

United States Patent Office.

G. F. CASE, OF WINDSOR, VERMONT, ASSIGNOR TO HIMSELF AND "THE WINDSOR MANUFACTURING COMPANY," OF SAME PLACE.

Letters Patent No. 86,903, dated February 16, 1869.

IMPROVED STEAM-DRILL.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, G. F. CASE, of Windsor, in the county of Windsor, and State of Vermont, have invented certain new and useful Improvements in Steam-Drilling Machines; and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents an elevation of the machine;

Figure 2 represents a vertical central section through the same; and

Figure 3 represents a top plan, with the cover or head removed to show the interior.

Similar letters of reference, where they occur in the several separate figures, denote like parts in all of the drawings.

My invention relates to the operation of a "diamond-point" drill, actuated through the power of steam, by being connected directly with the engine, as will be explained.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A represents a steam-cylinder or case, within which runs a steam-wheel, B, operated or driven by steam, admitted against the pistons *a a a*, in the usual well-known way of driving rotary steam-engines.

The steam is admitted to the pistons or steam-wheel by means of a two-way plug-cock at *b*, and thence through steam-passages *c*, in dotted lines, fig. 3, which have two openings into the steam-chamber, one at *d*, and the other at *e*, so that there shall be steam and uniformity of pressure on both sides of the pistons, and thus allow them to move into and out of the steam-wheel without pressure.

The two-way cock admits of reversing the engine.

The steam, after it has acted upon the pistons, escapes at the eduction-opening *f*.

This steam-apparatus is, in all respects, a rotary engine, and, as such, could not be claimed in connection with or for driving any special kind of machinery. But the steam-wheel must have a centre to run upon, as a shaft or journals. I use a hollow shaft, and with this hollow shaft, which is rotated by steam, I connect my drilling-mechanism, as follows:

Through the hollow shaft *g*, I pass a drill-shaft, C, there being a groove, *h*, cut longitudinally of said shaft, into which studs *i i*, in the hollow shaft *g*, pass, so that whilst the drill-shaft must revolve with the hollow shaft, it may slide through the shaft, up or down, as the case may be.

To the lower end of the hollow shaft *g* is fastened, so as to turn with it, a gear-wheel, *j*, and between this

gear-wheel and the under side of the case or lower head of the steam-cylinder A', is a series of balls, *l*, to relieve the pressure and friction of said gear upon the case, by the resistance on the drill.

This gear *j* works into and turns a gear, *k*, on the stud *l*; and upon the hub *m*, of the gear *k*, is placed another gear, *n*, which is pressed up against a rubber spring, *o*, placed between the two gears, and by which pressure the gear *n* may turn with the one, *k*, until the resistance becomes too great or excessive, and then the gear *n* will slip on or against the elastic ring.

The object of this connection is to regulate the feeding up of the drill to the stone, and to compensate for the difference in the hardness or otherwise of the stone being drilled.

A nut, *p*, below the gear *n*, regulates it and its pressure against the ring *o* and the gear *k*.

The gear *n* works into and turns a nut-gear wheel, *q*, the turning of which, through its screw-nut *r*, feeds up the drill, by or through the screw-threads on the drill-shaft C.

The drill *s*, I propose to use, is what is termed the diamond-point drill.

Of the rotary engine it may be necessary to mention that shoes, *2*, are placed on the ends of the pistons, so that they may adapt themselves to the interior of the cylinder, against which they run.

On top of the wheel, and between it and the upper head of the steam-case A, is placed angular or bevelled packing, *3*, the shape of which is shown in fig. 2.

At the centre of the steam-wheel there is a spring-ring, *t*, which tends to press all the pistons out against the steam-cylinder or case, and the forcing of the spring by one of the pistons sliding toward the centre of the wheel, acts to push out the other pistons against the cylinder.

Having thus fully described my invention,

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

In combination with the lower head of the cylinder A', the gear-wheel *j*, and a drill-rod, having rotary motion, the balls, when interposed to relieve friction, in the manner described, or its equivalent.

Also, in combination with the gear *k*, the gear *n*, held thereto by friction against an elastic ring, *o*, interposed and regulated so as to slip when excessive strain comes upon the gear *n*, as and for the purpose described.

G. F. CASE.

Witnesses:

L. W. HAWLEY,
W. T. SMITH.