Oct. 4, 1960 N. G. KANE 2,954,674

CENTRIFUGAL FEED UNIT

Filed Aug. 11, 1958

Fig. 1.

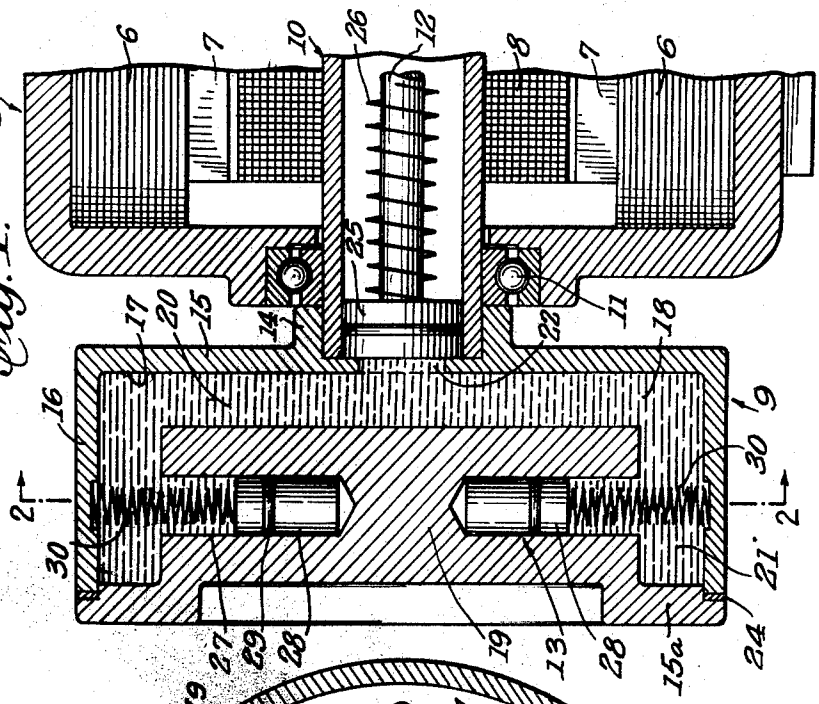
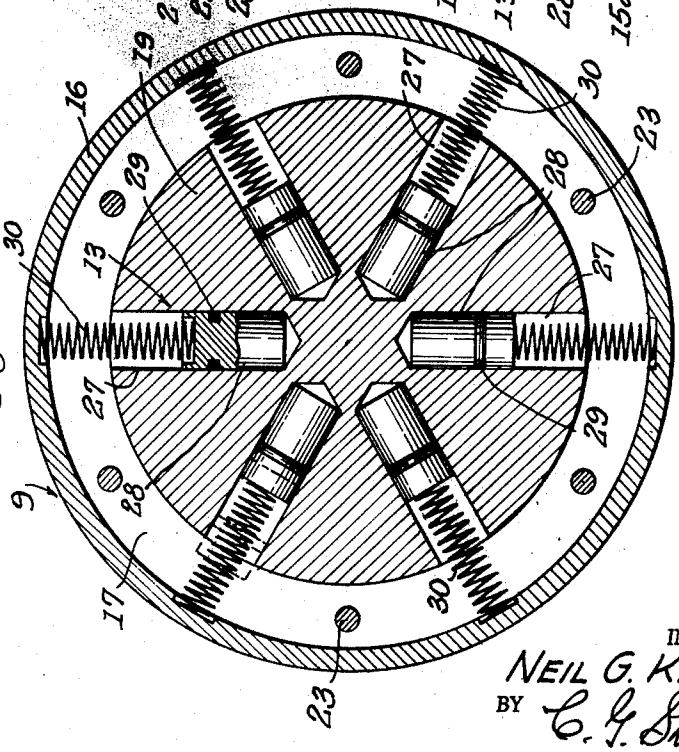


Fig. 2.



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CENTRIFUGAL FEED UNIT

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4 Claims. (Cl. 60—54.5)

This invention relates to mechanism for applying centrifugal force to feed a member, such as a tool while the same is being rotated. This invention is an improvement over the feed means disclosed in Serial No. 691,208, filed October 21, 1957, now Patent No. 2,896,412.

An object of the present invention is to provide simplified fluid-displacing means that utilizes inexpensve and efficient piston elements and radial arrangement.

A further object of the invention is to provide a feed unit in which displacement of hydraulic fluid centrifugally causes feed movement of a member axially.

The invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawing merely shows and the following description merely describes, one embodiment of the present invention, which is given by way of illustration or example only.

In the drawing, like reference characters designate similar parts in the several views.

Fig. 1 is a vertical sectional view of a centrifugal feed unit according to the present invention and shown as mounted on a means to rotate the same at high speed.

Fig. 2 is a cross-sectional view as taken on the line 2—2 of Fig. 1.

Fig. 1 shows an electric motor 5 that is, in the usual way, provided with field coils 6 for creating magnetism in field magnets 7, and an armature 8 that is rotated upon such energization of the field coils.

The present feed unit comprises, generally, a head 9 provided with a tubular extension 10 on which the armature 8 is wound and which is rotationally mounted on the axis of the motor 5 as by anti-friction bearings 11. Reference is made to said pending application with regard to the portions of the tubular extension that is broken away and to the manner in which the member 12 carries a tool or the like. Said unit further includes centrifugal means 13, in the head, for longitudinally feeding the member 12 while the same is rotating.

The head 9 comprises a housing provided with a wall 15 that has a boss 14 connected to the end of extension 10 that protrudes beyond the bearings 11, a wall 15*a* spaced from the wall 15, and an annular wall 16 that connects walls 15 and 15*a* and, together with the latter wall, define an interior chamber 17 in which hydraulic fluid 18 is adapted to be stored. A centrally disposed body 19 extends from the wall 15*a* toward the wall 15, the same providing the chamber 17 with a cup-like form in which the base 20 is defined between wall 15 and body 19 and the annulus 21 is defined between the wall 16 and the periphery of said body 19. An axial opening 22 is provided in wall 15, the same being in communication with the interior of the tubular extension 10.

The walls 15 and 16 are made separate from the walls 15*a* and the body 19 and the same are connected as by bolts 23 and the chamber 17 sealed by means of a gasket 24.

The tubular extension is fitted with a piston 25 that comprises part of the member 12, said piston being adapted to be acted on and projected by the fluid 18 upon displacement thereof through the opening 22. A spring 26 biases the member against such displacement force and returns the same to the retracted position shown when said projection force is removed.

The means 13 is shown as a set of cylinders 27 radially disposed in the body 19 and opening on the annulus 21. Six such cylinders are shown although the same may vary in number as well as in size, provided a balanced symmetrical arrangement is used. Said cylinders are each fitted with a sliding piston 28 and the latter are each provided with a sealing ring 29 to seal aganst the walls of the cylinders. A coil spring 30 is shown as biasing each piston inwardly toward the axis of rotation of the head. The displacement of each cylinder, when projected outwardly, is dependent on the size of the same and the degree of travel radially.

It will be clear that upon rotation of the head 9 by the motor 5, the member 12 will not only rotate, because keyed to the tube 10, but will also project against resistance by spring 26, according to the amount of hydraulic fluid that is displaced from the head by the outward centrifugal movement of the pistons 28. It will also be clear that the projecting force is a yielding one and, should the member encounter undue resistance to projection, the reactive force produced is effective to partly overcome the centrifugal force. Nevertheless, at high rotational speeds, the centrifugal force is quite great and effective for the purpose intended.

While the foregoing specification illustrates and describes what I now contemplate to be the best mode of carrying out my invention, the construction is, of course, subject to modification without departing from the spirit and scope of my invention. Therefore, I do not desire to restrict the invention to the particular form of construction illustrated and described, but desire to cover all modifications that may fall within the scope of the appended claims.

Having thus described my invention, what is claimed and desired to be secured by Letters Patent is:

1. A centrifugal feed unit comprising a head provided with a tubular extension, means mounting said head and extension for high speed rotation on the axis of the head and extension, said head having a chamber therein and the chamber including a plurality of radially disposed cylinders each closed at the end nearer the axis of the head and open at the opposite end, a piston in each cylinder arranged to keep the cylinders empty between their closed ends and the pistons, resilient means biasing each piston in a direction toward said axis and adapted to yield to outward movement of the pistons under centrifugal force during rotation of the head, said chamber and the portions of the cylinders outward of the pistons being totally filled with hydraulic fluid, said head having an axial opening in communication with the tubular extension and through which hydraulic fluid is adapted to move from the chamber to the extension upon displacement of such fluid by the pistons during rotation of the head, and a spring-biased axial member in the extension and projected axially by such displaced fluid.

2. A centrifugal feed unit according to claim 1 in which the pistons have a free sliding fit in their respective cylinders, and each piston is provided with a sealing ring in engagement with the wall of each respective cylinder to seal against flow of hydraulic fluid from the chamber past the piston and into the cylinder behind the piston.

3. A centrifugal feed unit according to claim 1 in which the chamber is formed to be cup-shaped with an annular space, and the cylinders being in direct communication with said annular space.

4. A centrifugal feed unit according to claim 1 in which the chamber is formed to be cup-shaped with an annular space, and the cylinders being in direct communication with said annular space, the chamber having a flat circular space from which the annular space extends on one side, the axial opening to the axial tube being in the middle of said circular space.

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