

(No Model.)

A. E. W. MEISSNER.
RECIPROCATING DRILLING MACHINE.

No. 555,254.

Patented Feb. 25, 1896.

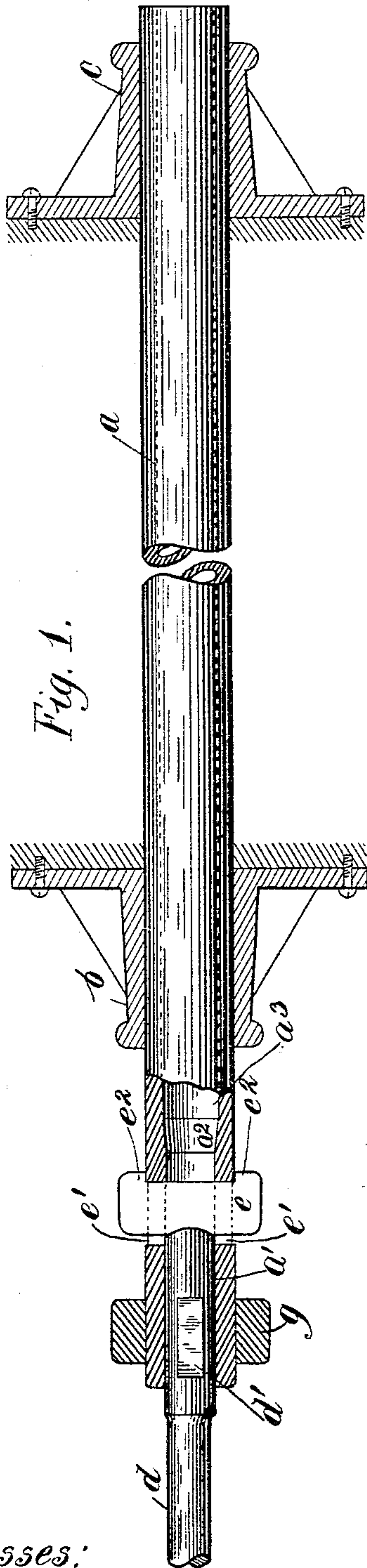


Fig. 1.

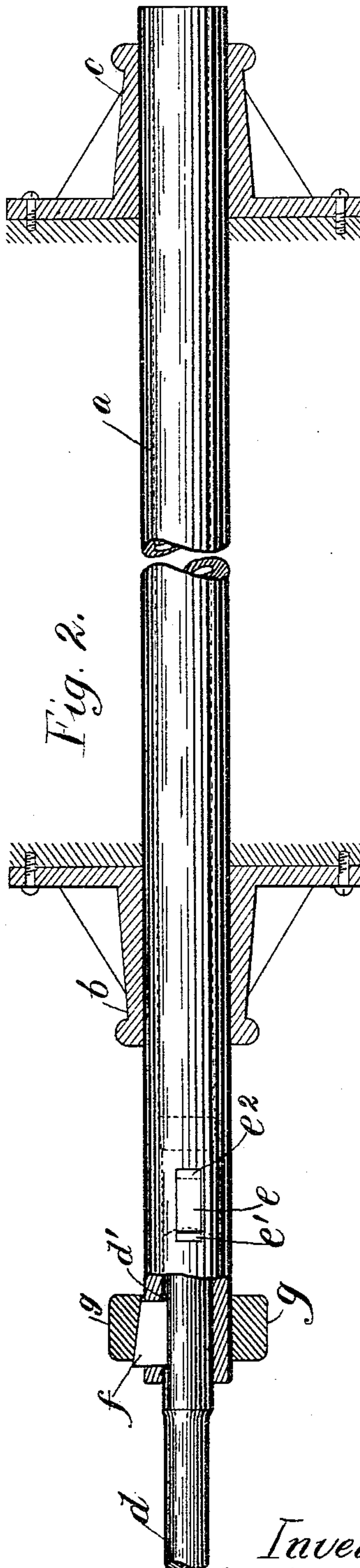


Fig. 2.

Witnesses:
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UNITED STATES PATENT OFFICE.

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RECIPROCATING DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 555,254, dated February 25, 1896.

Application filed August 15, 1895. Serial No. 559,343. (No model.) Patented in Belgium March 15, 1894, No. 108,701; in Italy March 21, 1894, No. 35,821; in France May 4, 1894, No. 236,250; in South African Republic June 19, 1894, No. 654; in Switzerland August 15, 1894, No. 8,317; in Germany August 23, 1894, No. 77,887; in England November 17, 1894, No. 649; in Norway November 30, 1894, No. 3,592, and in Sweden January 24, 1895, No. 5,786.

To all whom it may concern:

Be it known that I, ADOLF EMIL WALDEMAR MEISSNER, a subject of the Emperor of Germany, residing at Charlottenburg, near Berlin, Germany, have invented new and useful Improvements in Reciprocating Drilling-Machines, (Case No. 620,) of which the following is a specification, and for which Letters Patent have been granted in Germany, No. 77,887, dated August 23, 1894; in France, No. 236,250, dated May 4, 1894; in Great Britain, No. 649, dated November 17, 1894; in Norway, No. 3,592, dated November 30, 1894; in Italy, No. 35,821, dated March 21, 1894; in Sweden, No. 5,786, dated January 24, 1895; in Belgium, No. 108,701, dated March 15, 1894; in South African Republic, No. 654, dated June 19, 1894, and in Switzerland, No. 8,317, dated August 15, 1894.

My invention relates to improvements in reciprocating drilling-machines, and particularly in the plungers of such machines; and the object of my invention is to provide improved means for connecting the drill-bit with the plunger, such improved means having special reference to the desirability of permitting one drill-bit to be removed and replaced by another without the necessity of changing the position of the drilling-machine while making the substitution.

Reciprocating machines of the various types of construction hitherto devised have all suffered from this defect—namely, that in drilling a hole whose depth is greater than the feed of the machine the location of the machine must be changed when it is desired to remove a drill-bit and to substitute therefor a larger bit. This not only entails considerable loss of time in readjusting the drilling-machine to its former position, but after the machine is once removed it is exceedingly difficult to replace it so as to put the axis of the new drill-bit in exactly the same position as the axis of the first shorter bit occupied, while if not accurately replaced the new drill-bit will be pressed against a side of the hole already made, and so wedged fast.

The object of my invention is to provide means for removing the drill-bit from the plunger and replacing it by another without changing the position of the plunger, and this result I accomplish, first, by making the plunger or projectile of the drilling-machine hollow behind the bit-socket, so that the bit may be introduced into the machine and placed in position from the rear end of the plunger instead of from the front, as heretofore, and, secondly, in providing simple means readily removed and replaced for withstanding the recoil or back-thrust of the drill-bit.

Inasmuch as my invention is confined to the novel means for introducing the drill-bit into the plunger and therein securing it and has no reference to any particular form of drilling-machine, but is equally applicable to all forms of reciprocating drilling-machines, it will be sufficient to illustrate and describe only the plunger, bit, and connections, and in addition to indicate the bearings in which the plunger reciprocates.

Referring to the drawings, Figures 1 and 2 are longitudinal views, partly in section, of the plunger and connected end of the bit, taken at right angles to each other.

The plunger *a* is adapted to reciprocate in cylindrical bearings *b* and *c* and carries the bit *d*. In the forward end of the plunger is the socket *a'*, which receives the bit and which is bored of greater diameter than the cutting end of the largest bit to be used, the shanks of the bits being enlarged at their rear ends to exactly fit the socket *a'*. Rearwardly the socket *a'* extends into a short divergent conical bore *a²*, and beyond the part *a²* is a cylindrical bore *a³*, extending through to the rear end of the plunger.

It will be seen that with this construction even the largest bit to be used can readily be inserted into the plunger at its rear end and so placed in its operative position in the front end of the plunger, the rear end of the bit exactly fitting the socket *a'*.

Now as to the means for securing the bit

in its position in the plunger it is to be taken into consideration that, on account of the large number of bits to be used, only bits of the simplest shape should be employed, and
 5 that any special work on the bits for the purpose of fastening them must be avoided on account of the large expense that would be entailed. Furthermore, the connection between the bit and plunger should be such as
 10 to be made and undone easily to permit of the change of bits. I therefore employ the following devices for retaining the bit in place: For opposing the back-thrust of the drill-bit when the machine is in operation I provide
 15 a bolt or stop e , which is passed through slots e' in the wall of the plunger, and which has a mediate portion extending completely through the plunger cut away so as to leave shoulders e^2 , which overlap the walls of the
 20 plunger when the bolt e is urged rearwardly, and so effectually prevent lateral displacement of the bolt. On its forward side the bolt e is concaved to receive the convex end of the bit.
 25 The bit may be fastened in the bore a' in any desirable manner—for instance, by means of set-screws. In the drawings the well-known practical method of fastening is represented. The rear end of the bit is provided with a
 30 plane d' and is fastened by means of a wedge f and set-ring g . The ring, which is shoved on the wedge from the rear, draws automatically faster and faster from the blows of the machine.
 35 A little consideration will show that with machines of short stroke the length of feed possible to be obtained with any given machine is much greater with my arrangement, by which the bit can be inserted into its position in the plunger from the rear, than where
 40 it has had to be inserted from the front, as hitherto.

In the machines as at present in vogue, in which the bits must be inserted from the front,
 45 a certain portion of the feed of the machines is "dead-feed," at least in machines of short stroke, for when a longer bit is substituted for a shorter in order to insert the bit from the front it must be moved into the plunger
 50 a distance equal to the length of the socket, say one hundred millimeters. Necessarily,

then, when the bit has been secured in position the plunger would have to be moved back the same distance in order to again bring the cutting-edge of the bit into contact with the
 55 rock. From this, however, should be deducted the length of the stroke. In a certain type of percussion-drills it is forty-two millimeters. This would give fifty-eight millimeters as the amount of dead-feed in this type of drill. 60

With my present arrangement there is no dead-feed whatever, since the distance through which the bit should be pushed back in order to be secured in place is merely the amount of projection of the shoulders e —say
 65 eight millimeters—and this being less than the length of the stroke no dead-feed is necessary.

Having thus fully described my invention, what I claim as new, and desire to secure by
 70 Letters Patent, is—

1. In a drilling-machine, the combination with a reciprocating plunger having a socket for the drill at the forward end and a bore extending through the plunger and affording
 75 communication to said socket from the rear, of a drill adapted to fit said socket and having an elongated shank to permit the insertion of the drill into the socket from the rear through the bore in the plunger, and abutments near
 80 the forward end of the socket for taking up the thrust and the pull upon the drill; substantially as described.

2. In a reciprocating drill, the combination with a socket for the drill constructed to receive the drill from the rear, of a drill provided with a shank having an opening extending transversely therethrough, a key adapted to be inserted in said opening to serve as an
 85 abutment, the shank of said drill being enlarged at the rear end and carrying a shoulder, and a shoulder provided in the socket against which the shoulder on the drill is adapted to rest to act as an abutment; substantially as described. 95

In testimony whereof I have affixed my signature in the presence of two witnesses.

ADOLF EMIL WALDEMAR MEISSNER.

Witnesses:

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 OSCAR KIELEFELD.