Jan. 25, 1949. E. D. GREER, JR 2,460,254

UNIVERSAL GRIPPER HEAD

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Fig. 1.

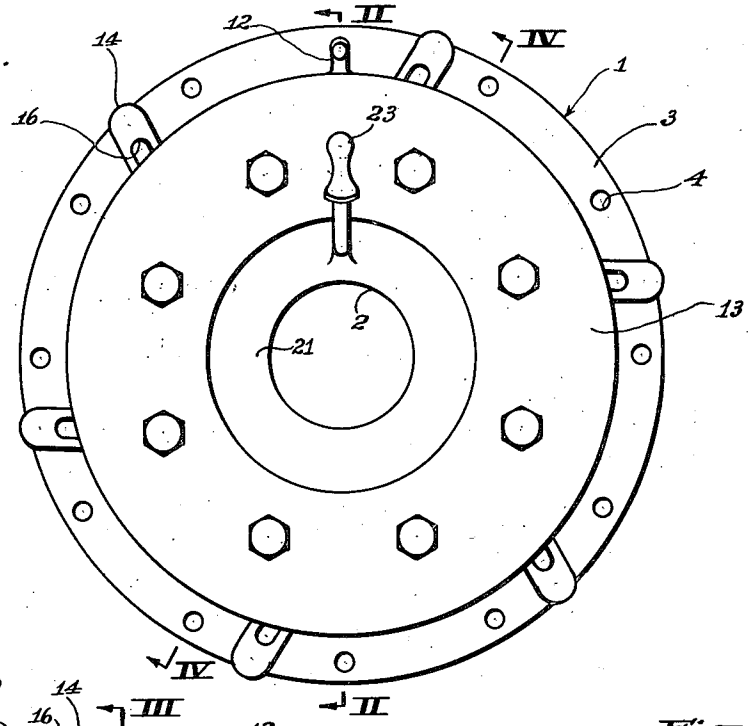


Fig. 2

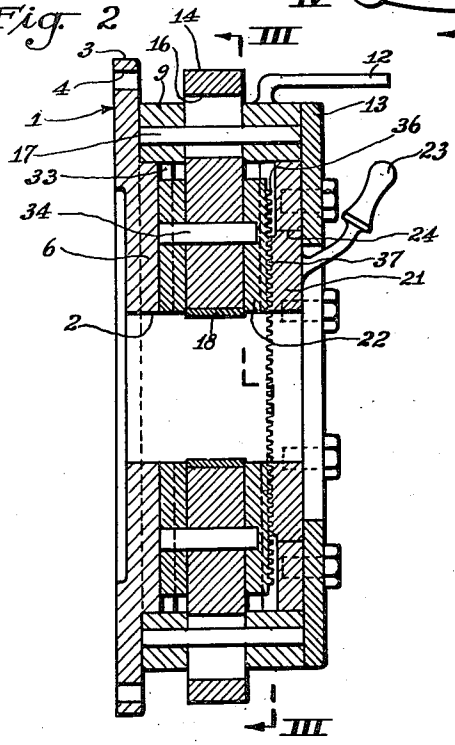
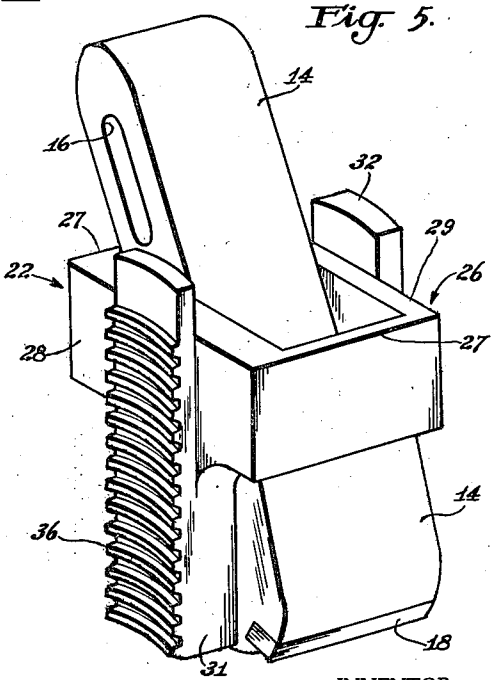


Fig. 5.



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Fig. 3.

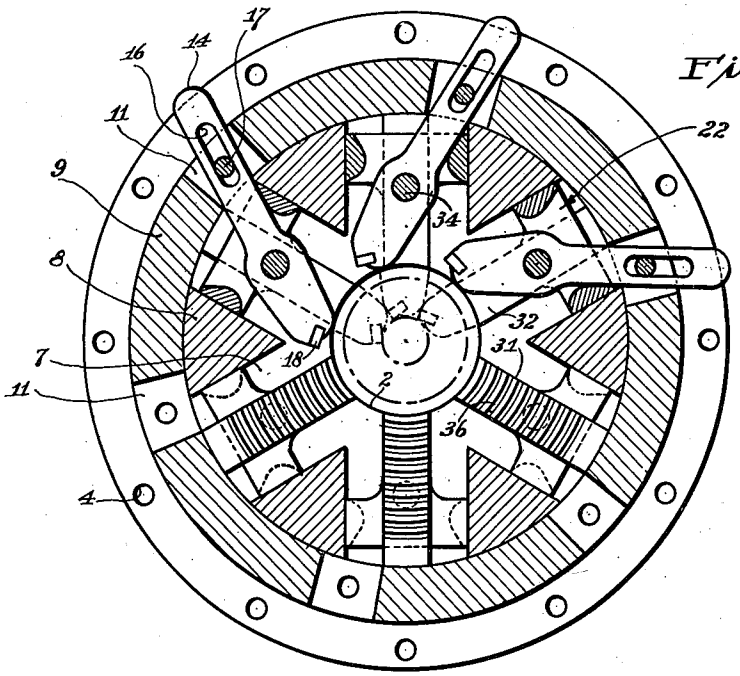
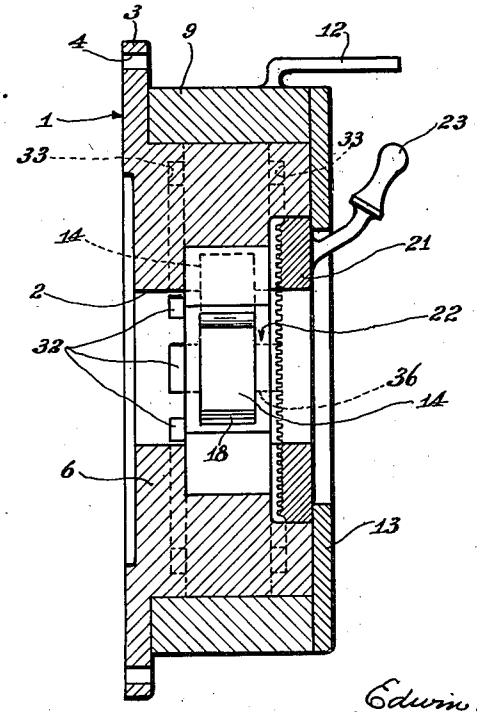


Fig. 4.



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UNIVERSAL GRIPPER HEAD

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5 Claims. (Cl. 279—34)

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This invention relates to apparatus for gripping cylindrical blanks and, in particular, to gripper heads for gripping such blanks during threading, cutting, and other metal working operations.

Gripper heads presently in use have a central opening in which a blank, such as a pipe or round, is received, and a number of radially arranged gripper arms which surround the opening and are adapted, by cam, toggle, or other mechanisms, to be swung into gripping engagement with the blank. A disadvantage of such heads is that each is capable of use for a limited range of blank sizes, and, for blanks beyond that range, a different sized head must be used. Consequently, work is delayed while head changes are being made.

It is therefore an object of this invention to provide a gripper head which is adjustable for gripping a wide range of cylindrical blank sizes.

Another object is to provide an adjustable head which has the gripping strength of standard heads and which can be easily set to resist torque in either direction.

According to the invention the head includes a frame which is provided with a central transverse opening for receiving various sizes of cylindrical blanks, and with a plurality of radial passages leading from the central opening. Gripper arms are disposed in the radial passages and are pivotally supported by brackets which are slidably mounted in the passages. To provide radial adjustment of the brackets and arms, one face of each of the brackets is provided with threads, and a ring, which is rotatably carried in the frame, also has a face provided with threads which engage the threads of the bracket, this threaded engagement being adapted, upon rotation of the ring, to move the brackets radially into the desired adjustment for the particular size of cylindrical blank to be gripped. After this adjustment the gripper arms are swung to and from blank-gripping position by any suitable means, such as a rotatable annular band which engages the outer ends of the arms and, when rotated, simultaneously swings the inner ends of the arms against the blank.

The preferred embodiment of the invention is illustrated in the accompanying drawings, of which Fig. 1 is a front elevation of the apparatus; Fig. 2 a vertical section on the line II—II of Fig. 1; Fig. 3 a vertical section on the broken line III—III of Fig. 2 showing in dot and dash lines the gripper arms adjusted to grip relatively small diameter blanks; Fig. 4 a section on the line

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IV—IV of Fig. 1; and Fig. 5 a perspective view of a bracket and gripper arm used with the apparatus.

Referring to the drawings, the gripper apparatus, commonly referred to as a gripper head, includes a frame 1, which may be a casting, provided with a central transverse opening 2 and having formed on its rear face a circular flange 3 provided with bolt holes 4 by which it may be secured to a suitable support or other form of metal working machine. The frame has a rear wall 6, forward of which are formed a plurality of passages 7 which extend from the periphery of the frame into its central opening 2 and intersect each other to form a number of V-shaped portions 8. Around the periphery of the frame is rotatably mounted an outer ring 9 provided with a plurality of openings 11 equal in number to the passages and spaced so that they will simultaneously come into radial alignment with the passages when the ring is rotated. A handle 12 is welded or otherwise attached to the ring for manually rotating it, and the ring is held in place between the frame's flange 3 and a front retainer plate 13 bolted to the frame.

Gripper arms 14 are disposed within the radial passages and extend outwardly of the frame through ring openings 11, the outer ends of the arms being provided with slots 16 that receive transverse pins 17 mounted in the openings. The inner ends of the arms are provided with tool steel blocks or dogs 18 which, in the usual manner, bite into and firmly grip a pipe or round inserted in central opening 2.

An important feature of the invention is that the gripper arms are mounted so as to be movable radially within the passages to bring them into a proper position to grip blanks of different diameters, and also that the arms can be quickly reversed for resisting torque in either a clockwise or counter-clockwise direction. This is accomplished by a threaded engagement between an inner ring 21 rotatably mounted in the front face of the frame and brackets 22 slidably positioned within radial passages 7. Ring 21, which is provided with a handle 23, is mounted in a recessed or notched portion 24 formed at the edges of V-shaped frame portions 8, and is held in place by the previously mentioned retainer plate 13.

Brackets 22, as shown in Fig. 5, have an outer box portion 26 formed of side walls 27 and front and rear walls 28 and 29, and the outer portions of the front and rear walls are reduced in width and formed into a pair of bifurcated front and

rear legs 31 and 32. For guiding the brackets during their radial sliding, their side walls 27 engage the side walls of the passages and, as shown in Fig. 2, rear walls 29 are received in grooves or tracks 33 formed in rear wall 6 of the frame. The gripper arms are mounted within the brackets on pivot pins 34 and are free to swing from side to side between the bracket's bifurcated legs.

The threaded engagement for moving the brackets is made by forming, on the front face of each front leg 31, spiral threads 36, and, on the rear face of inner ring 21, complementary spiral threads 37. The two sets of spiral threads engage each other in such a manner that, when inner ring 21 is rotated in its vertical plane by the handle 23, brackets 22 are caused to move simultaneously in the passages, in or out depending upon the direction of rotation.

The manner in which the tool operates is best seen in Fig. 3 in which the gripper arms shown in full lines are adjusted for gripping the largest diameter pipe for which this particular tool is designed, and in the dot and dash line, the arms are shown after they have been adjusted for gripping the smallest diameter pipe which the tool is capable of gripping and then swung into gripping engagement with an inserted pipe. Prior to the actual gripping of the pipe, adjustments are made by manually rotating inner ring 21 which, through its threaded engagement with brackets 22, slides the brackets radially in or out, thereby bringing the arms to the desired position. In such a position, the innermost ends of the arms lie in a circle which is of slightly larger diameter than pipe which is to be gripped so that the piping can be quickly and easily inserted. With the pipe inserted, the actual gripping is accomplished solely by rotating outer ring 9 in one or the other direction and thereby swinging the dogs into their biting engagement.

Practical consideration being given to size and weight, the gripper heads can be made to cover any desired range of pipe or blank diameters. One such gripper head which embodies the principles of this invention covers a range of diameters from one and a half to six inches, it being noted that, with prior non-adjustable gripper heads, it would require approximately fifteen separate heads to cover such a range.

Another feature of the invention which is inherent in its construction, is that the gripper arms are reversible so that they will resist the torque of the blank in either a clockwise or counter-clockwise direction. As shown in Fig. 3, the arms are adapted to resist torque in a clockwise direction. The reversing of the arms can be accomplished simply by throwing their outer ends from the right-hand position as shown in Fig. 3 to a left-hand position so that when the arms are moved into contact with the blank, their block or dogs 18 lie on the opposite side of the central axis of the arms' pivot pins 34 and are forced into biting contact with the blank by moving the outer ends of the arms in the opposite or clockwise direction.

According to the provisions of the patent statutes, I have explained the principle and mode of operation of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. Apparatus for gripping cylinder blanks, comprising a frame provided with a central transverse opening and a plurality of radial passages, a bracket slidably mounted in each of said passages and having a face provided with threads, a radially disposed arm pivotally mounted in each bracket and formed at its inner end to grip a cylindrical blank, a ring rotatably carried in said frame and having a face provided with threads engaging those of said brackets, said threaded engagement being adapted upon rotation of said ring to move said brackets radially in said passages for adjusting said arms for gripping blanks of different diameters, and means engaging the outer ends of said arms for swinging them to and from blank gripping position.

2. Apparatus for gripping cylinder blanks, comprising a frame provided with a central transverse opening and a plurality of radial passages, a bracket slidably mounted in each of said passages and having a face provided with threads, a radially disposed arm pivotally mounted in each bracket and formed at its inner end to grip a cylindrical blank, a ring rotatably carried in said frame and having a face provided with threads engaging those of said brackets, said threaded engagement being adapted upon rotation of said ring to move said brackets radially in said passages for adjusting said arms for gripping blanks of different diameters, and an annular band engaging the outer ends of said arms and rotatable on said frame simultaneously to swing the arms to and from blank gripping position.

3. Apparatus for gripping cylindrical blanks, comprising a frame provided with a central transverse opening and a plurality of radial passages, a bracket slidably mounted in each of said passages and having a face provided with threads, a radially disposed arm pivotally mounted in each bracket and formed at its inner end to grip a cylindrical blank, a ring rotatably carried in said frame and having a face provided with threads engaging those of said brackets, said threaded engagement being adapted upon rotation of said ring to move said brackets radially in said passages for adjusting said arms for gripping blanks of different diameters, an outer ring rotatably carried in said frame and provided with a plurality of annularly spaced openings, the outer ends of said arms being slotted and extending through said openings, and transverse pins mounted in said outer ring and projecting through said slots whereby rotation of said outer ring swings said arms to and from blank gripping position.

4. Apparatus for gripping cylindrical blanks, comprising a frame provided with a central transverse opening for receiving a cylindrical blank and with a plurality of radial passages, a bracket slidably mounted in each of said passages, a radially disposed arm pivotally mounted in each bracket and formed at its inner end to grip a cylindrical blank, said brackets each having a face provided with spiral threads, the outer portion of each bracket forming a box that slidably engages the walls of one of said passages and the inner portion forming legs in which one of said arms is pivotally supported, an inner ring rotatably carried in said frame and having a face provided with spiral threads engaging those of said brackets, said threaded engagement being adapted upon rotation of said inner ring to move said brackets radially in said passages for adjust-

ing said arms for gripping blanks of different diameter, and an annular band engaging the outer ends of said arms and being rotatable simultaneously to swing the arms to and from blank gripping position.

5. Apparatus for gripping cylindrical blanks, comprising a frame provided with a central transverse opening for receiving a cylindrical blank and with a plurality of radial passages, a bracket slidably mounted in each of said passages, a radially disposed arm pivotally mounted in each bracket and formed at its inner end to grip a cylindrical blank, said brackets each having a face provided with spiral threads, the outer portions of each bracket forming a box that slidably engages the walls of one of said passages, the inner portion being reduced in width and forming legs in which one of said arms is pivotally supported, an inner ring rotatably carried in said frame and having a face provided with spiral threads engaging those of said bracket, said threaded engagement being adapted upon rotation of said inner ring to move said brackets radially in said passages for adjusting said arms for gripping blanks of different diameter, an outer ring rotatably carried in said frame and provided with a plurality of annularly spaced openings, the outer ends of said arms being slotted and extending through said openings, and transverse pins mounted in said outer ring and projecting through said slots, said outer ring being rotatable simultaneously to swing the arms to and from blank gripping position.

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