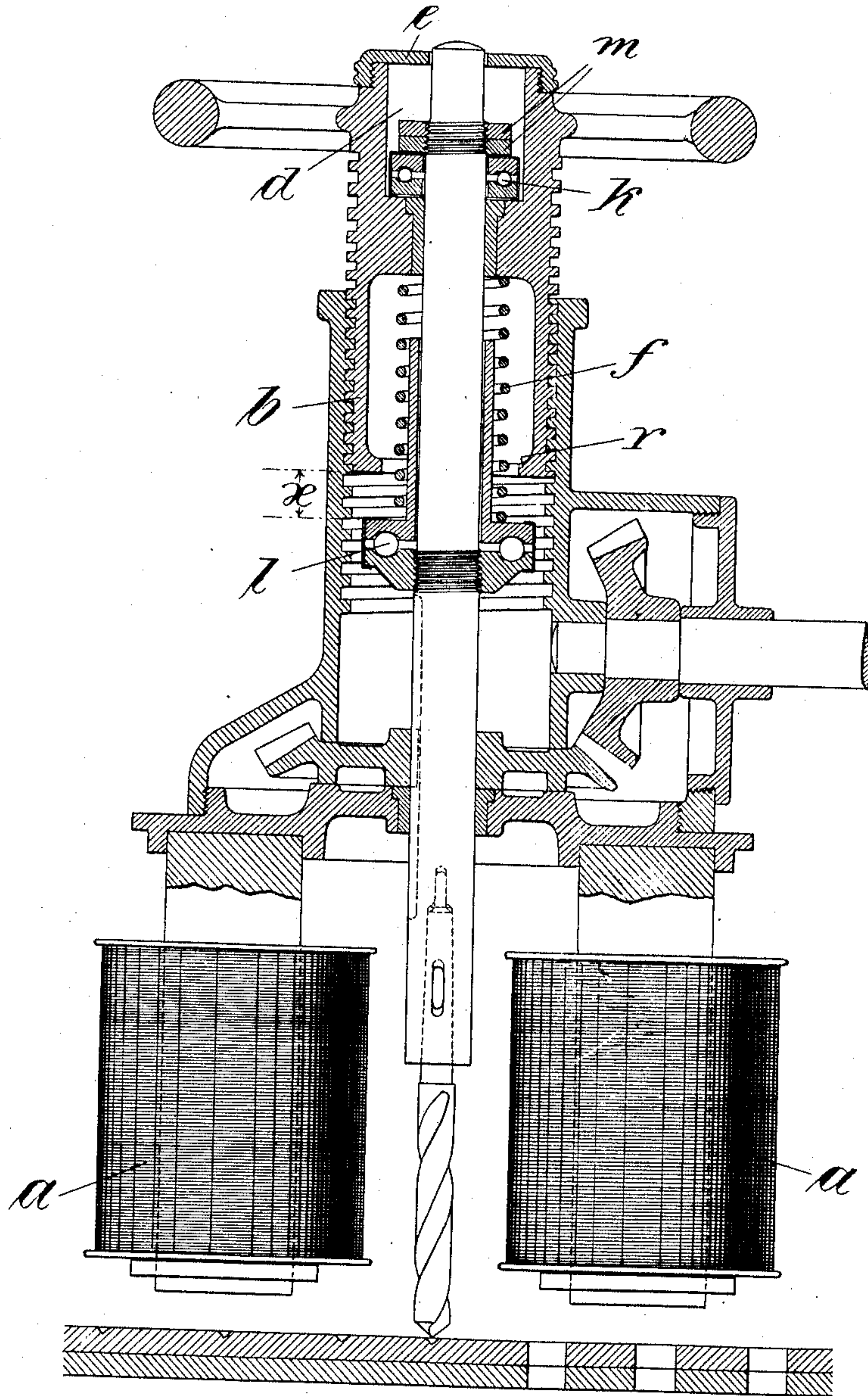


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PATENTED FEB. 18, 1908.

E. BURCKHARDT.
CENTERING APPARATUS FOR PORTABLE DRILLING MACHINES
AND THE LIKE.

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WITNESSES

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ERNST BURCKHARDT, OF MANNHEIM, GERMANY.

CENTERING APPARATUS FOR PORTABLE DRILLING-MACHINES AND THE LIKE.

No. 879,142.

Specification of Letters Patent.

Patented Feb. 18, 1908.

Application filed June 13, 1907. Serial No. 378,851.

To all whom it may concern:

Be it known that I, ERNST BURCKHARDT, engineer, a subject of the German Emperor, residing at 30 Beilstrasse, Mannheim, Germany, have invented new and useful Improvements in Centering Apparatus for Portable Drilling-Machines and the Like, of which the following is a specification.

The invention has for its object an improved arrangement in portable drilling machines preferably those which are held fast in known manner on the work by electromagnets. The improved arrangement consists in the manner of lodging the drilling spindle within the well known square-threaded hub of the hand wheel, by the revolving of which the spindle and tool as well known are pushed forward against the work, the parts being joined in such a way that the spindle can not only rotate within said hub, but can also be a little displaced in axial direction relatively to the hub. A spiral spring is arranged between the spindle and the hub, by the action of which spring the spindle is protruded out of the hub to a certain amount x , when the machine is hanging free, and when the machine is placed on the work, the spindle is pushed backward into the hub, the pressure of the spiral spring being overcome by the weight of the machine. This arrangement considerably facilitates the centering of the drilling machine above the mark of the hole to be bored. The device may of course also be employed for other portable machines of this kind, for instance milling machines, rivet-head calking machines and the like, in which cases the drill substituted by a cutter, viz. by a head, bearing calking rollers.

In the accompanying drawing a portable drilling machine is shown of the kind, for which the device shall be used preferably. The fastening of the machine upon the work, for instance a boiler shell or the like, is effected by electromagnets a . In the position represented in the drawing the machine is just being lowered onto the work for the purpose of drilling a fresh hole. So long as the machine is still hanging free over the work, the rotating spindle transfers the weight as well as the tension of the spiral spring f to a small ball bearing k placed in a suitable recess d of the hand wheel hub, the lock-nut m fastened on the spindle, resting

on the upper cup of said bearing. The larger ball bearing l , the lower cup of which is screwed fast on the spindle, has not in this position to support but the tension of the spiral spring. When the machine has wholly been lowered and the point of the drill stands upon the work, the entire weight of the drilling machine is supported by the spiral spring f , which transfers it to the ball bearing l fast on the spindle, and the small ball bearing k located in the hand wheel hub is entirely relieved.

The spring is compressed by the weight of the machine according to its flexibility in such a manner, that the distance x between the ball bearing l and the annular shoulder r which is arranged on the lower edge of the bush-like projection b of the hand wheel hub, diminishes, the lock nut m moving accordingly away from the upper cup of the ball bearing k . As in this position only the point of the drill touches the work, it is easy, by slight feeling lateral displacements of the machine, to insert the point of the drill in the center mark of the hole to be bored. This having been effected the circuit feeding the electro-magnets is closed, whereafter the magnets connected with the casing move forwards so far as to thrust against the work, the annular shoulder r further approaching the ball bearing l and the drill being pressed firmly in the center mark by the action of the spring. As no lateral forces arise in this approach of the machine to the work, a very exact automatic centering of the drilling machine on the hole is in this way obtained. Finally the hand wheel with its threaded hub is turned until the annular shoulder r rests on the upper cup of the ball bearing l : by further turning the hand wheel, the rotating spindle with the drill is protruded in the well known manner against the material of the work to be bored.

If the machine is not to work in a vertical or inclined position but in a horizontal one, the point of the drill is not pressed against the work by the weight of the machine; therefore in this case the workman attending to the machine must by hand press the machine against the work in centering the drill on the hole to be drilled before the magnets are excited.

The operations herein-before described require very little time and also do not need

special care, and therefore an incorrect boring of the holes is by this arrangement entirely avoided.

5 The small ball bearing *k* is arranged for the purpose of allowing the spindle to rotate without friction even when the drilling machine is hanging free. In place of this ball bearing *k* or in place of both ball bearings, ordinary thrust bearings may be used.

10 If the machine has only to work in a vertical position the spiral spring may be dispensed with. In this case, when the machine hangs free, protruding of the spindle out of the hand wheel hub is effected by the weight
15 itself of the spindle.

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

1. A portable drill comprising a casing, a feed member movable vertically in the casing,
20 a spindle bearing the working tool and adapted to turn within the member, two thrust bearings fixed on the spindle above and underneath said member at such a dis-

tance, that the spindle can be displaced in axial direction to a certain extent within
25 said member.

2. A portable drill comprising a casing, a feed member movable vertically in the casing, a spindle bearing the working tool and adapted to turn within the member, two
30 thrust bearings fixed on the spindle above and underneath said member at such a distance, that the spindle can be displaced in axial direction to a certain extent within
35 said member, and a spiral spring, the ends of which are respectively connected to the thrust bearing underneath the member and to the member, adapted to push the spindle forward out of the member.

In testimony whereof I have signed my
40 name to this specification in the presence of two subscribing witnesses.

ERNST BURCKHARDT.

Witnesses:

H. W. HARRIS,
Jos. H. LEUTE.