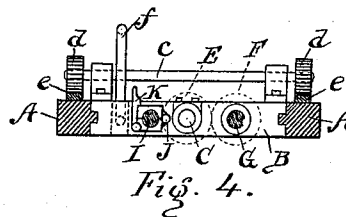
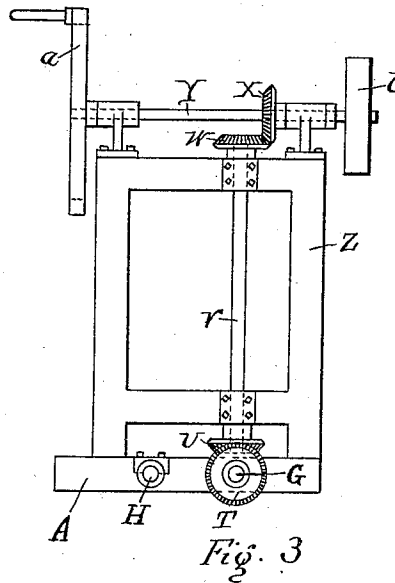
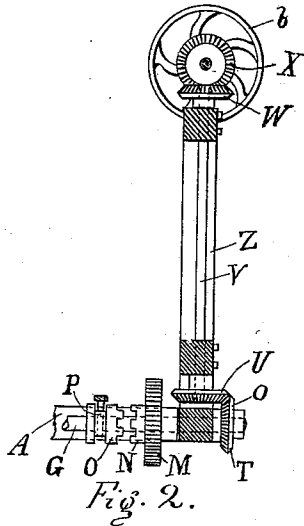
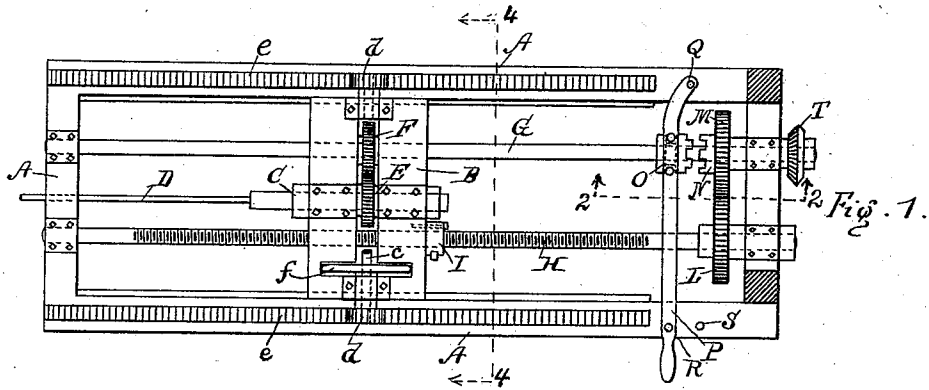


(No Model.)

J. H. SYNON.
BORING MACHINE.

No. 478,266.

Patented July 5, 1892.



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN H. SYNON, OF CHICAGO, ILLINOIS.

BORING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 478,266, dated July 5, 1892.

Application filed June 25, 1891. Serial No. 397,497. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. SYNON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Boring-Machines, of which the following is a specification.

This invention relates to improvements in boring-machines and especially designed and adapted for use in laying water-pipes in cities where mains are laid along about the center of the street for making connections between the mains and houses or lots along the street, so as to avoid the necessity for digging up or otherwise rendering the street impassable.

Heretofore it has been the common practice to dig a trench leading from the water-main to or beyond the sidewalk in which to lay the pipes for supplying the lots and buildings along the street, which mode of procedure is objectionable on account of the expense involved therein, the time required, and the inconvenience occasioned by the blocking of the street.

The object of this invention is to avoid all such expense, loss of time, and inconvenience by providing a machine especially adapted for boring horizontal holes into which the connecting pipes may be inserted, whereby connections between buildings, lots, and water-mains may be made by simply digging a hole in the center of the street to tap the main and another on the lot or sidewalk in which to place the machine during operation and make suitable surface connections. This object is attained by the devices illustrated in the accompanying drawings, in which—

Figure 1 is a horizontal section of a boring-machine embodying my invention, taken on the line 1 1, Figs. 2 and 3. Fig. 2 is a detail vertical section on the line 2 2 of Fig. 1, looking in the direction indicated by the arrows. Fig. 3 is an end elevation of the machine. Fig. 4 is a transverse vertical section on the line 4 4 of Fig. 1, looking in the direction indicated by the arrows.

Similar letters of reference indicate the same parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, A indicates a rectangular frame of

any suitable construction, between the side bars or timbers of which works a carriage B, having a tongue-and-groove or other sliding connection with said bars, as more clearly illustrated in Fig. 4, to the center of which carriage is secured a chuck C of any suitable construction for receiving a drill D.

Upon the shank of the chuck is mounted a pinion E, meshing with and driven by a corresponding pinion F, splined upon a longitudinal shaft G, loosely journaled in the frame A, so that the gear F will be carried back and forth by the carriage, and thus in all positions drive the gear F, and consequently the drill D, whenever the shaft G is rotated.

In the frame A at the opposite side of the drill-chuck is loosely journaled a longitudinal screw-threaded shaft H, parallel with the power-shaft G, working through a sectional or detachable screw-threaded hub I upon the carriage, by means of which the carriage may be moved back and forth on the frame, but which may be disengaged therefrom by throwing the section of the hub back upon their pivot connection J, thereby disengaging the hub from the threads of the shaft, the two sections of the hub being held in close and proper relation when in their operative position by a catch K, pivoted to one of the sections. The screw-threaded shaft H has a gear-wheel L mounted thereon near the rear end, and is driven by a corresponding gear-wheel M, loosely journaled upon the power-shaft G and provided with a half-clutch N, adapted and arranged to be engaged by a corresponding half-clutch O, splined upon the power-shaft and actuated by a hand-lever P. This lever is pivoted at Q to the one side bar of the rectangular frame and may be locked, in either adjusted position with the clutch, in or out of gear, by means of a pin R, projecting through a hole therein and into perforations S in the other side bar of the frame, or by any other suitable locking device, the clutch-coupling between the gear and power-shaft being of the ordinary form.

The power-shaft G is operated by means of a bevel-gear T, keyed thereon, with which meshes a corresponding bevel-gear U on the lower end of the vertical shaft V. On the upper end of this shaft is keyed another bevel-gear W,

meshing with a corresponding bevel-gear X upon a cross-shaft Y, journaled in suitable bearings upon a vertical supplemental frame Z, attached to one end of the main frame, which latter shaft may be operated by hand through the medium of the crank-wheel *a*, mounted upon one end thereof, or it may be driven by mechanical power through the medium of the belt-pulley *b*, mounted upon the opposite end of the shaft. It will thus be seen that when power is applied to the cross-shaft Y the drill will be continuously rotated, and the carriage may be caused to simultaneously advance, keeping the drill up to its work, from a single source of power if the clutch be operated to that end, or the carriage will remain stationary or cease its travel whenever the clutch is thrown out of gear.

In connection with this machine it is proposed to employ any suitable form of sectional drill, the sections of which will be added as rapidly as the drill penetrates through the ground. For greater convenience in returning the carriage to its first position, and at the same time avoiding the necessity for reversing the machine, I have provided a short shaft *c*, suitably journaled in bearings upon the carriage and provided at each end with a pinion *d*, working in racks *e*, attached to the side bars of the rectangular or main frame A, said shaft being operated by a hand-wheel *f*, mounted thereon, by means of which when the sectional hub I is disengaged from the screw-threaded shaft H the carriage may be quickly run back to its first position.

In the practical use of this machine it is proposed to dig a hole of suitable dimensions and depth upon the building-lot or sidewalk and sink the machine therein until the drill reaches the same horizontal plane as the water-mains at the center of the street, in which position it is expected that the vertical supplemental frame will project sufficiently above the surface of the ground to enable the operation of the machine from above, it being only necessary for one operator to be in the hole with the machine to add the sections to the drills as the work is performed.

This machine possesses great utility and economy, especially when used in large cities, for besides saving at least two-thirds of the present cost of making water connections between building-lots it also avoids the inconvenience resulting from torn-up streets, which can seldom be restored to their original condition, for which reason it is now the custom to lay all such connections at great cost before the streets are graded and paved wherever it is practicable.

What I claim, and desire to secure by Letters Patent, is—

1. In a boring-machine, the combination, with the frame, a power-shaft journaled therein, a screw-threaded shaft also journaled in said frame parallel with the power-shaft, and a gear connection between said shafts, of a carriage mounted upon and having a sliding

connection with said frame, a rotary drill journaled in said carriage, a gear connection between said drill and the power-shaft, and a detachable screw-threaded connection between the carriage and the screw-threaded shaft, substantially as described.

2. In a boring-machine, the combination, with the frame, a power-shaft journaled therein, a screw-threaded shaft also journaled in said frame parallel with the power-shaft, a gear-wheel keyed upon said screw-threaded shaft, another gear-wheel meshing therewith and loosely mounted upon the power-shaft, and a clutch-coupling between said wheel and the power-shaft, of a carriage mounted upon and having a sliding connection with said frame, a screw-thread connection between said carriage and the screw-threaded shaft, a rotary drill journaled in said carriage, a gear-wheel for operating the same, and another gear-wheel meshing therewith and splined upon the power-shaft, substantially as described.

3. In a boring-machine, the combination, with the frame, a power-shaft journaled therein, a screw-threaded shaft also journaled in said frame parallel with the power-shaft, and a gear connection between said shafts, of a carriage mounted upon and having a sliding connection with said frame, a rotary drill journaled in said carriage, a gear connection between said drill and the power-shaft, a detachable connection between said carriage and the screw-threaded shaft, and a rack-and-pinion connection between said carriage and the frame, substantially as described.

4. In a boring-machine, the combination, with the frame, a power-shaft journaled therein, a screw-threaded shaft also journaled in said frame parallel with the power-shaft, a gear-wheel keyed upon said screw-threaded shaft, a second gear-wheel meshing with the first gear-wheel and being loosely mounted upon the power-shaft, and a clutch-coupling between said second gear-wheel and the power-shaft, of a carriage mounted upon and having a sliding connection with said frame, a detachable screw-thread connection between said carriage and the screw-threaded shaft, a rotary drill journaled in said carriage, a gear-wheel for operating said drill, and another gear-wheel meshing with the latter gear-wheel splined on the power-shaft, substantially as described.

5. In a boring-machine, the combination, with the frame, a power-shaft journaled therein, a screw-threaded shaft also journaled in said frame parallel with the power-shaft, and a gear connection between said shafts, of a carriage mounted upon and having a sliding connection with said frame, a rotary drill journaled in said carriage, a permanent sliding-gear connection between said drill and the power-shaft, and a detachable connection between said carriage and the screw-threaded shaft, substantially as described.

6. In a boring-machine, the combination,

with the main frame, of a carriage mounted
to slide thereon, a rotary drill-chuck having
a driving-gear E, journaled in and supported
by said carriage, the driving-shaft, a gear F,
5 meshing with the gear E and being splined on
said driving-shaft and adapted to be slid along
the driving-shaft by the movement of the car-

riage, and means for advancing and withdrawing
said carriage, substantially as described.

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