July 16, 1946. F. A. REYNOLDS 2,404,092

RATCHET MECHANISM

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FIG. 1.

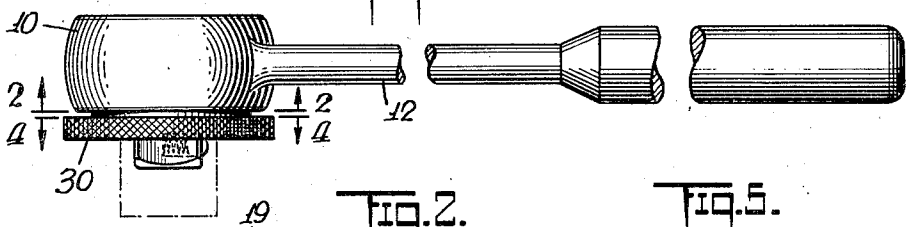

FIG. 2.

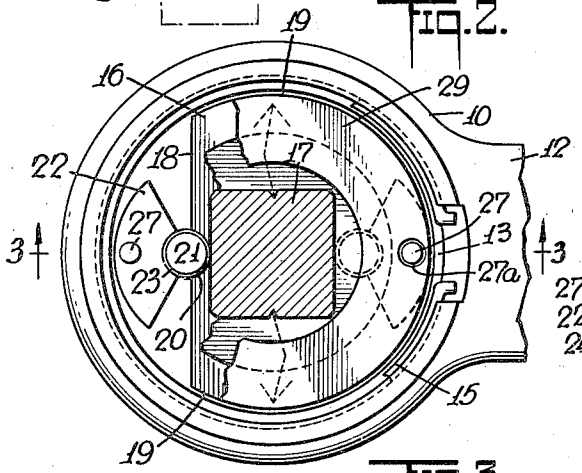

FIG. 5.

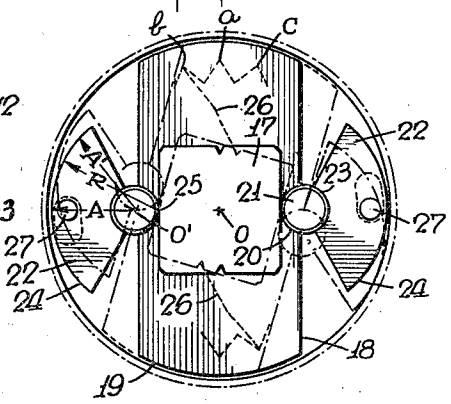

FIG. 3.

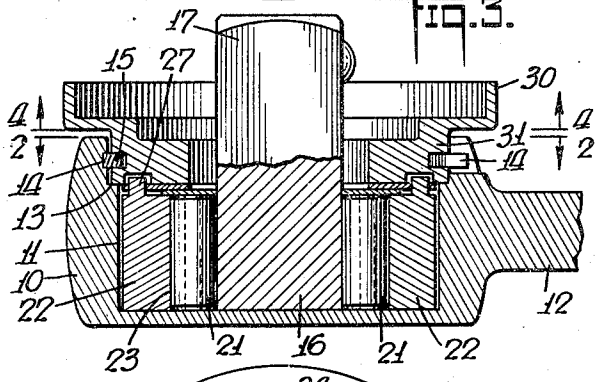

FIG. 7.

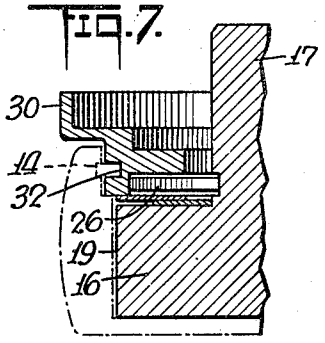

FIG. 4.

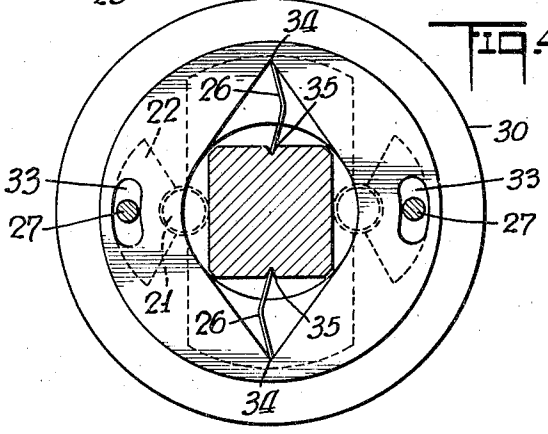

FIG. 6.

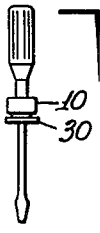

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Fig. 8.

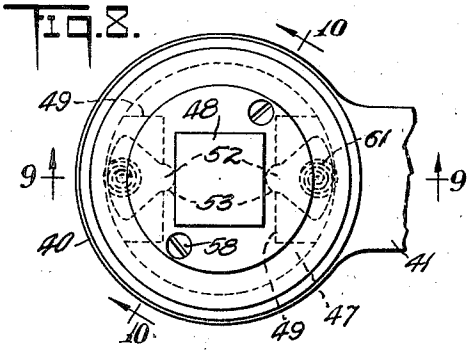


Fig. 12.

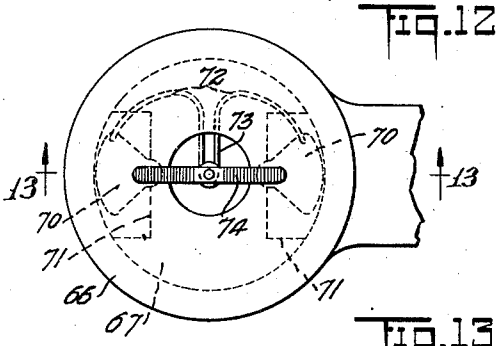


Fig. 9.

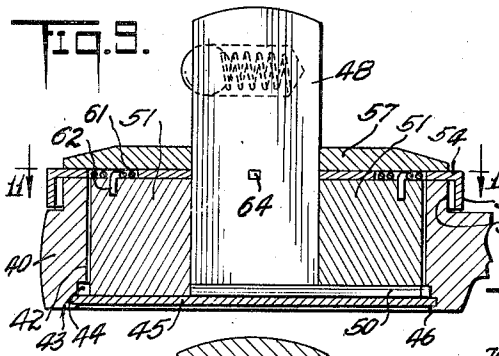


Fig. 13.

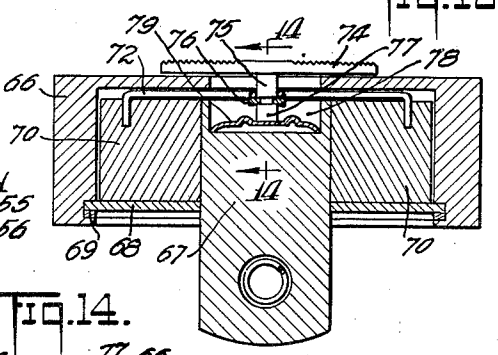


Fig. 14.

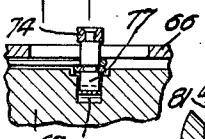


Fig. 10.

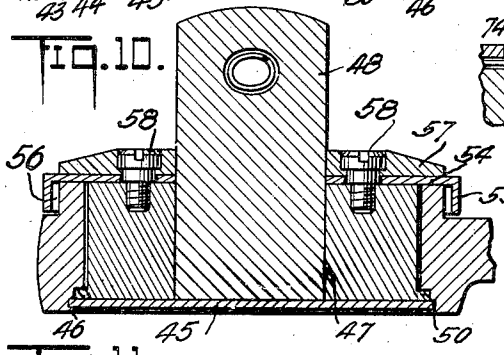


Fig. 15.

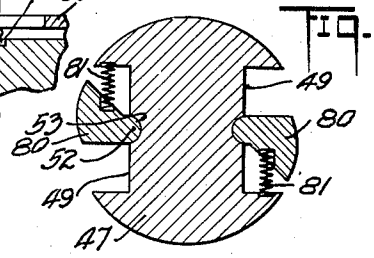


Fig. 11.

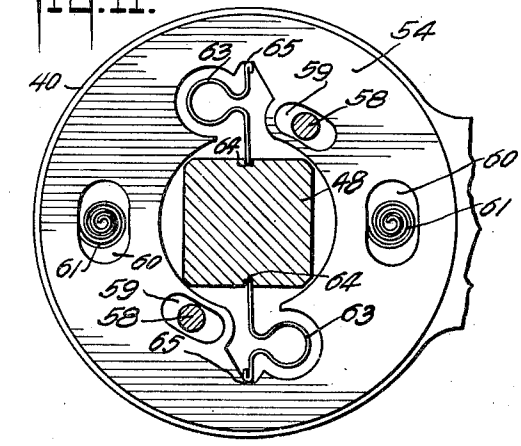
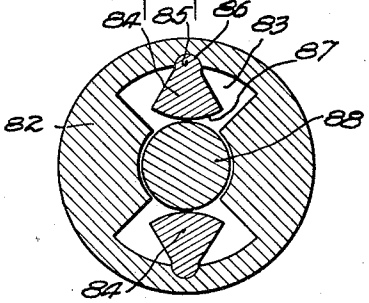


Fig. 16.



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44-2

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2,404,092

UNITED STATES PATENT OFFICE

2,404,092

RATCHET MECHANISM

Frederick A. Reynolds, Denver, Colo.

Application January 17, 1944, Serial No. 518,559

10 Claims. (Cl. 192—45.1)

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This invention relates to improvements in ratchet mechanisms and has reference more particularly to a ratchet mechanism of the friction type that can be employed in many different relations, but which is primarily intended for use in connection with wrenches. This application is a continuation-in-part of my application Serial No. 461,266, filed October 8, 1942.

In the assembling and repairing of machines of different types, ratchet wrenches are found to be very useful and serve to speed up the work and simplify the operation of tightening and loosening nuts. Ratchet wrenches of different kinds are on the market and are quite extensively employed and this invention relates to improvements in such wrenches and is directed more particularly to the production of a ratchet mechanism that possesses certain advantages of operation over similar mechanisms and which is of an extremely simple and rigid construction and which can therefore be manufactured and assembled at a moderate cost and which will be practically unbreakable.

Another object of this invention is to produce a ratchet mechanism that can be readily reversed and will have practically no lost motion and which, for this purpose, will be effective where the handle can be oscillated through a very small angle.

Another object is to produce a ratchet mechanism which, in addition to being readily reversible, is so constructed that the operator can rotate the nut in either direction while the handle of the wrench remains stationary, and when such manual rotation is terminated the wrench can be employed for finishing the tightening of a nut when applying it to a bolt.

Another object of this invention is to produce a wrench in which the turning head is biased in one direction by means of springs so as to maintain the parts in resilient operative engagement at all times whereby excess lash or lost motion is prevented.

A still further object of this invention is to produce a ratchet mechanism that can be made of any desirable size and which can therefore be made sufficiently small to adapt it for use with screw drivers or any other small tools where a reversible ratchet is desired.

The above and any other objects that may become apparent as this description proceeds are attained by means of a construction and an arrangement of parts that will hereinafter be described in detail, and for this purpose reference will now be had to the accompanying drawings

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in which the invention has been illustrated in its preferred form and in which:

Figure 1 is a side elevation of the improved wrench;

Figure 2 is a section to an enlarged scale, taken on lines 2—2, Figures 1 and 3;

Figure 3 is a diametrical section taken on line 3—3, Figure 2;

Figure 4 is a section taken on lines 4—4, Figures 1 and 3; the section line following the under surface of ring 30 when viewed as in Fig. 3, the parts below the section line (Fig. 3) being shown dotted;

Figure 5 is a diagrammatic view showing the relationship of the several parts;

Figure 6 is a side elevation of a screw driver equipped with the improved ratchet mechanism;

Figure 7 is a section taken on line 7—7, Figure 4, and shows the position of the biasing spring;

Figure 8 is a plan view of a wrench illustrating a modification;

Figure 9 is a sectional view taken substantially in the plane of the line 9—9 of Figure 8;

Figure 10 is a sectional view taken substantially in the plane of the line 10—10 of Figure 8;

Figure 11 is a sectional view taken substantially in the plane of the line 11—11 of Figure 9;

Figure 12 is a plan view of a wrench illustrating a further modification.

Figure 13 is a sectional view taken substantially in the plane of the line 13—13 of Figure 12;

Figure 14 is a fragmentary sectional view taken substantially in the plane of the line 14—14 of Fig. 13;

Figure 15 is a detail sectional view of a ratchet part illustrating a further modification; and

Figure 16 is a detail sectional view illustrating a further modification.

In the drawings reference numeral 10 designates a cup-like housing having a cylindrical outer wall 11. A handle 12 projects from one side of the housing as shown in the drawings. The inner surface of the housing is provided adjacent its open end with an annular shoulder 13 and the cylindrical wall surface above this shoulder is provided with a groove 14 for the reception of a ring 15. Positioned within the housing is a turning head 16 from one side of which a non-circular projection 17 extends. The turning head 16 has parallel sides 18 connected by cylindrical surfaces 19. The radius of curvature of the arcuate ends 19 is substantially the same as that of the cylin-

drical wall 11 of the housing and is slightly less than this by an amount which permits a free rotation of the parts. In the form illustrated, the projection 17 is of square cross section and the width of the turning head 16 is slightly greater than the length of a corresponding side of the projection. The turning head is provided on each side with a cylindrical recess 20 in which is positioned a steel roller 21, as shown most clearly in Figs. 4 and 5. Positioned between each of the rollers 21 and the inner wall of the housing is a cam 22. These cams are sector-shaped and are provided at their apexes with arcuate bearing surfaces 23 of the proper curvature to receive the rollers 21. The outer arcuate surfaces 24 are curved about centers located substantially at the bottom of the cylindrical grooves 20 in the turning head at points which have been designated by reference numeral 25 in Figure 5. It will therefore be evident that the radial distances between the inner and outer arcuate surfaces increases from the center line of the segments towards their outer edges and this variation in distance is taken advantage of in the particular ratchet mechanism employed in this invention.

Referring now more particularly to Figure 5 in which the full line position of the parts designates the neutral position and in which the dotted line positions of the projection, the rollers and the cams designate one of the locking positions, it will be observed that the turning head and the projection 17 have been rotated in a clockwise direction and are urged in this direction by the action of springs 26. The pins 27 that project upwardly from the cams are in the same position as they were before the turning head was moved from the full line position and as a result of this the centers 0' have been moved in a clockwise direction as has also the centers 25. This turning movement results in a rocking of the pawls on the inner surface of the cylindrical housing and since the outer surfaces 24 have a longer radius than the distance from the center of roller 21 to wall 11, the distance from the center 0 of the turning head increases during such rocking movement with the result that the pawls exert a strong outward pressure against the cylindrical wall of the housing and this pressure is exerted at an angle much less than the angle of repose, wherefore no sliding can take place. Since the parts are continually acted upon by springs 26, there will be no lost motion or back lash because the pawls are always in engagement with the inner wall of the housing and for this reason ratcheting will take place even where the angular movement of the handle is very small.

The turning head 16, together with the rollers 21 and cams 22, is positioned in the cylindrical housing and support on the bottom thereof in the manner shown quite clearly in Figs. 2 and 3. The parts are so proportioned that the arcuate ends of the turning head 16 make a sliding fit with the interior of the housing and when the cams are positioned as in Fig. 2, they are spaced from the inner wall surface a distance of about one one-hundredth of an inch. When the parts are in the position shown in Figure 2 the turning head and cams can freely rotate within the housing. Since the two cams cooperate to jointly form a ratchet mechanism they must be supported so that the pins 27 will always be on a diameter and for this purpose a ring 29 has been provided with holes 27a that are positioned diametrically opposite each other and receive the pins 27. If ring 29 is held against rotation and the turning head 16 rotated in either direction the outer surfaces of the cams will come into engagement with the inner surface of the cylindrical housing wall for reasons that will now be explained.

Referring now more particularly to Figure 5, it will be seen that the centers of the rollers 21 have been designated by reference characters 0' and the distance from center 0' to the middle point of the cam surface has been designated by A. The cam surface, however, is curved about the center 25 on radius R which obviously is greater than the distance A and therefore the distances from the centers 0' to any point of the cam surfaces, to either side of the middle point, are greater than A and have been designated by reference character A'. It will now be apparent that if the turning head 16 is rotated from the full line to the dotted line position shown in Figure 5 while the pins 25 are held against rotation, the centers 0' will move in a clockwise direction and the cam surfaces will then contact the inner surface of the housing at some point between the middle of the arc and its end. The toggle action, produced by the movement of the parts, forces the cam against the wall of the house with a very large leverage and the force is directed at an angle less than the angle of repose and therefore no sliding takes place.

When the force exerted by the cams against the housing wall is very great, it distorts the housing wall slightly and this distortion tends to reduce the vertical diameter, when viewed as in Fig. 5. By making the turning head a close sliding fit, any contraction of the vertical diameter is prevented and this in turn assures that the cams will not slide along the housing wall. In Fig. 5 the turning head has been shown as displaced in a clockwise direction, but it can be similarly displaced in a counterclockwise direction and when so displaced the direction of the pawl operation will also be reversed.

For the purpose of reversing the pawl operation, a reversing disk 30 has been provided. This disk has a knurled flange by means of which it can be gripped and turned about the axes of the housing when in position thereon. The reversing disk has a cylindrical section 31 that fits within the outer end of the housing and this is provided with a groove 32 for the reception of a locking ring 15 by means of which the reversing disk is held in position.

Referring now to Figure 4, it will be observed that the bottom of this disk has two diametrically positioned recesses 33 into which the pins 27 project. The bottom is also provided with an opening through which the projection 17 extends and which terminates in sharp corners 34. Curved springs 26 have one end positioned in the corners 34 and the other in notches 35 in projection 17. When the parts are in the position shown in Fig. 4, the springs are in what may be determined a dead center position, but if the disk is rotated in either direction from the position shown in Fig. 4, the force exerted by springs 26 will tend to rotate the turning head relative to the disk 30 and bring them into the angular relation shown in Fig. 5. The cams will be held against rotation because when the disk 30 is rotated, it brings the ends of recesses 33 into contact with the pins 27. When the parts are in the position shown in Fig. 5, the turning head can be rotated freely in a counterclockwise direction because the position of the cams is then such that no interlocking will take place during this rota-

tion and it is therefore possible to turn a nut on a bolt by rotating the reversing disk until the nut comes into operation, whereupon the completion of the rotation is effected by the operation of the wrench handle.

Attention is called in particular to the operation just described and to the construction by means of which it is attained. The employment of springs 26 or some other equivalent spring mechanism for the purpose of urging the reversing disk and the turning head in opposite directions results in a structure that permits the mechanic to rotate the nut in either direction, on the bolt, by means of the reversing disk and to immediately effect rotation by the ratchet mechanism whenever the force required to turn the nut becomes too great for manual operation.

In Fig. 6 a screw-driver has been shown equipped with a ratchet mechanism constructed in the manner described and shown on the drawings and described herein. Such a screw-driver has several advantages, among which is the manual rotation by means of the disk 30 and the positive action of the ratchet mechanism.

The ratchet mechanism can, of course, be employed in any place where a ratchet mechanism is desired and the two uses to which attention has been called are merely illustrative.

When the parts are to be disassembled, the holding ring 15 is removed by engaging the ends thereof and compressing it sufficiently to release it from the recess 14.

In the above description the terms "cams" and "pawls" have been used interchangeably.

In that form of the invention disclosed in Figs. 8 to 11 inclusive the structure is somewhat simplified and the cams or pawls are of improved form, so as to produce greatly improved results, as will be hereinafter pointed out. As disclosed in Figs. 8 to 11 the housing 40, which in the case of a wrench would ordinarily include a handle 41, is preferably bored straight through, as indicated at 42, and at the lower end there is a counterbore 43 and a second larger counterbore 44. A separate end or cover plate 45 is seated in the counterbore 44 and held therein, as by peening over the edge of the counterbore, as indicated at 46. Thus, the bored housing 40 and the closure plate 45 form a readily manufactured cup corresponding in general to the integral cup housing of the general form shown in Fig. 3.

The turning head 47 is preferably of generally circular or somewhat dumb-bell form, as illustrated in Fig. 8 and also in Fig. 15 (which illustrates a modified form of cam). The turning head has an angular wrench shank 48, which may be and preferably is an integral part of the turning head and projects to the outside of the housing for engagement with a suitable socket. The turning head is through slotted, as indicated at 49, and in the form illustrated in Figs. 8 to 11 the turning head has an integral flange 50 fitting the counterbore 43, so that the turning head and square shank 48 will be rotatably held and definitely positioned in the housing 40. The cams or pawls 51 may rest on the closure plate 45 and be supported thereby.

The cams or pawls 51 are preferably of generally the same outside contour as the pawls 22 heretofore described but at the inside, instead of being mounted upon cylindrical pins, they are provided with integral cylindrical projections 52, which fit in correspondingly shaped cylindrical recesses 53 in the turning head. This general construction is clearly illustrated in Figs. 8 and 15.

This cam structure is highly advantageous for reasons which will be hereinafter pointed out.

In order to shift the cams for reversing a ratchet mechanism I preferably employ spring biasing mechanism and further resilient mechanism, for urging the cams in one or the other direction. As illustrated a disk or plate 54 is positioned above the cams 51 and may rest on the top of the housing 40. The periphery of the flange may be flanged down, as indicated at 55, and may be partially housed in a rabbet 56 on the housing. The flange 55 is preferably knurled on the outside so as to be readily turned when it is desired to reverse the ratchet mechanism or spin the turning head. The cover plate 57 may rest loosely on the disk 54 and be held in position as by means of shouldered screws 58—58 which pass through the cover plate 57, through elongated holes 59 in the disk 54 and are secured in the turning head 47. The screws 58 are suitably shouldered so as to leave a proper sliding fit for the plate 54, so that the latter may be readily turned. The plate 54 preferably has elongated openings 60 over each cam, and resilient means may be interposed between the cams and the plate 54. In the form shown there is a resilient coil 61, more or less loosely fitted in the slot 60, and the inner end of the coil may be turned down and rotatably fitted in a hole in the cam, as indicated particularly at 62. Thus, when the plate 54 is turned (as permitted by the slots 59), the ends of the slots 60 will engage the spring coils 61 and the pawls will be resiliently shifted or rocked about their inner pivot seats, as will be understood. The plate 54 is biased to one or the other side of its neutral position, shown in Fig. 11, by suitable spring means. As illustrated, springs 63 are compressed and held between recesses 64 on a part of the turning head and recesses 65 in the plate 54. Thus, when the plate 54 is rotated in either direction from its neutral position shown in Fig. 11, the compressed springs 63 will tend to snap the plate into its extreme position and resiliently hold the same in such position, and through the slots 60 and the spring coils 61 the pawls will be urged in one or the other direction for ratcheting action.

The construction shown in Figs. 8 to 11 as has been stated is quite simple and the parts may be readily manufactured and assembled. The flange 55 on the reversing plate or disk 54 being turned inwardly toward the housing 40 will provide a thinner wrench than is shown in Fig. 1. Of course, the disk 54 may be spun by hand just as may be the disk 31 for turning the screw in one direction or the other before there is necessity for using the wrench handle.

In that form of the invention shown in Figs. 12, 13 and 14 the housing 66 is shown as of integral cup form and the turning head, including the square shank 67, is secured in the housing 66 as by means of a cover plate 68 and snap ring 69. The plate 68 may turn with the turning head 67 or the plate 68 may have an opening of sufficient size to permit a free turning of the shank 67 while the cover plate 68 remains stationary. The pawls 70, which are preferably of the same form as those last described, are rockable in the slots 71 of the turning head, as has been described. The pawls 70—70, however, are linked together and are actuated by means other than a reversing disk. In the form illustrated the pawls 70—70 are linked together by means of a link 72, which may be in the form of a spring, or partly in the

form of a spring, and may include a U-bend 73 extending about to the axial center of the ratchet mechanism. The thumb-piece 74, which may be used for reversing the ratchet action, may be a serrated member slidable on the outside of the housing 66. The thumb piece 74 may have a shank 75 engageable with the U-bend 73 of the link member and held relatively thereto, as by means of a snap ring 76. The inner end 77 of the shank is preferably angular or slabbed off to fit in slot 78 in the turning head 67. Snap action means may be provided for holding the thumb-piece in one or the other extreme position so that the pawls will be urged in one or the other direction for determining the direction of ratchet action. As illustrated, the snap action means may comprise a plate spring 79 in the bottom of the slot 78 and provided with projections over which the end 77 of the shank may snap for holding the shank in either extreme position in the slot, as will be readily understood. Thus when the thumb-piece is moved in one direction, the pawls, being linked together by the link 72, will be shifted resiliently in one direction, and when the thumb-piece is moved in the other direction the pawls will be moved to position for ratcheting in the opposite direction. When the thumb-piece is in the neutral position shown in Figs. 12 and 13, both pawls will be disengaged from the housing and the housing may be rotated freely relatively to the turning head.

In the invention as disclosed in Fig. 15 the turning head 47 may be the same as those heretofore described and will fit in a suitable housing which may be a wrench or other housing, for example, a clutch housing. The pawls 80 are single acting pawls and may be urged into operative or gripping position, as by means of springs 81—81. It will be clear that when the turning head 47 of Fig. 15 is rotated in a clockwise direction the pawls 80—80 will tend to bind in a surrounding housing and turn the latter in a clockwise direction. However, when the turning head 47 is rotated in a counterclockwise direction there will be no binding action and the pawls 80—80 would simply slide around in the housing.

In that form of the invention shown in Fig. 16 the housing 82 may be recessed or slotted, as shown at 83, for receiving the pawls 84. These pawls may be of the same type as those heretofore described, but in this case the cylindrical bearings 85 of the pawls are movable in cylindrical seats 86, formed in the housing 82 rather than in an inner turning head. The cam surfaces 87 of the pawls may be engageable with a circular turning head or shaft-like part 88, so that when the housing 82 is turned the pawls may be caused to grip the shaft 88 and turn the same, or of course the shaft 88 could be the driver and the housing 82 the driven member. The pawls 84, as will be understood, could be linked or actuated by any of the means heretofore described.

As has been stated heretofore, the pawls or cams having cylindrical bearing surfaces fitting in cylindrical sockets present some very important advantages in a ratchet type mechanism. If the pawls were, say, in the form of rollers or the like, the greater the relative turning movement between the turning head and the housing the greater would be the wedging action and the greater would be the tendency to rupture the housing. In other words, the rupturing tendency would be in at least direct proportion to the relative turning force exerted between the housing and the turning head. However, with my improved cams or pawls, wherein the cylindrical bearing projections on the cams fit in cylindrical bearing recesses in the turning head (or in the housing as in Fig. 16), the tendency of the pawls to rupture the housing is very greatly reduced, for the reason that, as the turning head and the housing are rotated relatively to each other to cause the pawls to grip, the lubricating film is quickly squeezed out of the space between the cylindrical projection on the pawl and its cylindrical seat, and due to the relatively high pressure between the cylindrical pawl projection and its seat a high frictional force against further turning is set up and a very great relative turning force may be exerted between the housing and the turning head, without in fact further rocking the pawls, and consequently the tendency of the pawls to burst the housing is greatly reduced. This is a most important feature in a ratchet mechanism of the general type described. It is equally important whether the ratchet mechanism be embodied in a wrench or a clutch or other device where my ratchet mechanism may be employed. Even if the pawl bearing and its seat do not fit perfectly the above advantage will be realized to a great extent because the pawl bearing will not roll uphill or "climb" in its bearing.

In each form illustrated there are two cams or pawls, but generally speaking there may be a greater or a lesser number. Two pawls provide a balanced construction but a single pawl will lock and function and the same may be said for any number of pawls greater than one.

While the invention has been described in considerable detail and preferred forms illustrated and certain applications of the invention mentioned, it is to be understood that various changes may be made within the scope of the invention as defined in the appended claims and that many applications, including clutches and the like, will suggest themselves to those skilled in the art.

Having described the invention what is claimed as new is:

1. A ratchet mechanism, comprising, in combination, a cylindrical housing, a turning head positioned therein for rotation about the axis thereof, a pawl pivoted to each side of the turning head and positioned between the head and the wall of the housing, the outer end of the pawl being curved on a radius greater than the distance from the pivot point to the housing wall and less than the radius of the inner surface of the housing wall, a reversing disk mounted for rotation about the axis of the housing, means comprising a spring for exerting a force tending to rotate the turning head relative to the reversing disk, and means for effecting a lost motion interlock between the reversing disk and the pawls.

2. A ratchet mechanism comprising, in combination, a cylindrical housing, a turning head positioned therein for rotation about the axis thereof, pawls positioned between opposite sides of the head and the housing wall, a pivotal connection between each pawl and the head, the outer surfaces of the pawls being curved about centers positioned between the pivots and the center of the housing, means for holding the pawls in predetermined relative angular positions, means for turning the turning head relative to the pawls comprising, a reversing disk

mounted for rotation about the axis of the housing, and means comprising at least one spring for normally urging the turning head and the reversing disk in opposite directions.

3. A ratchet mechanism comprising, in combination, a cylindrical housing, a turning head positioned therein for rotation about the axis thereof, pawls positioned between opposite sides of the head and the housing wall, a pivotal connection between each pawl and the head, the outer surfaces of the pawls being curved about centers positioned between the pivots and the center of the housing, means for holding the pawls in predetermined angular positions, means for rotating the turning head relative to the pawls comprising, a reversing disk mounted for rotation about the axis of the housing, and means comprising at least one spring and the reversing disk for normally urging the turning head and pawls in opposite directions, the reversing disk and springs being movable to either side of a neutral position to effect reversal of the pawl mechanism.

4. A ratchet mechanism comprising, in combination, a housing having a cylindrical opening, an elongated turning head positioned in the housing for rotation about the axis thereof, the ends of the turning head being curved on a radius slightly less than the radius of the opening, the head being of less width than the diameter of the opening, pawls positioned between sides of the head and the wall of the housing, pivotal connections between the pawls and the turning head, the outer surfaces of the pawls being curved about centers that lie between the pivots and the center of the turning head, a reversing disk mounted for rotation in one end of the housing, means for removably and rotatably securing the disk in the housing, a pin projecting upwardly from each pawl, the under surface of the reversing disk having recesses for the reception of the pins, the recesses being of greater angular extent than the pins, whereby relative angular movement can take place, and resilient means comprising at least one spring, for producing a force tending to rotate the turning head relative to the reversing disk, said resilient means having a neutral and two operative positions, whereby the direction of ratchet action can be determined.

5. In a ratchet mechanism, a housing member, a turning head member therein and rotatable relatively thereto, a plurality of pawls interposed between said members, each said pawl having a cylindrical bearing portion thereon and one of said members having a cylindrical seat for each said cylindrical bearing portion, the side of each said pawl opposite said cylindrical bearing portion having a curved bearing surface of greater radius than the distance from the pivot point of said pawl to the curved surface, means for coupling said pawls for simultaneous movement, and a manually actuable part for actuating said coupling means to move said pawls, for the purpose described.

6. In a ratchet mechanism, a housing member, a turning head member therein and rotatable relatively thereto, a plurality of pawls interposed between said members, each said pawl having a cylindrical bearing portion thereon and one of said members having a cylindrical seat for each said cylindrical bearing portion, the side of each

said pawl opposite said cylindrical bearing portion having a curved bearing surface of greater radius than the distance from the pivot point of said pawl to the curved surface, means for coupling said pawls for simultaneous movement, and spring biasing means for urging said pawls in one direction.

7. In a ratchet mechanism, a housing member, a turning head member therein and rotatable relatively thereto, a pawl interposed between said members, said pawl having a cylindrical bearing portion thereon and one of said members having a cylindrical seat for said cylindrical bearing portion, the side of said pawl opposite said bearing portion having a curved bearing surface of greater radius than the distance between the pivot point of said pawl and said curved surface, a disk-like member having a driving connection with said pawl for shifting the latter, said disk-like member having a part extending to the outside of said housing for ready manual manipulation.

8. In a ratchet mechanism, a housing member, a turning head member therein and rotatable relatively thereto, a pawl interposed between said members, said pawl having a cylindrical bearing portion thereon and one of said members having a cylindrical seat for said cylindrical bearing portion, the side of said pawl opposite said bearing portion having a curved bearing surface of greater radius than the distance between the pivot point of said pawl and said curved surface, a disk-like member having a driving connection with said pawl for shifting the latter, said disk-like member having a peripheral flange at the outside of said housing and over a part of said housing for ready manual manipulation.

9. In a ratchet mechanism, a housing member, a turning head member therein and rotatable relatively thereto, a plurality of pawls interposed between said members, means for pivotally mounting said pawls on one of said members, the side of each said pawl opposite the pivotal mounting means having a curved bearing surface of greater radius than the distance from the pivot axis of each pawl to the curved bearing surface, means for coupling said pawls for simultaneous rocking movement about their pivot axes, and means accessible from the outside of said housing for actuating the coupling means to move said pawls, for the purpose described.

10. In a ratchet mechanism, a housing member, said housing member being in the form of a block having a cylindrical bore extending completely therethrough, a turning head member in said cylindrical bore, a plurality of pawls interposed between the turning head member and the surface of said cylindrical bore, means for pivotally mounting said pawls on said turning head for rocking movement thereon, the side of each said pawl opposite the pivotal mounting thereof having a curved bearing surface of greater radius than the distance from the pivot axis of each pawl to the curved surface thereof, means for holding said turning head and pawls in said cylindrical bore, means for coupling said pawls for simultaneous rocking movement, and means accessible from the outside of said housing for actuating the coupling means to rock said pawls, for the purpose described.

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