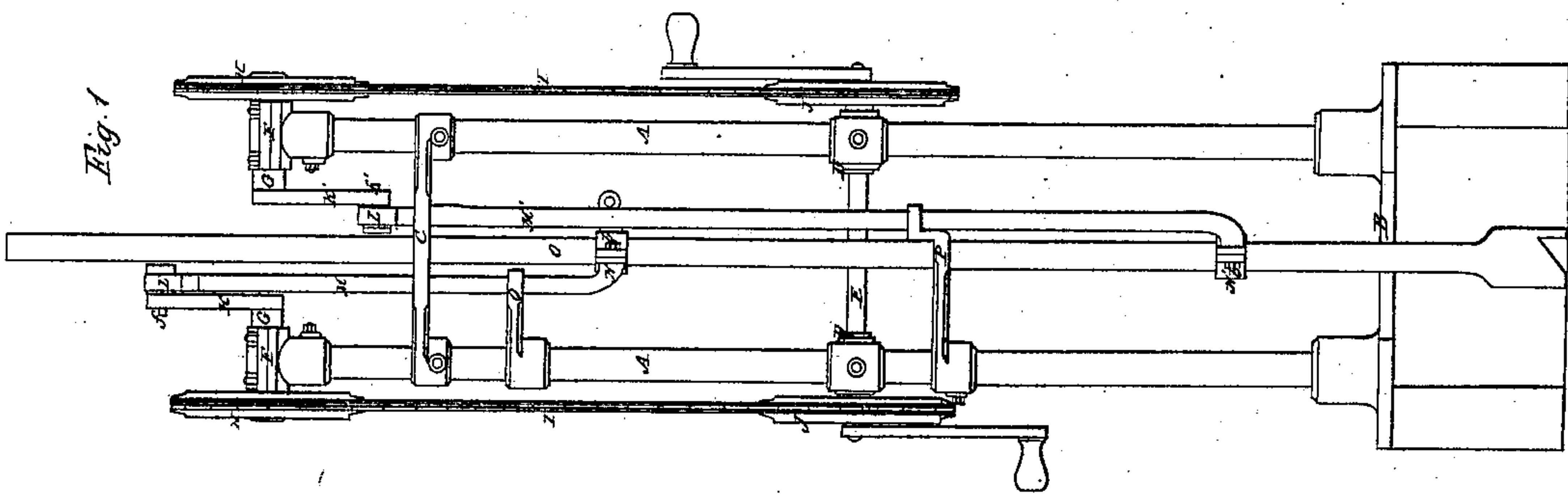
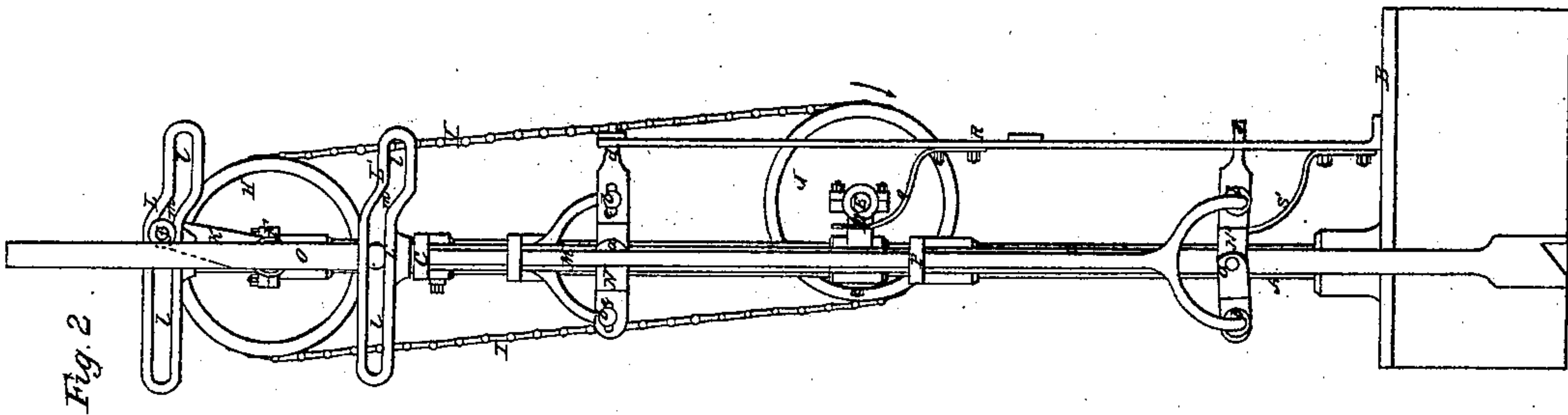
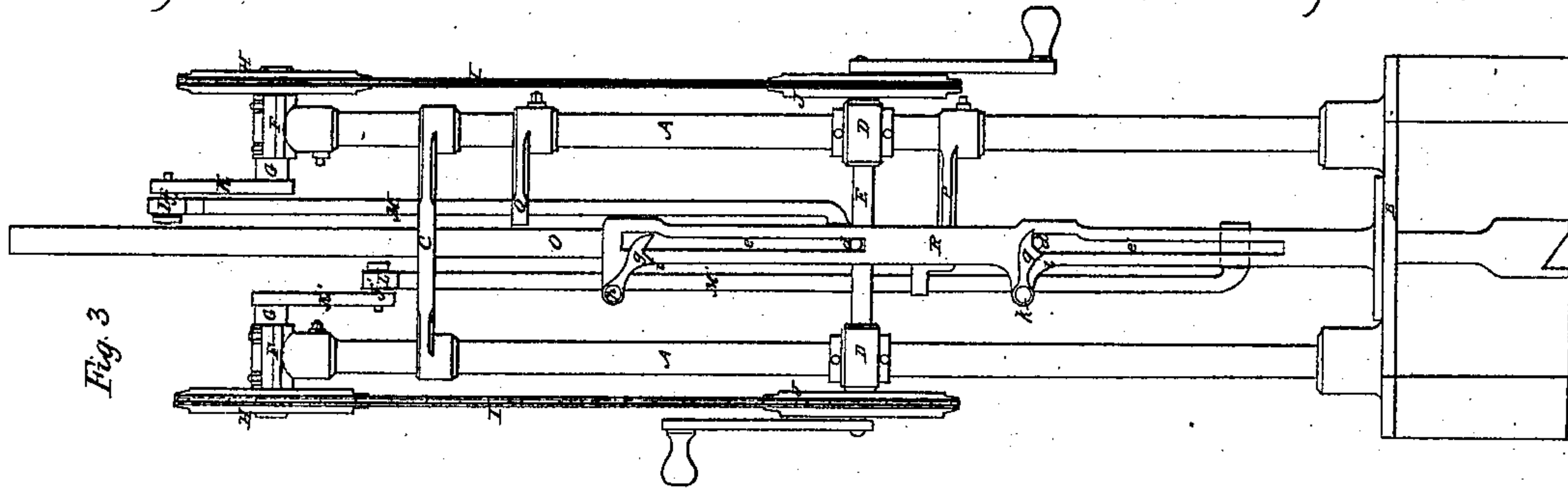


W. C. Wright,

Stone Drill.

N^o 10,618.

Patented Mar. 7, 1854.



UNITED STATES PATENT OFFICE.

WILLIAM C. WRIGHT, OF BOSTON, MASSACHUSETTS.

MACHINE FOR DRILLING STONE.

Specification of Letters Patent No. 10,618, dated March 7, 1854.

To all whom it may concern:

Be it known that I, WILLIAM C. WRIGHT, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Drilling Stone; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being made to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a front elevation of a machine constructed according to my invention. Fig. 2, is a sectional side elevation, and Fig. 3, a back elevation of the same.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists in a certain arrangement of, and mode of operating two sets of grippers, whereby each set is caused to grip and carry up the drill bar, while the other set slide down the bar previous to renewing their grip, and the drill bar is liberated from both pairs of grippers, and let fall at the end of every upward movement. This arrangement allows the drill to strike two blows during every revolution of the driving shaft, and saves the time lost in raising the bar when only one set of grippers are employed, as one set is always rising, and also gripping the bar, except during the short interval when the drill bar falls.

To enable those skilled in the art, to make and use my invention, I will proceed to describe its construction and operation.

A, A, are two wrought iron uprights, which are secured firmly to a base, B, of cast iron or timber, and are stayed by a cross tie, C, near the top. At about the middle of the height of the uprights, are secured the boxes, D, D, which form the bearings of the horizontal driving shaft, E, which is furnished with cranks, by which rotary motion is given to it. At the top of the uprights are secured the boxes, F, F, which form the bearings of two short shafts, G, G', which carry each a sprocket wheel, H, receiving rotary motion through an endless chain, I, from one of two sprocket wheels, J, J, on the driving shaft. The two shafts, G, G', stand in line, and are furnished at their adjacent ends, with two cranks, K, K, which stand on diametrically opposite sides of their common axis. The cranks are furnished with wrists, f, f', which enter slotted heads, L, L', at the top of upright rods, M,

M', whose lower ends are forked to carry the grippers, N, N', which seize the drill bar.

The drill bar, O, is parallel with the uprights, A, A, and is placed midway between them, being fitted to work in two guides, one of which is in the cross tie C, and the other in an arm, P, below. The rods, M, M', which carry the grippers, are on opposite sides of, and nearly close to the drill bar, and they work in guides in the cross tie, C, and in the arms, P, and Q, below. The rod, M', is much longer than the other rod, M, as the grippers must occupy such positions that when the upper set have descended, and the lower set ascended, simultaneously, they will clear each other. The nippers are of a form substantially like some of the nippers in use for similar purposes, the two jaws being hinged together by lugs, a, a, on opposite sides of the drill bar, and each jaw being suspended on a horizontal pivot, b, at the end of one prong of the fork on the rod. The jaws are made heavy at the ends, and are so formed that their weight makes them grip the drill bar when they hang free, but that when the ends are raised they will release the bar. The holes, c, c, see Fig. 2, which receive the pivots, b, of the fork, must be elongated, in order to allow the grippers the necessary motion to grip and release the bar. At the back of the pivot, b, of the back jaw of each pair of nippers, is a shank, d, which passes through one of two slots, e, e', in a light upright standard, R, which is secured to the base, B, behind the drill bar.

The slots, e, e', in the standard, R, are of such length that they will allow the shanks, d, d', of the nippers to move in them as they are raised and lowered by the revolution of the wrists of the cranks in the slots, L, L', at the top of the rods, M, M', but that each shank will strike the top of its slot just before the grippers arrive at the top of their upward stroke, and arrest its upward movement, after which the continued upward movement of the gripper rod causes the jaws of the grippers to be tilted up, and thereby opened to release the rod, which during their ascent they have gripped and carried up. The slots, e, e', are both straight for the greater portion of their length, and of a proper width for the shanks, d, d', to pass easily, but they are both curved outward on one side; and thus widened

from a short distance below the top to the top, and on the opposite side of each is suspended by a pivot, *h*, a small arm, *g*, whose end rests upon a pin, *i*, which prevents it falling. The end of this arm is furnished with a hand or angle piece, which, when the arm rests on the pin, *i*, lays across the slot in the position in which the upper one is represented in Fig. 1. As the shank of the grippers arrives opposite the widened part of the slot, it comes in contact with the hand of the arm, *g*, and as it continues ascending, raises the hand, which, moving in an arc, throws the shank laterally across the widened part of the slot. The grippers at that time holding the drill bar, continue to turn it until the shank strikes the top of the slot, and causes it to be released.

The slots in the heads *L*, *L'*, of the gripper rods, in which the cranks work to give the rods a reciprocating motion, consist each of two straight parts, *l*, *l'*, one a little above the other at right angles to the rod, united by a step, *m*, which is of the form of an arc, described with the radius of the crank. The arc formed step, *m*, descends from the central point in the slot, and allows the crank wrist after having raised the rod to the highest position, by passing along the long straight part of the slot, to move in the slot for some distance before commencing to drive it downward. The object of this is to leave the nippers, which have raised the bar, open, after they have released it, for a sufficient time, to allow it to fall. There are stop pieces, *S*, *S'*, attached to the front of the standard, *R*, to open the grippers which have descended, and thus both sets of grippers are opened when the bar falls.

The operation of the machine is as follows: I will first suppose the drill bar to have just fallen, after having been raised by the upper set of grippers, *N*, as represented in Figs. 1 and 2. The wrist, *f*, of the crank, *K*, will be seen in Fig. 2, to be moving down the arc, *m*, of the slot in the head, *L*, of the gripper rod, *M*, consequently the rod is not moving. Both sets of grippers are open; the upper set in consequence of the shank, *d*, being depressed by the top of the slot, *e*, in the standard, *R*, and the lower set, in consequence of the jaws being tilted by the stop, *S'*, on the lower part of the said standard. As the motion of the shafts and cranks continues, the first half of the revolution of the wrist of the crank, *K*, will raise the gripper rod, *M'*, and the lower set of grippers, *N'*, and as soon as the said grippers are raised clear of the stop, *S'*, the jaws will fall of their own weight, and grasp the drill bar, whose friction and weight will draw them tight. In the mean

time, the crank, *K*, after its wrist passes down the arc of the slot in the head, *L*, drives down the rod, *M*, and the upper set of grippers. The downward motion of these grippers on the rod, and the upward motion of the rod through them, both tend to prevent their gripping the rod, so they slide down easily. When the shank, *d*, of the grippers, *N'*, reaches the hand of the arm, *g*, they raise it, and in ascending, this hand turns the drill bar by forcing the shank toward the widened or recessed part of the slot, *e'*, where it remains until the descent of the grippers. When the shank, *d*, reaches the top of the slot, and its upward progress is arrested, the grippers, *N'*, being opened, allow the bar to fall. The next half revolution of the cranks will cause the wrist of the crank, *K*, to raise the gripper rod, *M*, and grippers, *N*, which will raise the drill bar, while the wrist of the crank, *K'*, after descending the arc, *m*, of the slot in the head of the rod, *M'*, will force down the grippers, *N'*. Before either pair of grippers are opened, after raising the bar, the pair which have, in the meantime, descended, are also opened by coming in contact with one of the stops, *S*, *S'*, on the standard, *R*, and these grippers remain open during the latter part of their downward stroke, and the early part of their upward stroke; this is necessary for the same reason that the descent of the nippers which have raised the bar, is for a time, arrested, viz:—because if the nippers were not kept open and clear of the bar during its descent, the friction of the bar within them would draw them tight. The continued operation of the machine is but a repetition of that described, every revolution of the driving shaft giving two strokes to the drill bar.

What I claim as my invention, and desire to secure by Letters Patent, is:

The combination of mechanism herein described, for operating the drill bar, consisting of two pairs of grippers, *N*, *N'*, attached to rods, *M*, *M'*, having slotted heads, *L*, *L'*, which receive the wrists, *f*, *f'*, of two cranks, *K*, *K'*, the said cranks being arranged diametrically opposite each other on a common axis, and the slots in the heads of the gripper rods being of such form as described, so as to cause one set of grippers to be always rising while the other pair are descending, but to cause a cessation of motion before every descent, in order to give time for the drill bar to fall, as herein set forth.

WILLIAM C. WRIGHT.

Witnesses:

I. K. TYLER,
JNO. B. ROBB.