

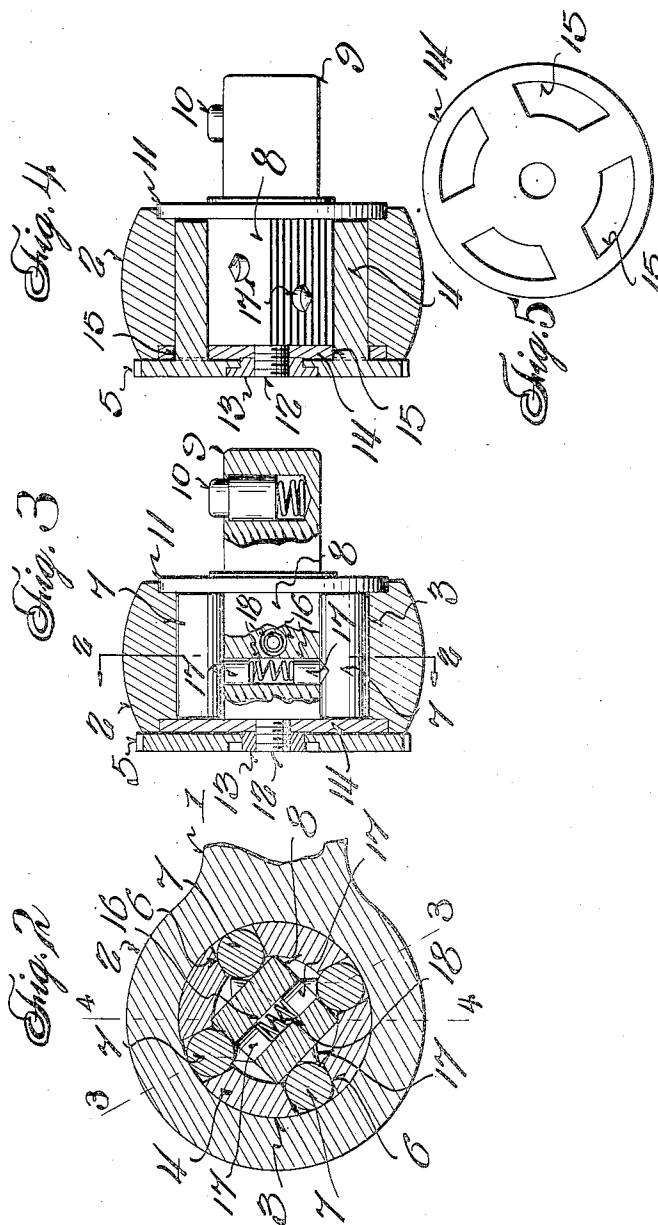
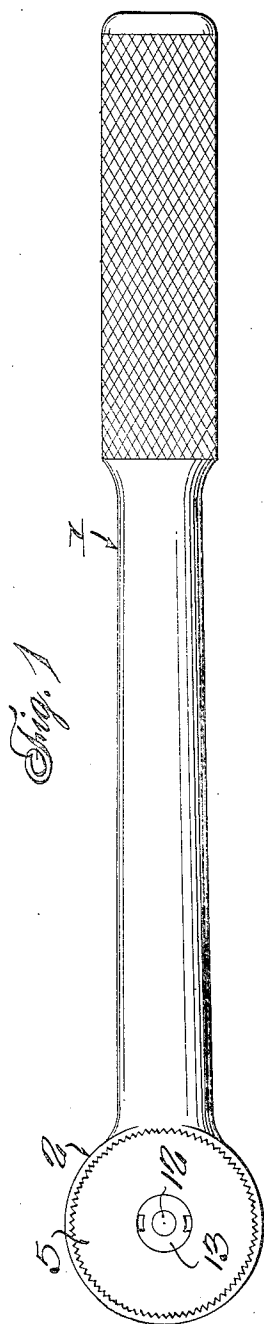
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REVERSIBLE FRICTION CLUTCH

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REVERSIBLE FRICTION CLUTCH

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This invention relates to reversible friction clutches applicable to various uses where a friction clutch is desired for obtaining intermittent operable engagement in one direction at a time, such as is obtained in a ratchet mechanism.

While the present invention pertains broadly to a clutch mechanism, the same is designed particularly for use in tools such as wrenches, bits, screw drivers, and the like. In present types of tools of the foregoing character, it is customary to utilize a shiftable ratchet dog to obtain reverse action of the tool. In other instances, such as in wrenches, the wrench carrying member is longitudinally shiftable with relation to the manipulating handle, to provide for reverse action. Also, frictional gripping means has been substituted for ratchet mechanism, but no provision has heretofore been made for reversing the direction of frictional engagement between the tool and the manipulating handle.

It is therefore the primary object of the present invention to provide a tool of the foregoing character embodying frictional actuating means, together with means for reversing the direction of frictional engagement of said actuating means.

Incidental to the foregoing, a more specific object resides in the provision of a handle and a tool receiving member having frictional means to provide intermittent operable engagement between the handle and tool member in one direction at a time, together with means for reversing the direction of operable engagement.

A still further object is to provide a manipulating handle and a tool receiving member having frictional clutching members to provide operable engagement between the two, together with means for shifting the frictional clutching members with relation to the tool receiving member, whereby the direction of operable engagement is reversed.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawing is illustrated one complete example of the physical embodiment of the present invention constructed according to the best mode so far devised for the practical application of the principles thereof.

Figure 1 is an elevation of a wrench embodying the principles of the present invention.

Figure 2 is a longitudinal section through the wrench head, as indicated by the line 2-2 of Figure 3.

Figure 3 is a transverse section taken on the line 3-3 of Figure 2.

Figure 4 is a similar section taken on the line 4-4 of Figure 2, and

Figure 5 is a detailed view of the spacing washer disposed between the wrench head and friction controlling means.

Referring now more particularly to the accompanying drawing, the numeral 1 designates a conventional wrench handle provided with an annular head 2 having a central transverse cylindrical bore 3 for reception of the sleeve 4, the latter being provided with a flanged head 5 having its peripheral edge knurled or roughened to provide for the manual manipulation of the same.

As best shown in Figure 2, the sleeve 4 is provided with diametrically disposed milled slots 6 for reception of the frictional rollers 7. Disposed within the sleeve 4 is the squared end 8 of a wrench socket receiving shank 9, which shank is provided with a conventional spring-urged plunger 10 to retain the socket thereon. Formed integral with the shank 9 and head 8 is an annular flange 11 engaging one face of the head 2 of the wrench, while the flange 5 of the sleeve 4 engages the opposite face. To retain the sleeve and shank in assembled position in the head 2 of the wrench, the head 8 of the shank is provided with a threaded lug 12 projecting through the flange 5 for reception of the retaining nut 13, while disposed between the flange 5 and the head 8 is a spacing washer 14 provided with cutout portions 15 for reception of the spaced portions of the sleeve 4.

The squared head 8 is provided with a pair of spaced, transverse bores 16 extending at right angles to each other, and parallel to the faces of the head 8. Positioned within the bores are the plungers 17 provided with conical heads, and having disposed therebetween expansible springs 18 urging each pair of plungers toward projected position. As best shown in Figure 2, each plunger engages one of the frictional rollers 7 to retain the same in engagement with one side of the adjacent face of the squared head 8, and the inner bore 3 of the head 2.

Taking up the operation of the wrench, with particular reference to Figure 2, it will be quite apparent that as the head 2 is rotated in a clockwise direction, the frictional rollers 7 will pro-

vide wedging frictional engagement between the inner bore of the head 2 and the adjacent face of the squared head 8, whereas when rotated in an anti-clockwise direction the head 2 will slip past the frictional rollers, thus providing intermittent ratchet actuating of the shank 9. When it is desired to reverse the direction of frictional engagement, it is merely necessary to shift the sleeve 4 with relation to the squared head 8, through manipulation of the flanged head 5. Such shifting of the sleeve will cause the frictional rollers to pass over the plungers 17 and engage the opposite side of the faces of the squared head, in which position of the rollers operable clutching engagement between the head 2 and the head 8 occurs upon rotation of the head 2 in an anti-clockwise direction.

While the spacing washer 14 is not essential to the operation of the invention, the same is provided to eliminate possible frictional engagement between the head 2 and flange 5 when the head is rotated on its return stroke, thus eliminating any possibility of undesired shifting of the sleeve 4 by the head 2, which, as heretofore explained, would effect reversal of the direction of engagement of the frictional means. Obviously the washer 14, which serves to space the flange 5 from the head 2, will eliminate possible friction between the two, inasmuch as the washer is secured to the end of the head 8 and engages the head 2 to retain the flange 5 and head 2 in spaced relation.

From the foregoing explanation, taken in connection with the accompanying drawing, it will be apparent that an exceedingly simple, compact and efficient frictional actuating tool has been provided, in which the direction of actuating can be reversed through simple manipulation of the frictional controlling means, namely shifting of the sleeve 4, thus eliminating longitudinal shifting of the tool receiving shank, which provides for a more rigid, simple construction and also eliminates the necessity of removing the tool from the work to reverse the action of the same.

While the invention has been illustrated and described in considerable detail, as applied to what is commonly termed a ratchet wrench, it is to be understood that the same is adaptable to any type of tool, such as a bit, screw driver and the like, wherein it is desired to obtain a ratchet movement in either selected direction.

Furthermore, as previously set forth, it is contemplated that the invention may be applied to a wide range of devices and machines wherein a selective intermittent feeding action in opposite directions is desired, as for instance in a lathe feed, or in the operation of a screw jack.

I claim:—

1. A tool operating handle provided with a head having a cylindrical bore therein, a sleeve positioned within said bore and provided with spaced slots and a flange at one end, frictional elements positioned within said slots, a tool receiving member having a polygonal head positioned within said sleeve and rotatably connected thereto, and resilient means for releasably retaining said sleeve and polygonal head in relative adjusted position.

2. A tool operating handle provided with a head having a cylindrical bore therein, a sleeve positioned within said bore and provided with spaced slots and a flange at one end, frictional elements positioned within said slots, a tool receiving member having a polygonal head positioned within said sleeve and rotatably connected thereto, resilient means for releasably retaining said sleeve and polygonal head in relative adjusted position, and a washer carried by said polygonal head for spacing the flange of said sleeve from the head of said handle.

3. In a device of the class described, a barrel member having a continuous internal cylindrical clutch surface, a tool receiving member having a polygonal head, said polygonal head and the interior clutch surface providing a plurality of pockets which are narrower at the ends than at the center, a roller in each of said pockets, said rollers being adapted to be drawn into binding engagement in either end of the pockets, means for resiliently urging the rollers into either end of the pockets, and a slotted sleeve member disposed between the barrel member and the head member for shifting said rollers from one end of the pockets to the other end of the pockets, said sleeve member being rotatably supported in said barrel member coaxially with said cylindrical clutch surface and having an end plate, and said head having a stud projecting through and guided centrally in said plate.

4. In a device of the class described, a wrench arm having an integral head, said head having a bore therethrough, the walls of the bore providing an annular clutch surface and having a short counterbore at each end of the main bore, a polygonal shank member forming with the annular clutch surface a plurality of pockets which are narrower at the ends than at their centers, a clutch roller in each pocket, means for resiliently urging each roller into either end of the corresponding pocket, a pair of end plates seated in said counterbore and retaining said shank member in said bore, and a slotted sleeve within the bore for shifting the rollers from one end of the pockets to the opposite end of the pockets.

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