machine may be continuously lengthwise; or the slide-block, receiving motion from the crank-wheel, may be placed in the opposite direction to economize space—that is, back by the side of the location of the applied power, or above or below—that is, at right angles to the horizontal diameter.

The machine is represented in the said accompanying drawing, which is hereby referred to. The appliances are delineated in direct lines from the applied power—that is, continuously lengthwise, as above mentioned.

A represents the cylinder; B, the piston; C, the piston-slide; D, the piston and connecting-rod slide-block; P, the crank-wheel or plate whose center and axis is at J; F, the connecting-rod between the piston-slide block and the crank-wheel, connecting with the latter at what has been designated the first crank-pin. The half-circle G L represents the track of the first crank-pin whose center is at K on the dotted line H a short distance below the horizontal diameter of the crank-wheel. The line or diameter G L is equal, practically, to the length of the stroke of the piston. Thus by the return-stroke of the piston the first crank-pin returns on the same track of its advance and the crank-wheel is prevented from making a complete revolution. The line G E represents another position of the rod F—that is, at its point of rest before return. The circle M O N represents the track of the second crank-pin N, which, by one stroke of the piston toward the left travels forward and upward from N to the left and to the intersection of the horizontal diameter of the crank-wheel, thence upward and to the right to M, and thus, by means of the connecting-rod R, gives to the slide-block T in the slide S a motion forward to the left and backward to the right by this single motion of the piston to the left, and thus the slide-block T, being connected by the rod T V to the drive or pulley wheel V W, gives it a complete revolution from one stroke of the piston to the left. The return-stroke of the piston to the right brings the first crank-pin back from G to L, and the second crank-pin from M to N, and so completes another revolution of the wheel V W. The double revolution of the drive or pulley wheel is produced by the respective connecting-rods F and R operating upon the same crank-wheel at right angles to each other, or otherwise in some cases. The points L and N are adjusted, as may be desired, according to the length of the cylinder and the size of the circle V W.

The position of the machine may be as delineated, or the slide S may be placed above or below the horizontal diameter of the crank-wheel, or to the right of its vertical diameter by the side of the cylinder A.

A double crank may be substituted for the crank-wheel, so constructed that the same effect be produced—that is, as L moves to G on the smaller circle N may move to M on the larger circle. Where desired, the connecting-rod R may be connected by the extremity T with a walking-beam with the same results of double motion above described. For other purposes than circular motion the rod W X may move in a direct line; also in the case either of walking-beam or appliance for other than circular motion the same may be placed to the left or right or above or below the crank-wheel, a proper corresponding change being made in the location of the second crank-pin.

I claim—

1. The said double-crank wheel or crank with its said crank-pins, constructed as aforesaid, to be operated by the half-motion aforesaid from the applied power, and the combination thereof with the connecting-rods F and R, and the slide-block T, constructed and operated substantially as above described, and substantially as and for the purpose of producing the said double motion of a drive or pulley wheel, or said other appliance from a single motion from the applied power.

2. The said crank-wheel or crank and the said crank-pins located therein, as above described, and operated as above set forth, for producing the said forward and backward motion of said second crank-pin and connecting-rod R therefrom at each forward or at each backward motion of said connecting-rod F.

3. The said crank-wheel or crank with said second crank-pin, so located therein, as above described, that said connecting-rod R may operate to the right or left or above or below the center thereof to either a slide-block or drive or pulley wheel or walking-beam, or such other appliance as may be desired, substantially as above set forth, for the purposes above described.

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