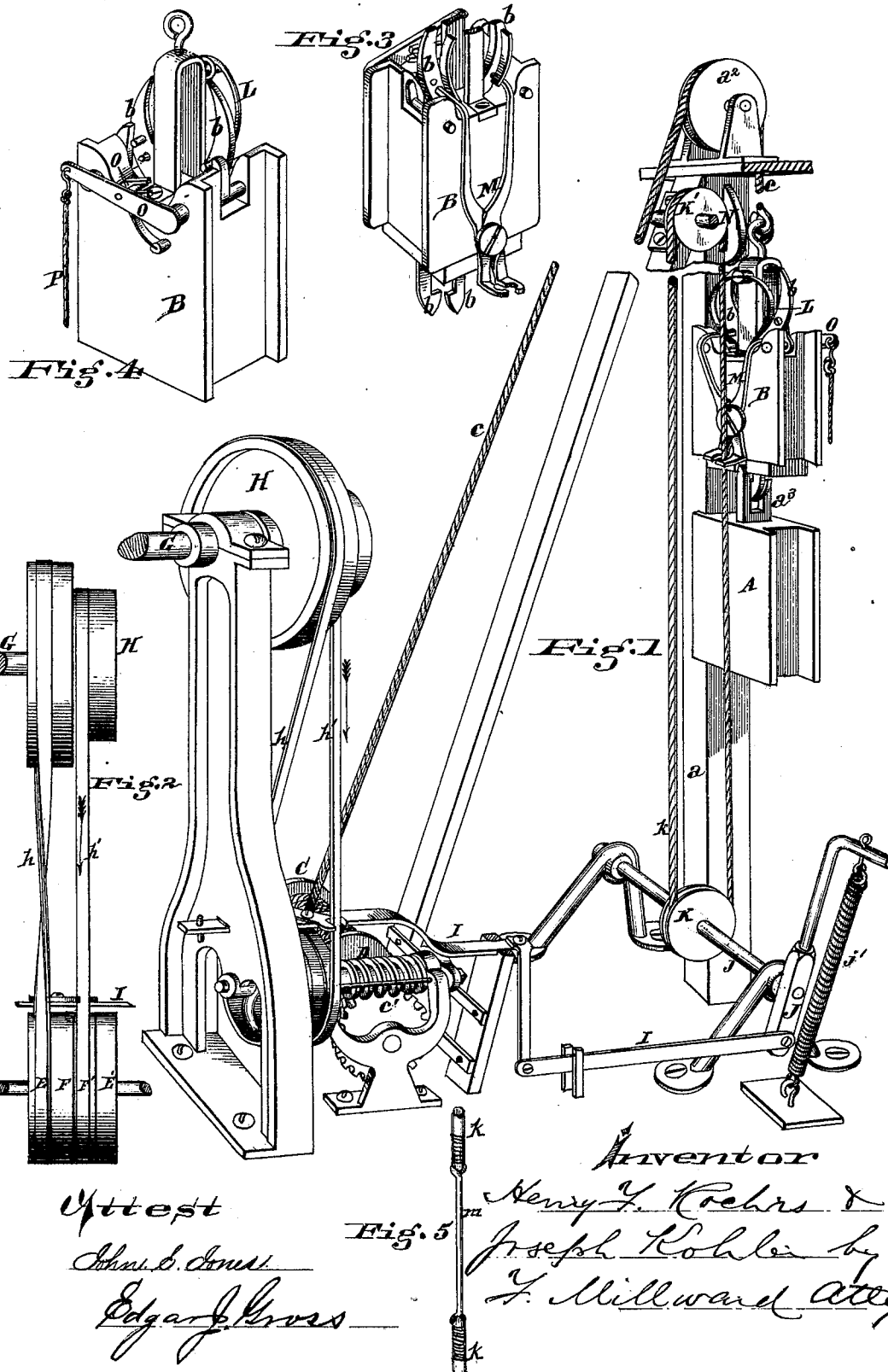


H. F. ROEHRS & J. KOHLER.

PILE-DRIVERS.

No. 175,169.

Patented March 21, 1876.



Attest

John C. Jones

Edgar J. Jones

Fig. 5

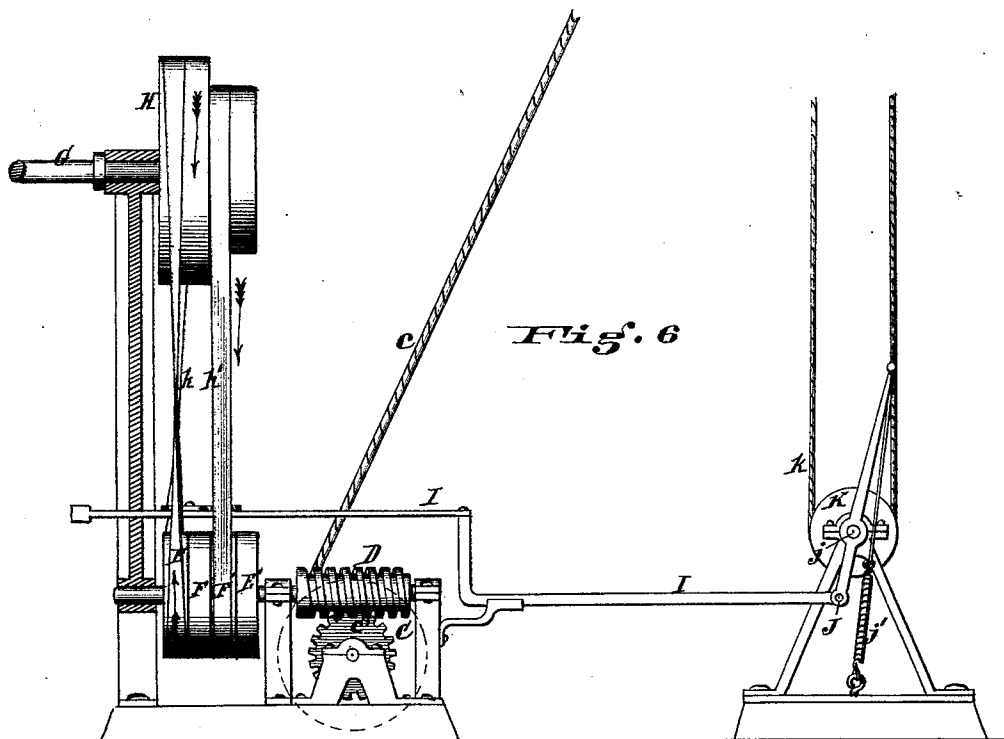
Inventor
Henry F. Roehrs &
Joseph Kohler by
Y. Millward atty

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UNITED STATES PATENT OFFICE.

HENRY F. ROEHRS AND JOSEPH KOHLER, OF CINCINNATI, OHIO, ASSIGNORS
TO THEMSELVES AND F. W. ALMS, OF SAME PLACE.

IMPROVEMENT IN PILE-DRIVERS.

Specification forming part of Letters Patent No. **175,169**, dated March 21, 1876; application filed-
February 2, 1876.

To all whom it may concern:

Be it known that we, HENRY F. ROEHRS and JOSEPH KOHLER, of Cincinnati, Hamilton county, State of Ohio, have invented an Improvement in Pile-Drivers, of which the following is a specification:

Our invention has for its object the construction of a pile-driver which shall perform its work effectively and expeditiously and require but little manual labor to aid in its operation. To this end, our improvement consists, first, of a certain arrangement and connection with the driving-engine of cross and straight driving-belts, suitably shifted by hand or automatically, to respectively drop the follower-head and raise the hammer without requiring the reversing of the engine, the whole acting through the agency of a driving-worm, operating upon a drum continuously, without loss of time, and with but little attention; second, in a pair of clamps, which, as the spring-hooks of the follower-head either clasp or release the bail of the hammer, clamp an extended endless cable, and move it sufficiently, in connection with spring-balanced lever, to reverse the motion of said follower-head by shifting the driving-belts, the whole being automatic in action; third, in the connection with said automatic shifting devices of projections suitably situated to trip the follower-head clamps or hooks at any desired point in the path of the drop and release the hammer; fourth, in the connection with said automatic shifting devices of spring tripping-levers, provided with a hand-rope, whereby the hammer may be dropped or tripped at any point in the length of its drop; fifth, in an extended shifting cable, forming part of the automatic belt-shifter, and so constructed that one portion of it cannot, by reason of its small diameter, be clasped by the clamps. This feature, as hereinafter fully explained, is for the purpose of preventing the accidental shifting of the belts before the spring-hooks of the follower-head have completed their proper function.

Figure 1 is a perspective view of a pile-driver embodying our invention. Fig. 2 is an elevation of the driving-belts. Fig. 3 is a perspective view of the follower-head of the drop. Fig.

4 is also a view of the follower-head, taken from different point of sight. Fig. 5 is an elevation, showing a non-operative blank in the extent of the shifting cable. Fig. 6 is an elevation showing spring shifting-lever, driving-worm, and belts.

A is the hammer, fitted to slide between ways $a a'$, and is detachably secured to a follower-head, B, which is hung and operated by cable c , running over idler a^2 , at the top of the ways $a a'$, and secured to drum C. The shaft of the drum C is provided with a worm-wheel, c' , which gears with a driving-worm, D. The worm D is secured to a common shaft, with the driving-pulleys E E', upon which also revolve the loose pulleys F F'. G is the driving-shaft of the engine which supports the cone driving-pulley H, which pulley connects with pulleys upon worm-shaft by belts $h h'$. I is a belt-shifting rod, which shifts both belts $h h'$ simultaneously, and whose outer end is attached to one end of a lever, J, pivoted upon a shaft, j . Secured to the other end of lever J is a spring, j' , which extends past both the end of shaft j and connection of rod I to the lever, and connects at a point in line with the position of lever J when at its central point of throw. Now, it is evident from the drawing that if the lever J is tilted, either one or the other way, beyond this central point of throw, the spring j' will act to draw it to the limit of throw, and thus shift completely the belts $h h'$.

Secured upon shaft j is a fast pulley, K, and around said pulley is secured an endless cable, k , which is extended by a second pulley, K', at the top of ways $a a'$. The operation of this cable, so as to move the lever J from its central point of throw, is necessary to produce an automatic belt-shifter, and this is produced as follows: The follower-head B is provided with catch-hooks $b b$, which clasp the bail a^3 of hammer A from opposite sides through the agency of compressing-spring L. And the said spring L also serves simultaneously to extend or spread apart a pair of clamps, M. Now, the cable k is so situated with respect to the path traveled by follower B that the clamps M in their extended position encircle the said cable loosely, and only clamp it tightly when

the hooks *b b* are separated in the act of tripping or taking up the hammer A, and by reason of the fact that the follower-head B trips and takes up the hammer A while in motion, the clamps M cramp and move the cable *k* sufficiently to carry the lever J beyond its central point of throw, and thus cause the spring *j'* to complete the act of shifting the belts. When the belts *h h'* are shifted it is obvious that the motion of follower-head B will be reversed, and if the hammer A has just been released in the act of striking a blow, the follower-head B, which was raising the hammer, will, as aforesaid, immediately reverse its motion and descend, by reason of the use of the largest section of cone driving-pulley H, at greater speed than it rose, to again attach to the hammer A; and, as before, in the act of detaching the hammer, so now in the act of attaching the hammer, the clamps M will move the cable *k*, which, in connection with spring *j'*, will shift belts *h h'* and reverse the motion of follower-head B, so as to raise the hammer preparatory to again dropping it. The follower-head will attach itself to the hammer when descending; but to trip its hold when rising, I provide tripping-blocks N, so situated as to oppose the progress of and trip the hooks *b b* at any fixed point. Now, it may be desirable to at times control the point of tripping so as to drop the hammer from various heights, and, therefore, we provide the tripping-levers O, suitably sprung away from contact with the hooks *b b* until forced against them by the operator drawing upon cord P. And it will be seen that by this means the height of the drop can be entirely regulated by the operator without interfering with the continuous operation of the machine. To provide for an instantaneous movement of the cable *k*, and to more exactly define the point at which the clamps M shall grasp said cable, we provide in the cable a blank, *m*, of smaller diameter than can be grasped by the clamps M, so that the said clamps cannot act until they have closed their fullest extent, and the hooks *b b* have opened sufficiently to receive or release the bail *a*³ of hammer A; when the clamps will strike the ordinary size of the cable, and the

motion of the follower-head will instantly be reversed, as is proper and desirable. The object of the blank or blanks in the cable *k* is to prevent the accidental movement of the cable, and consequent shifting of belts, from anticipating the complete action of the hooks *b b*. The increased size of the section of cone-pulley H, which, suitably attached, lowers the follower-head, also provides for an increase of speed in lowering, which is desirable as economizing time when no great power is required; and it is obvious that the ordinary driving-wheel may be used, if desired.

Having thus described our invention, we claim—

1. As applied to a pile-driving machine, the combination of driving-pulley H, cross and straight driving-belts suitably shifted, either automatically or by hand, driving-pulleys E E', idlers F F', driving-worm D, drum C, lifting-cable, and follower-head B, the whole operating substantially as and for the purpose specified.

2. In a pile-driving machine, the automatic belt-shifter, composed of rod I, tilting-lever J on shaft *j*, an operating-spring; *j'*, operating-chain *k* suitably extended from shaft *j*, and clamps M, acting in concert with hooks *b b*, and upon chain *k* by any preferred tripping devices, the whole operating substantially as and for the purpose specified.

3. In combination with the automatic belt-shifter, the tripping-blocks N, situated and operating substantially as specified.

4. In combination with the automatic belt-shifter, the spring tripping-levers O, provided with operating-cord, the whole operating substantially as and for the purpose specified.

5. In combination with the automatic shifting device, the shifting-chain *k*, when provided with blanks *m* to operate substantially as and for the purpose specified.

In testimony of which invention we hereunto set our hands.

HENRY F. ROEHR'S.
JOSEPH KOHLER.

Witnesses:

JOHN E. JONES,
EDGAR J. GROSS.