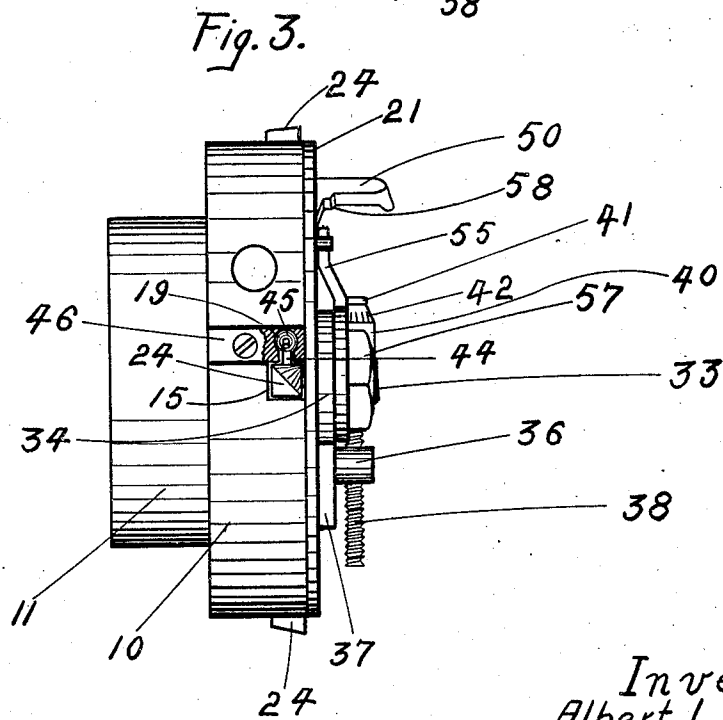
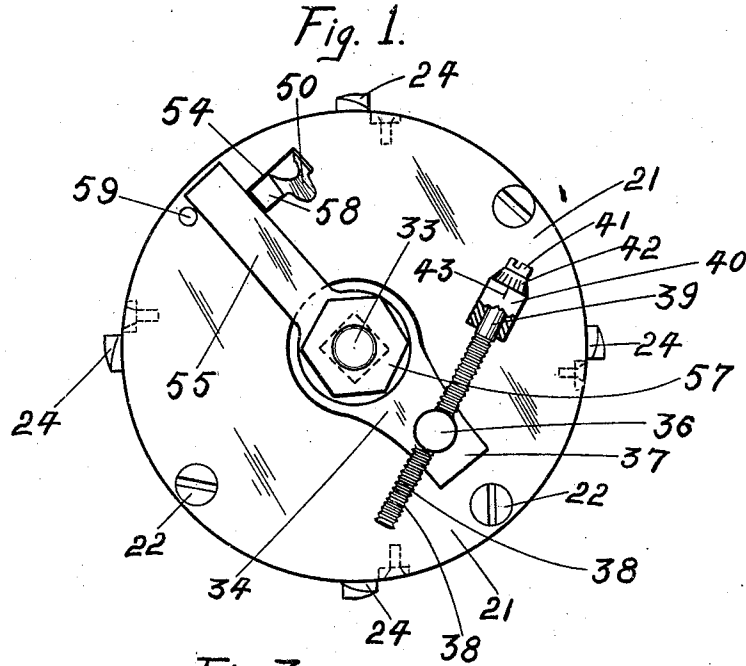


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APPLICATION FILED MAY 8, 1917.

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Patented Nov. 18, 1919.  
2 SHEETS—SHEET 1.

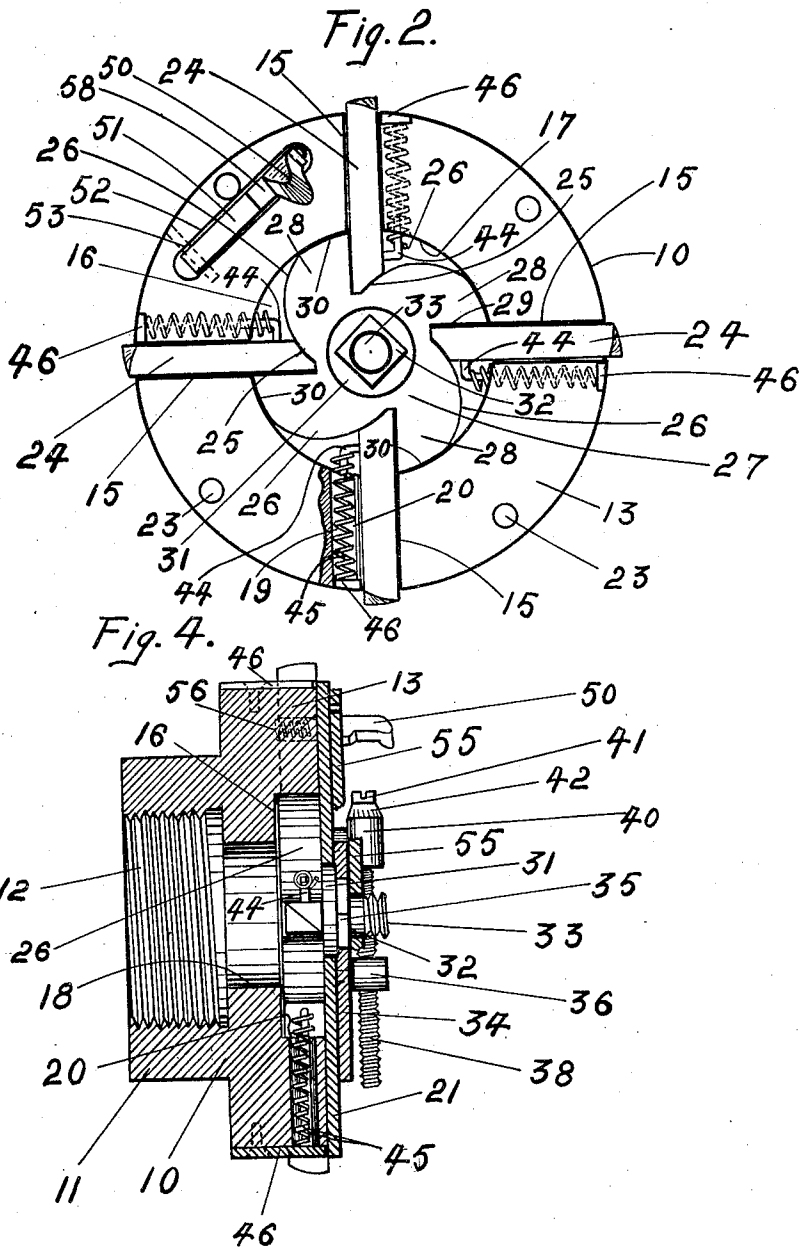


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# UNITED STATES PATENT OFFICE.

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ASSIGNORS TO MARVEL MACHINERY COMPANY, OF MINNEAPOLIS, MINNE-  
SOTA, A CORPORATION OF MINNESOTA.

## CUTTER-HEAD FOR BORING-MACHINES.

1,322,248.

Specification of Letters Patent.

Patented Nov. 18, 1919.

Application filed May 8, 1917. Serial No. 167,201.

*To all whom it may concern:*

Be it known that we, ALBERT LECHNYR and CHARLES E. LARSON, citizens of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Cutter-Heads for Boring-Machines, of which the following is a specification.

Our invention relates to cutter-heads for boring machines and has for its object to provide a cutter-head having a multiplicity of cutter knives adjustably held so as to be adapted to be forced in or out a desired and determined distance to vary the cut taken in boring the interior of any hollow member such as the interior of a cylinder of an explosive engine.

It is a further object of our invention to provide a cutter-head which shall effectively hold the knives assembled so that they may move readily in said cutter-head and may readily be withdrawn and changed, and to provide in combination with said knives a single cam member with multiple cam faces against which the bases of the knives are continually held, together with means for moving the cam any determined distance to project the cutter knives a determined amount in reference to the holder-head.

The full objects and advantages of our invention will appear in connection with the detailed description thereof and are particularly pointed out in the claims.

In the drawings illustrating the application of our invention in one form,—

Figure 1 is an end face view of the cutter-head embodying our improvement.

Fig. 2 is a similar view with the face plate and adjusting parts removed.

Fig. 3 is an edge view of the parts shown in Fig. 1.

Fig. 4 is a central sectional view of the device as shown in Fig. 3.

As illustrated we provide a head 10 formed with a tubular extension 11 which is threaded at 12 providing a means of securing the head to the boring bar. The head proper is formed with an annular faced portion 13 provided with a multiplicity of radial grooves 15 which extend from the outer wall of the face portion 13 to the bottom wall 16 of an annular chamber 17, which is

extended through the reduced portion 18 to the threaded portion 12 by which the head 55 is attached to the boring bar. Bores 19 are provided adjacent the grooves 15 and connect with the sides thereof through slots 20 as clearly shown in Figs. 2 and 4. A face plate 21 is adapted to be screwed 60 to the face member 13 by screws 22 threaded into apertures 23 in said face member. The slots 15 are open at both ends and receive cutting tools 24 which project at their outer ends beyond the limits of the 65 annular portion 13 and have at their inner ends cam surfaces 25 engaging circular cam surfaces 26 upon the cam piece 27 which is rotatably held upon the bottom wall 16 of the annular chamber 17. The cam piece 27, 70 as clearly shown in Fig. 2, has wings 28 each formed at one side with the aforesaid cam surface 26 and at the other side with substantially radially extended surfaces 29 forming a pocket which receive the rear ends 75 of the cutter knives 24, and the wings 28 also have a portion thereof provided with a circular wall 30 for engagement with the wall of the annular chamber 17 to guide the cam piece 27 in its rotary movements. The cam 80 piece 27 is provided with a circular boss 31 which extends in the plane of the face plate 21 and upon which is formed a square extension 32 and a threaded stud 33. A wrench piece 34 has a square socket 35 which en- 85 gages over the squared portion 32 upon the boss 31. A boss 36 is formed on the shank 37 of the wrench piece 34 and has a threaded aperture through which extends a micrometer screw 38 having a bearing at 39 90 in a boss 40 carried by face plate 21. The screw head 41 of the micrometer 38 is formed with a graduated scale 42, the graduations of which coact with a single line or mark 43 milled upon the top of the bearing 95 boss 40. The rotation of the micrometer screw 38 through a measured distance indicated in reference to line 43 by scale 42 will move the cam piece 27 a determinate distance and simultaneously project the cut- 100 ter members 15 a determinate distance and each the same distance.

Each of the cutter tools 24 has secured to its side wall adjacent to slots 20 so as to extend therethrough an arm 44 which pref- 105 erably has its outer end bent to extend

within a compression spring 45 seated in bore 19 and held positioned therein by an end plate 46, said respective end plates being seated in longitudinal grooves cut in the outer annular surface of the head 10. By this means the cam surfaces 25 at the rear ends of the tools 24 are continuously held in an engagement with the cam surface 26 on cam wings 28 of cam member 27. At the same time the tools 24 can readily be withdrawn by removing the end plates 46 or top plate 21. In practice the tools may be adjusted by means of the micrometer screw 38 and thereafter be set in a fixed position for release by means of a trip when the tool approaches to within a predetermined distance of the end of the cylinder. The trip 50 is mounted upon an arm 51 extending within a slot 52 in the annular faced portion 13 and pivoted upon a pin 53, and the trip 50 extends through a slot 54 in the face plate 21 where it engages an arm 55 pivoted upon the unthreaded portion of bolt 33. The trip 50 is forced outwardly by a spring indicated by dotted lines at 56 in Fig. 4, and in its outermost position extends beyond the end of the bolt 33 and a nut 57 thereon where it may engage the bottom of the cylinder and release the cutter and tools in the following manner: By operation of the micrometer screw 38 the tools are adjusted against the pressure of springs 45 to project the requisite distance beyond the periphery of head 10. The nut 57 is then set down upon the hubs of the arm 55 and arm 34 which connects them to operate as a unit with the cam pieces 27. The arm 55 is held positioned between a step 58 on the trip 50 and a pin 59 on the face plate 21. This arrangement locks the cutter tools 24 in their operative position. The micrometer screw 41 is then unscrewed a certain distance so as to leave a clearance between its head 42 and the bearing boss 40. When the boring of a cylinder has been completed the end of the trip 50 will engage the bottom wall of the cylinder and thereby the trip will be depressed against the force of the spring 56, finally releasing arm 55, when the springs 46 operating upon the several cutter members 24 will cause said members to be retracted, the cam piece 28 rotating under the impulse of the cam faces 25 against the cam faces 26.

The advantages of our invention will be apparent. The boring tools are rigidly and accurately held to do their work and yet are adjusted with the utmost accuracy and refinement of precision. This adjustment is simultaneous for each tool and is exactly the same for each tool. The construction makes practicable the use of multiplicity of tools, for such tools as shown being a convenient and satisfactory number, since

thereby a perfectly balanced pressure upon the boring head at four quadrant points thereby is produced.

The tools may be quickly removed for replacement and sharpening. All the parts of the construction are easily accessible.

We claim:

1. A boring tool having a head with a central circular cavity and a multiplicity of grooves extending radially from said cavity 75 to the outside of the head, a cam piece rotatably mounted in said cavity and having a separate cam face opposite the end of each of said grooves, a cutter tool slidable in each of said grooves, means for holding said 80 cutter tools with their inner ends in engagement with the respective cam faces, an arm connected with the cam piece, and a micrometer screw having threaded connection with the arm for rotating the cam piece to 85 simultaneously and equally project all of said tools a known and predetermined distance.

2. A boring tool having a head with a central circular cavity and a multiplicity 90 of grooves extending radially from said cavity to the outside of the head and a corresponding number of bores adjacent and parallel with the grooves with slots connecting the bores with the sides of the 95 grooves, a cam piece rotatably mounted in said cavity and having a separate cam face opposite the end of each of said grooves, a cutter tool slidable in each of said grooves, an arm on each of said cutter tools extending 100 through the slots and into the bores, springs in the bores in engagement with said arms for holding the tools with their inner ends in an engagement with the respective cam faces, and means for rotating the cam 105 piece for simultaneously and equally projecting all of said tools.

3. A boring tool having a head with a multiplicity of radially extended grooves therein and a corresponding number of 110 bores adjacent and parallel with the grooves with slots connecting the bores with the sides of the grooves, a cutter tool slidable in each of said grooves, an arm on each cutter tool extending through the slots and into 115 the bores, springs in the bores engaging the arms to hold the tools in retracted positions, removable pieces closing the ends of the bores to form a fulcrum for the springs, and means for simultaneously and equally 120 projecting all of said tools against the force of said springs.

4. A cutter-head comprising a radially slidable tool, means tending to retract inwardly said tool, means for holding said 125 tool fixedly in outward position, and a trip associated with said last mentioned means for permitting said retracting means to become operative.

5. A boring tool having a head provided 130

with a multiplicity of radially extending grooves therein, a cutter tool slidable in each of said grooves, means tending to retract inwardly said tools, means for holding said tools fixedly in outward position, and a trip associated with said last mentioned means for permitting said retracting means to become operative.

6. A boring tool having a head with a central circular cavity and a multiplicity of grooves extending radially from said cavity to the outside of the head, a cam member rotatably mounted in said cavity and having a separate cam face opposite the inner end of each of said grooves, a cutter tool slidably mounted in each of said grooves, means for yieldingly holding said cutter tools with their inner ends in engagement with corresponding cam faces, means for rotating the cam member for simultaneously and equally projecting all of said tools, means for holding the cam member fixed in the position to which it is rotated, and a trip for releasing said last mentioned means whereby said tools are permitted to be retracted.

7. A boring tool having a head provided

with a multiplicity of radially extending grooves therein, a cutter tool slidably mounted in each of said grooves, means tending to retract inwardly said tools, said head having an annular face portion provided with a slot, a trip arm pivotally mounted in said slot, a trip member on said arm, a cam member mounted in said annular portion to engage the inner end of said tools, an angular member extending from the center of said cam member, a threaded stud extending from said angular member, a wrench piece having an angular opening within which said angular member fits, a boss on said wrench piece, a boss on said head, a micrometer screw extending loosely through said last mentioned boss and screw threaded through the boss on said wrench piece, an arm loosely mounted on said threaded stud, and a nut on said stud for securing said arm and said wrench piece together, said last mentioned arm being arranged for engagement with said trip arm.

In testimony whereof we affix our signatures.

ALBERT LECHNYR.  
CHARLES E. LARSON.