P. MÜLLER.

ATTACHMENT FOR METAL WORKING MACHINES.

APPLICATION FILED NOV. 26, 1915.

1,238,929.

Patented Sept. 4, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

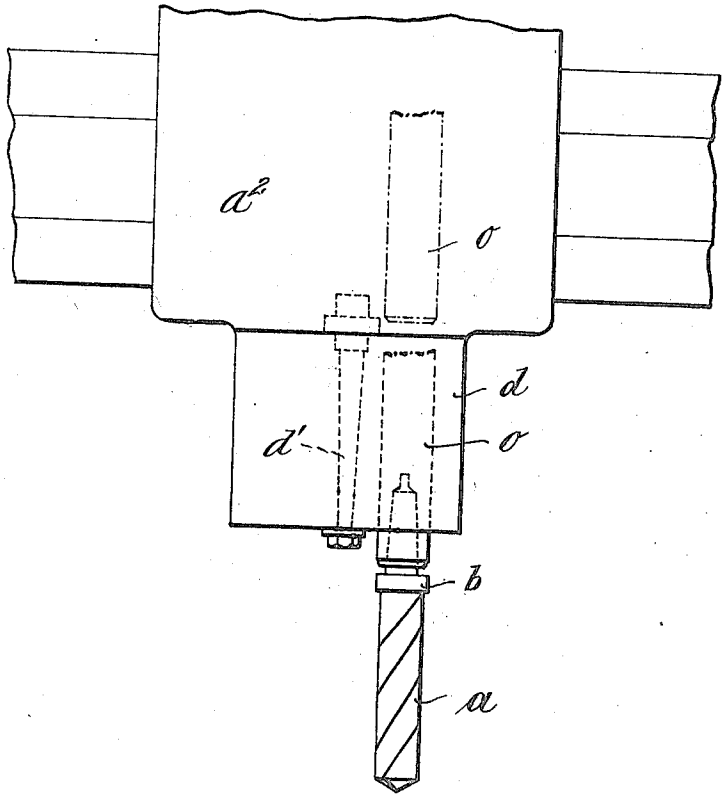
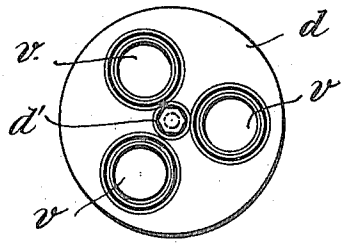


Fig. 2.



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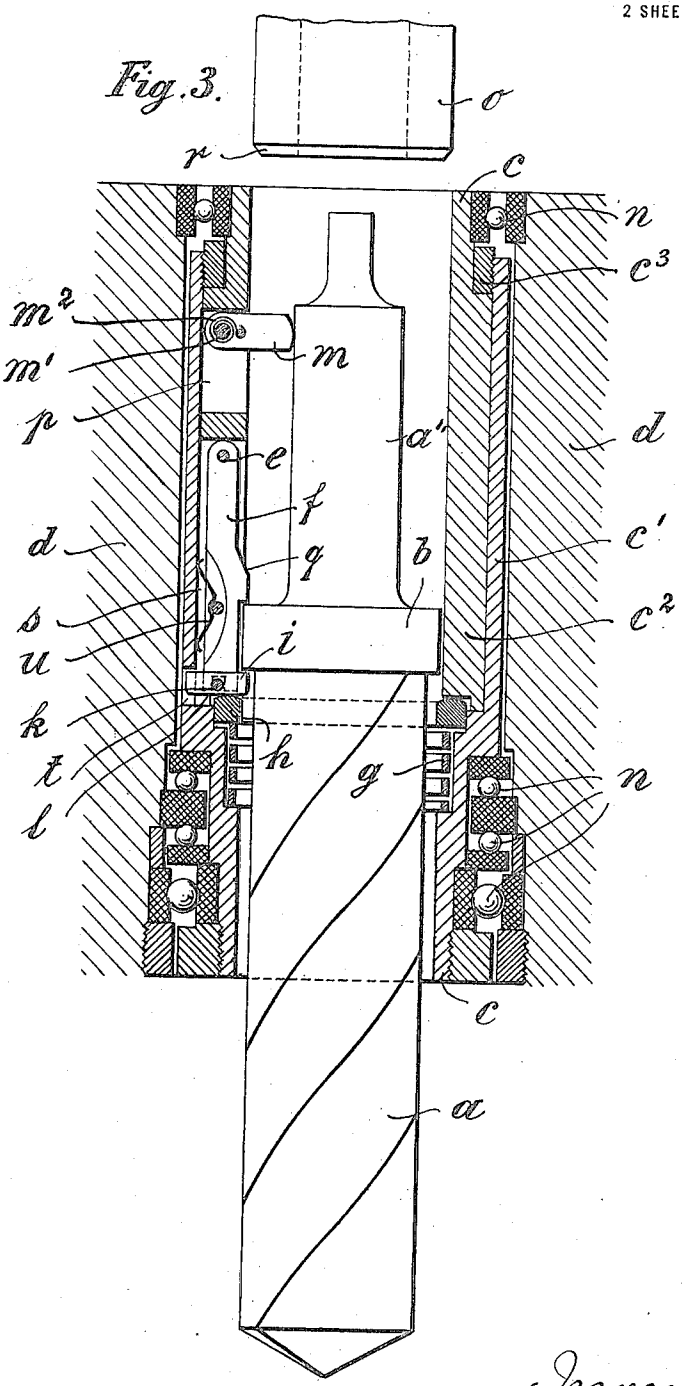
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2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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ATTACHMENT FOR METAL-WORKING MACHINES.

1,238,929. Specification of Letters Patent. Patented Sept. 4, 1917.

Application filed November 26, 1915. Serial No. 63,428.

To all whom it may concern:

Be it known that I, PAUL MÜLLER, a subject of the King of Prussia, and residing at Berlin, in the Kingdom of Prussia and German Empire, have invented certain new and useful Improvements in Attachments for Metal-Working Machines, of which the following is a specification.

My invention relates to improvements in boring, drilling and similar metal working machines and in particular to the tool holder of such machines. The object of my invention is to provide a device adapted to hold a plurality of tools which are successively brought into operative position as required by the particular work to be performed. A main feature of the invention resides in that the connection of the driving spindle with the successive tools is automatically effected within the said device.

My invention consists essentially of a rotatable turret-head having a plurality of vertical bores for the insertion of the tools, and adapted to successively bring said tools in line with the driving spindle for the purpose of operatively connecting the latter with the respective tool.

My invention further consists in certain means devised for holding the tool in the head ready for connection with the driving spindle and insuring a positive connection while at the same time allowing the tool to move together with the driving spindle in the head as required either for engaging the work or for withdrawal therefrom.

My invention is shown in the accompanying drawings wherein:

Figure 1 is an elevation of the head with a single tool therein, and of the part of the machine to which the head is rotatively attached,

Fig. 2 is an end view of the turret-head showing three holes located symmetrically, for the insertion of three tools and

Fig. 3 is a sectional view of the turret-head on a larger scale with a tool therein and the driving spindle disengaged therefrom.

a designates a tool having an annular flange b to exactly fit, and guide the tool in, the holding means c provided in the head d. The holding means comprises two hollow cylinders c^1 and c^2, the one telescopically fitted within the other and secured thereto by means of a threaded ring c^3, and further a catching and a centering device, both devices being attached to the inner cylinder c^2. The head d is mounted to allow of rotation about the central pivot d^1 rigidly connected with a stationary part a^2 of the machine and is provided with a number of, preferably three, symmetrically located bores e, Fig. 2, for the insertion of three tools. The flange b is also a means for retaining the tool a within the holding means c, so that the tool upon being inserted, as shown in Fig. 3, is caught and cannot drop from the holder. To this end a catch f is movably suspended on a pin e in a recess s of the wall of the inner cylinder c^2 and has a lateral projection or nose q forming a stop or abutment. On the back of said nose q a spring u is provided in said recess s to keep the catch f in its normal position, that is to say, with the nose q in the path of the tool as shown in Fig. 3. The lower end of the catch is forked at 1 so as to engage a pin k of a small plate i mounted to occupy partly the lower part of the recess s and partly a recess t of the outer cylinder c^1 and to transversely project into the path of the tool. This plate i is carried by a ring h yieldingly supported by a spring g.

In Fig. 3, a single catch f and a single plate i only are shown, but in fact a plurality thereof, preferably three, are provided in the cylinder c.

To keep the tool ready for operative connection with the driving spindle in exactly axial position a plurality of centering arms, preferably three, are provided.

Each arm m is movably mounted on a pin m^1 and a spring m^2 is provided to hold the arm in straight or horizontal position, as shown in Fig. 3, so that the free ends of the arms are in contact with the shank a^1 of the tool. The two cylinders c^1 and c^2 forming a single rigid piece are mounted on ball bearings n within the head d.

The operation is as follows:

The hollow driving spindle o, Fig. 3, is lowered to cover the shank a^1 of the tool a and in going down the spindle turns each arm m to a vertical position, causing it to lie within the recess p of the inner cylinder c^2. On the further advance of the spindle o the latter is locked to the shank a^1 of the tool. To this end the said shank may be slightly tapered so that a frictional connection will be insured between the parts (spindle o and shank a^1) under the pressure of the descending spindle. The spindle on its further descent engages the nose q of the

catch f and forces the catch and the plate i out of the way, said catch and plate moving back against the resistance of the spring u and becoming embedded in the recesses s and t provided in the cylinders c^1, c^2, respectively. Thus the tool a is released and can be further moved out of the head d by the descending spindle o, to assume the position, shown in Fig. 1.

During the drilling operation the spindle o is in contact and rotates with the holding cylinders c^1 and c^2 and their appurtenances. When the work is finished the spindle o is withdrawn from the head to reassume the position shown in Fig. 3, the flange b of the tool a engaging the nose q, as shown in Fig. 3, so that the spindle o can be withdrawn from the tool shank a^1.

What I claim is:

1. In a drilling, boring or similar metal working machine, the combination with the driving spindle, of a rotatable head having bores adapted to receive each a tool and also the said driving spindle, permitting the same to be operatively connected to the said tool, and a holding means within each bore, comprising a rotatable cylinder, catches pivoted in recesses of the said cylinder and having projections to engage the said tool for holding it in position ready for the driving spindle to be connected thereto, and springs for holding said catches in operative position.

2. In a drilling, boring or similar metal working machine, the combination with the driving spindle, of a rotatable head having bores adapted to receive each a tool and also the said driving spindle, permitting the same to be operatively connected to the said tool, and a holding means within each bore, comprising a rotatable cylinder, catches pivoted in recesses of the said cylinder and having projections and each a forked end, springs for holding said catches in operative position, and yieldingly mounted plates, located in recesses of said cylinder and having each a pin in engagement with the forked ends of the said catches, both the catches and the said plates being arranged to hold the tool in position ready for the said driving spindle to be connected thereto.

3. In a drilling, boring or similar metal working machine, the combination with the driving spindle, of a rotatable head having bores adapted to receive each a tool and also the said driving spindle, permitting the same to be operatively connected to the said tool, and a holding means within each bore comprising a rotatable cylinder, catches pivoted in recesses of said cylinder and having each a projection and a forked end, springs for holding said catches in operative position, a helical spring, a ring on top of said helical spring, plates supported by said ring, and pins in the said plates adapted to be engaged by the forked ends of the said catches, both the latter and the said plates being arranged to hold the tool in position ready for the said driving spindle to be connected thereto.

4. In a drilling, boring or similar metal working machine, the combination with the driving spindle, of a rotatable head having bores adapted to receive each a tool and also the said driving spindle, permitting the same to be operatively connected to the said tool, and a holding means within each bore for holding the tool ready for the said driving spindle to be connected thereto, and centering arms for supporting the tool in centered position.

5. In a drilling, boring or similar metal working machine, the combination with the driving spindle, of a rotatable head having bores adapted to receive each a tool and also the said driving spindle, permitting the same to be operatively connected to the said tool, and a holding means within each bore, comprising a rotatable cylinder, catches provided in recesses of said cylinder and having projections adapted to engage the said tool springs for holding said catches in operative position, a yieldingly supported plate arranged to coöperate with said catches, and centering means to support the tool in centered position.

6. In a drilling, boring or similar metal working machine, the combination with the driving spindle, of a rotatable head having bores adapted to receive each a tool and also the said driving spindle, permitting the same to be operatively connected to the said tool, and a means for holding the tool within each bore, comprising a rotatable cylinder, composed of two telescoping cylinders capable of relative adjustment, a threaded ring locking the two cylinders together, ball bearings between the inner wall of the said rotatable head and the said cylinders, catches provided in the wall of the inner cylinder and adapted to engage a projection on the tool, and centering means for centering and guiding the tool in the bore.

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

PAUL MÜLLER.

Witnesses:
BERNHARD GRÄTZ,
WILH ANDRAE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."