March 5, 1935. V. E. ROYLE 1,993,384

EXTRUDING MACHINE

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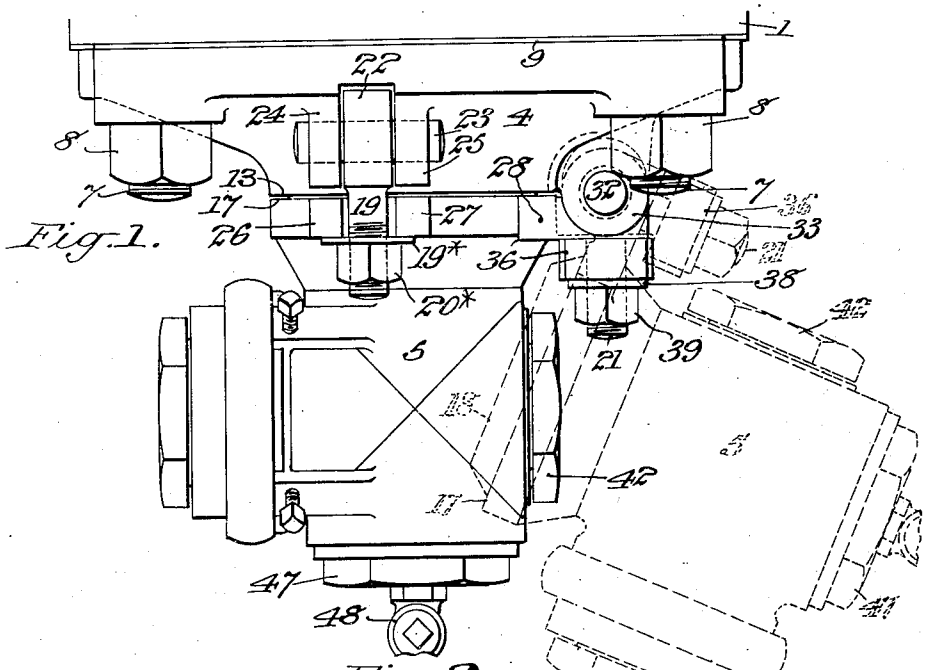


Fig. 1.

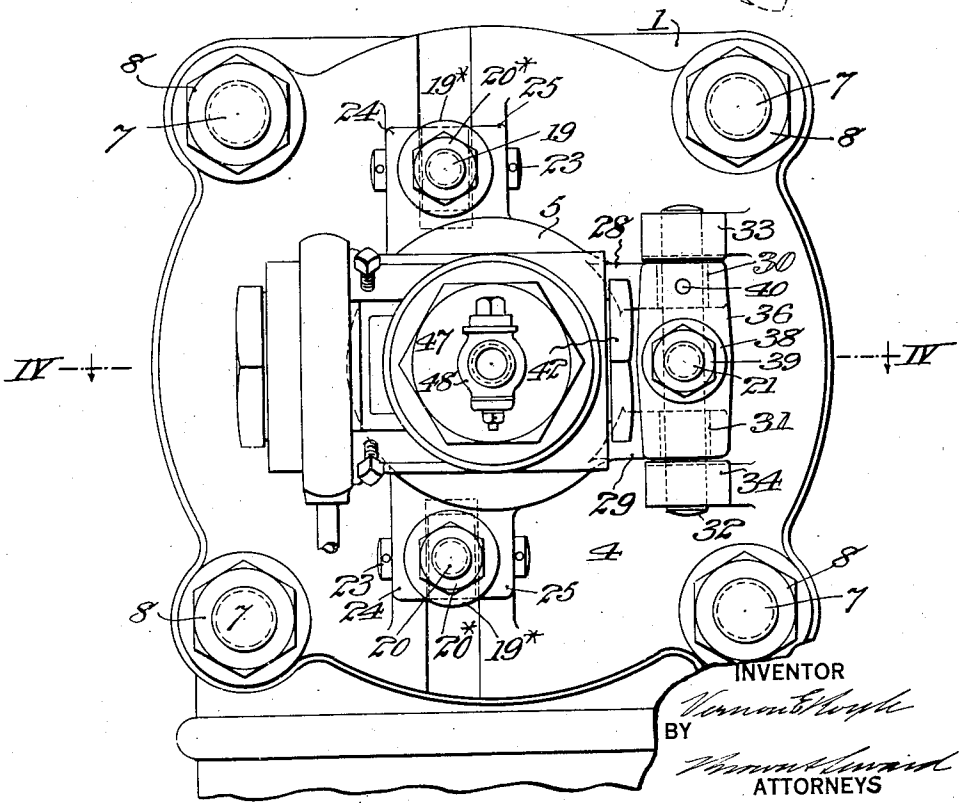


Fig. 2.

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Fig. 3.

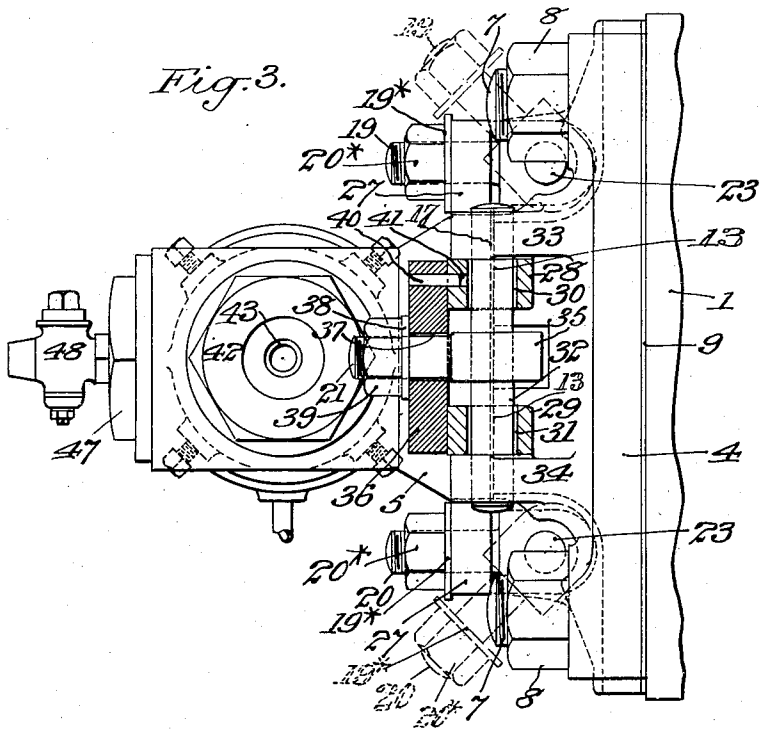
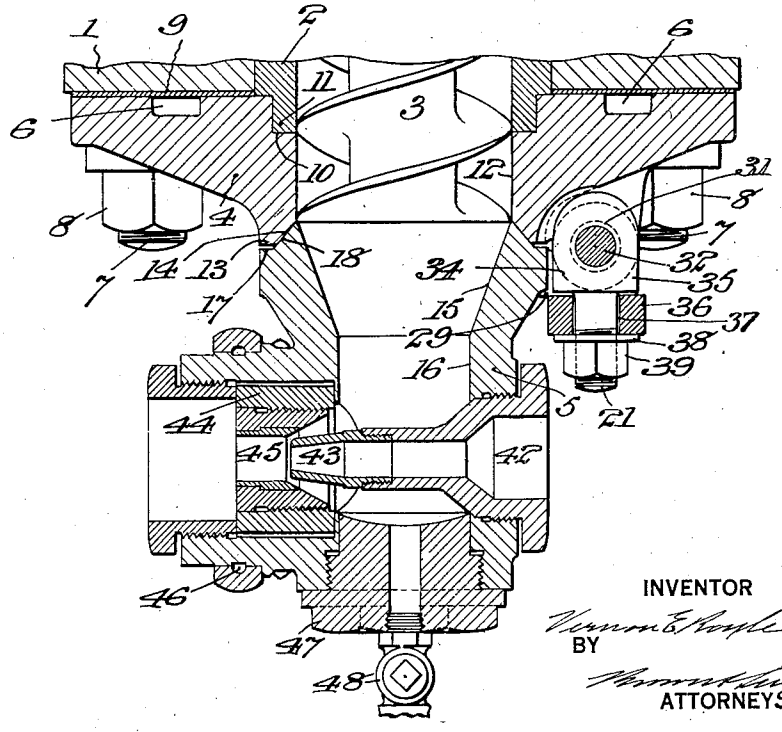


Fig. 4.



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EXTRUDING MACHINE

Vernon E. Royle, Paterson, N. J.

Application February 27, 1932, Serial No. 595,543

6 Claims. (Cl. 18—13)

This invention relates to an improvement in heads for extruding machines and has for an object to provide a device of this character in which the members forming the head are hinged together and arranged to be swung into and out of operative position, for cleaning, repair or replacement.

Another object of the invention is to provide a device of this character in which the members of the head are provided with transversely disposed coacting surfaces arranged to interengage so that the members will be automatically alined when brought into operative relation.

Another object is to provide a means for quickly and easily locking and unlocking the members of the head, which means is disposed adjacent the transverse joint formed by the coacting surfaces of the members.

Another object is to provide certain improvements in the form, construction and arrangement of the several parts whereby the above named and other objects may effectively be attained.

A practical embodiment of my invention is represented in the accompanying drawings, in which

Fig. 1 represents a plan view of a head secured to the end of the cylinder, the movable member being shown in another or open position in dotted outline.

Fig. 2 represents a front elevation of the same.

Fig. 3 represents a side elevation of the same, portions of which are shown in section and certain of the locking means being shown in their inoperative position in dotted outline, and

Fig. 4 represents a horizontal section taken in the plane of the line IV—IV of Fig. 2, looking in the direction of the arrows.

The front portion of the cylinder, to which the improved head is attached, is denoted by 1 and the bore liner by 2. The screw or plodder is denoted by 3 and fitted to operate within the screw receiving portion of the head, as clearly shown in Fig. 3. These parts may be of any well-known or approved form and, as their particular construction constitutes no part of this present invention, a further description of the same is deemed unnecessary.

The head comprises a fixed member 4 and a movable member 5. The fixed member 4 may be provided with suitable passages 6 for the circulation of a temperature controlling medium in a manner well understood in the art. The member 4 may be secured to the cylinder by stud bolts 7 provided with nuts 8, a washer 9 being preferably interposed between the adjacent parts. The member 4 is also recessed at 10 to receive a reduced flange 11 that projects forwardly from the bore liner 2. The member 4 is also provided with a bore 12 disposed in precise alinement with the bore of the liner 2. The transverse face 13 of the member 4 has an annular seat 14, which is flared outwardly from the bore 12 to the face 13.

The movable member 5 is provided with a tapered bore 15 terminating in a restricted straight bore 16. The movable member 5 may also be provided with a transverse face 17 developed outwardly therefrom into a tapered or conical portion 18 which is arranged to coact with the flared seat 14 of the fixed member 4 when the members are brought together. This coaction of the tapered portion 18 and seat 14 will automatically aline the bore 12 of the fixed member 4 with the tapered bore 15 of the movable member 5. The movable member 5 is removably secured to the fixed member 4 by means of bolts 19, 20, 21, of which the bolts 19, 20 are each provided with a head 22 mounted to swing on a pivot 23 carried by ears 24, 25 projecting outwardly from the member 4. The threaded outer end of each of the bolts 19, 20 is arranged to move into and out of a pair of lugs 26, 27 extending outwardly from the movable member 5 adjacent the transverse face 17. A washer 19* and a nut 20* are disposed on each bolt 19, 20, with the washer in position to engage the lugs 26, 27, so that, as the nut is screwed on its bolt, the washer 19* will be caused to engage the lugs 26, 27 on the movable member and the tapered portion thereof will be forced into coaction with the flared seat 14 of the fixed member and the members tightly held in contact with the bore 12 in register with the bore 15.

The movable member 5 is adapted to be swung toward and away from the fixed member 4, when the bolts are released from the lugs 26, 27, by means of a hinge formed by knuckles 28, 29 extending from the movable member 5 and having holes 30, 31 therethrough for loosely mounting the knuckles on a pin 32 fixed in ears 33, 34 projecting laterally from the fixed member 4. The holes 30, 31 of the knuckles are slightly larger in diameter than the pin 32 to compensate for the adjustment of the tapered portion 18 on its seat 14.

The bolt 21, above referred to, is provided with a head 35 fulcrumed on the pin 32 of the hinge. A removable bar 36 is arranged to bridge the knuckles 28, 29 in position to receive the outer end of the bolt 21, which is disposed to

extend through a central hole 37 in the bar 36. The threaded outer end of the bolt 21 has a washer 38 and a nut 39 arranged to be screwed on the bolt, so that the washer will be caused to engage the bar 36 and secure it rigidly to the knuckles 28, 29 which, in turn, assist in holding the tapered portion 18 on the seat 14. In order to prevent the bar 36 from turning on the bolt 21, I provide a pin 40 fixed in the bar and arranged to enter a hole 41 in the knuckle 28.

The delivery end of the movable member 5 is, in the present instance, formed to receive a device for receiving and passing therethrough tubing or wire to be covered with the plastic material forced by the screw or plodder through the members 4, 5, in a manner well known in the art. The device comprises a core 42 provided with a removable nozzle 43 and a die support 44 having a die 45 adjustably mounted therein. The core 42 is threaded into the movable member 5, while the die support 44 is mounted in the member 5 in position to be adjusted in axial alinement with the core 42. The member 5 may also be provided with suitable passages 46 for the circulation of a temperature controlling medium in a manner well understood in the art.

A clean-out plug 47 is threaded in the outer end of the movable member 5 and provided with a valve 48 for testing the plastic material flowing through the members to the core and die.

From the above described construction, it will be seen that the movable member 5 may be readily and easily swung into and out of operative position by backing off the nuts 20* on the bolts 19, 20, and each bolt swung on its pivot 23 to the position free of the lugs 26, 27 on the member 5, as shown in dotted outline in Fig. 3. The nut 39 is also backed off the bolt 21, and the bar 36 released from contact with the knuckles 28, 29, so that the bolt and bar may be rocked on the hinge pin 32 to a position shown in dotted outline in Fig. 1. With the bolts 19, 20, 21 in the positions above mentioned the member 5 may be swung on the hinge pin 32 to the position shown in dotted outline in Fig. 1, where it may be cleaned, repaired or parts replaced without the necessity of disassembling the head, after which the member may be swung back into place and the bolts returned to their locking position with the washers and nuts in engagement with the lugs, and the bar in contact with the knuckles. It will also be seen that by reason of the tapered portion 18 on the movable member 5 and the flared seat 14 on the fixed member 4, the movable member will be automatically seated and the bores 12 and 15 precisely alined.

When the movable member 5 has been moved away from the fixed member 4, the bores 12 and 15 will be wholly exposed so that any cleaning or removal which may be required is readily and easily accomplished.

It will be understood that various changes may be resorted to in the form, construction and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I do not intend to be limited to the details herein shown and described, except as they may be included in the claims.

What I claim is:

1. In combination with the cylinder and screw of an extruding machine, a head comprising fixed and movable members provided with coacting hinge elements, a hinge pin engaging said elements, said fixed member having a straight longitudinal bore registering with the end of the bore of the cylinder, said movable member having a tapered bore terminating in a reduced straight bore for the passage of the material, said longitudinal bore of the fixed member being flared outwardly immediately in advance of the end of the screw to form an alining seat for the movable member, the rear face of said movable member being provided with a rearwardly tapered surface surrounding and terminating at the end of said tapered bore, said rearwardly tapered surface being arranged to coact with the outwardly flared seat of the fixed member for longitudinally registering the bores of the members, means for locking the movable member to the fixed member, one of said locking means being interposed between the hinge elements and pivoted on said hinge pin, and a device on the locking means arranged to engage the hinge elements to assist in locking the members together.

2. In combination with the cylinder and screw of an extruding machine, a head comprising fixed and movable members provided with coacting hinge elements, a hinge pin engaging said elements, said fixed member having a straight longitudinal bore registering with the end of the bore of the cylinder, said movable member having a tapered bore terminating in a reduced straight bore for the passage of the material, said longitudinal bore of the fixed member being flared outwardly immediately in advance of the end of the screw to form an alining seat for the movable member, the rear face of said movable member being provided with a rearwardly tapered surface surrounding and terminating at the end of said tapered bore, said rearwardly tapered surface being arranged to coact with the outwardly flared seat of the fixed member for longitudinally registering the bores of the members, means for locking the movable member to the fixed member, one of said locking means being interposed between the hinge elements and pivoted on said hinge pin, and a bar on said locking means arranged to rest on the hinge elements to assist in locking the members together.

3. In an extruding machine, a cylinder having a bore in which the extruding screw works for the advancement of the material, a swinging member having a loose hinge connection supported by the cylinder and removably and adjustably carrying both a core and a die, whereby the swinging member may be turned on its hinge for cleaning the parts and returned to operative position by a swinging movement only without the necessity of removing, disturbing the adjustment of, or readjusting any of the movable parts, cooperative means on the swinging member and carried by the cylinder for automatically alining the parts, and means acting upon said loose hinge for rigidly securing the parts in alined position.

4. In an extruding machine, a cylinder having a bore in which the extruding screw works for the advancement of the material, a swinging member having a loose hinge connection supported by the cylinder and carrying both a core and a die, cooperative means comprising a pair of beveled faces which serve, in conjunction with the loose hinge connection, to aline the parts when the swinging member is brought to operative position, and means for locking the parts in operative position and eliminating the looseness at the hinge.

5. In an extruding machine, a cylinder having a bore in which the extruding screw works for the advancement of the material, a swinging

member having a loose hinge connection supported by the cylinder and removably and adjustably carrying both a core and a die, whereby the swinging member may be turned on its hinge for cleaning the parts and returned to operative position by a swinging movement without the necessity of removing, disturbing the adjustment of, or readjusting any of the movable parts, cooperative means on the swinging member and carried by the cylinder for automatically alining the parts, and means for axially urging the parts into their automatically alined operative position and retaining them in said position irrespective of the loose hinge connection.

6. In an extruding machine, a cylinder having a bore in which the extruding screw works for the advancement of the material, an extruding head mounted on a hinge supported by the cylinder, whereby the head may be turned on its hinge for cleaning the parts and returned to operative position by a swinging movement without the necessity of removing or disturbing the adjustment of any of the parts, and means effective upon the swinging head after it has been returned to operative position for axially urging it and the parts carried thereby into tight engagement with the cooperative parts of the machine and holding said parts in such engagement.

VERNON E. ROYLE.