United States Patent [19]

Whiteford

[11] **3,742,787**

[45] **July 3, 1973**

[54] **REVERSIBLE DRIVE RATCHET HAND TOOL WITH SPHERICAL HANDLE**

[75] Inventor: **Carlton L. Whiteford,** Westport, Conn.

[73] Assignee: **Creative Tools, Inc.,** Bennington, Vt.

[22] Filed: **July 26, 1971**

[21] Appl. No.: **165,482**

[52] **U.S. Cl.** ..... **81/61,** 145/50 C, 145/61 C, 145/75

[51] **Int. Cl.** **B25b 13/46**

[58] **Field of Search** 81/61, 60; 145/50, 145/61, 75, 76

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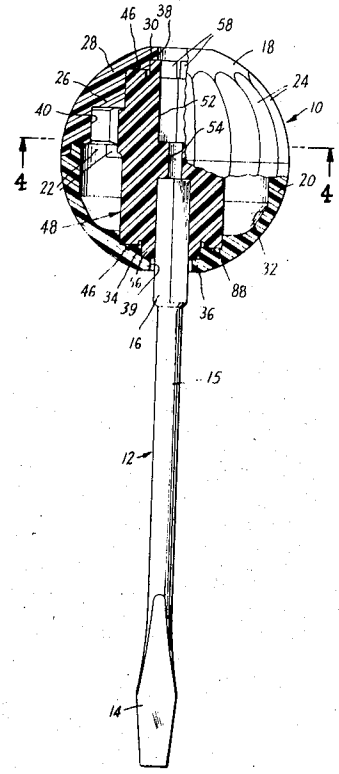
Primary Examiner—James L. Jones, Jr.
Attorney—Peter L. Costas

[57] **ABSTRACT**

A hand tool employs a generally spherical handle with a housing and a drive member seated therewithin for engagement of a tool member for positive drive action in one direction. One-way clutch means within the housing permits relative rotation of the drive member in a first direction and interengagement for joint movement in the direction opposite thereto. The tool member or bit may be engaged in either of two apertures extending inwardly from opposite ends of the drive member to enable reversal of the directions of free and joint movement, and the tool is comfortable and effective to employ by virtue of the configuration of its handle allowing the palm to seat it firmly for exerting the axial force on the tool member.

8 Claims, 13 Drawing Figures



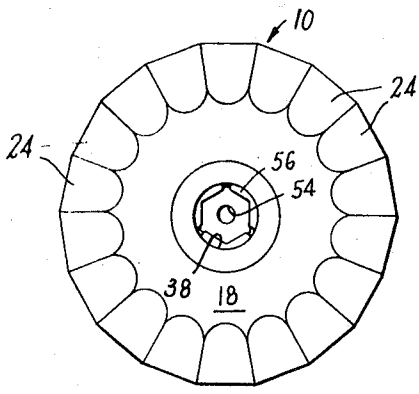


FIG. 2

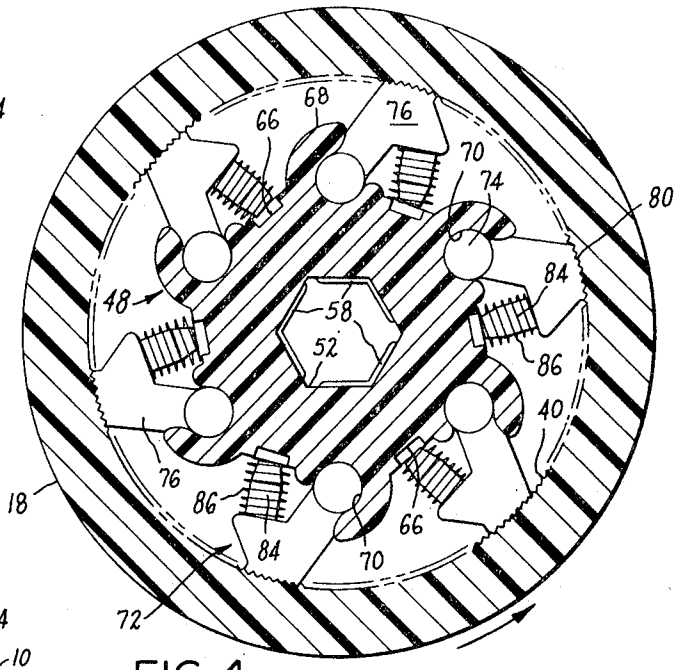


FIG. 4

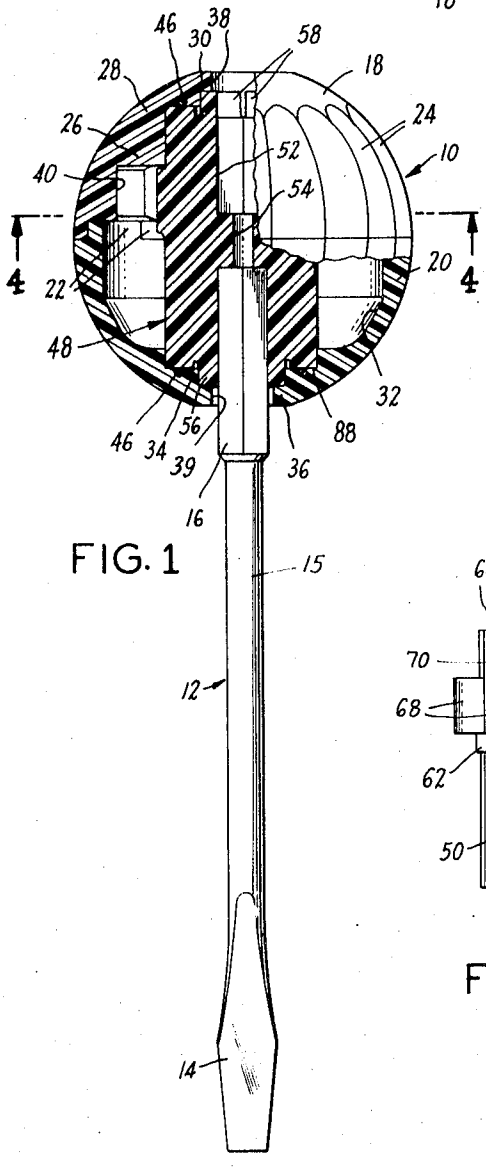


FIG. 1

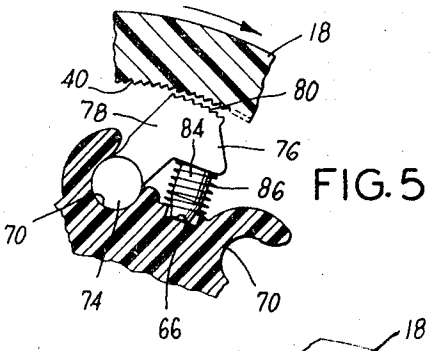


FIG. 5

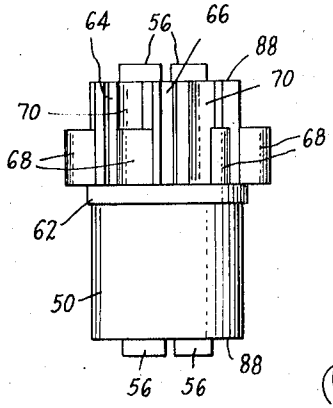


FIG. 3

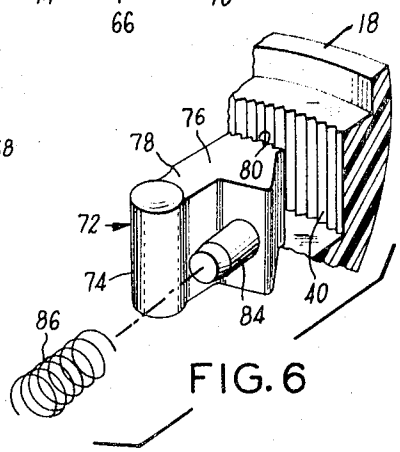


FIG. 6

Inventor
Carlton L. Whiteford

By Peter L. Costas

Attorney

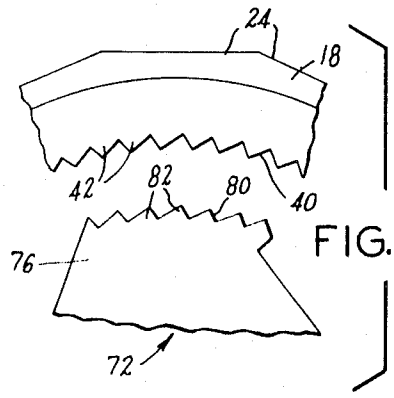


FIG. 7

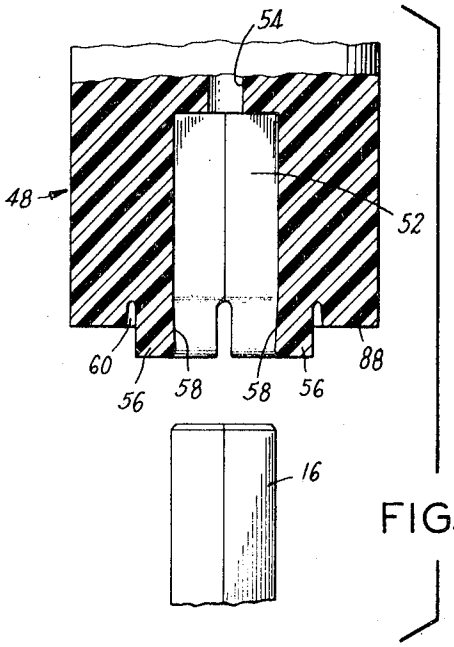


FIG. 8

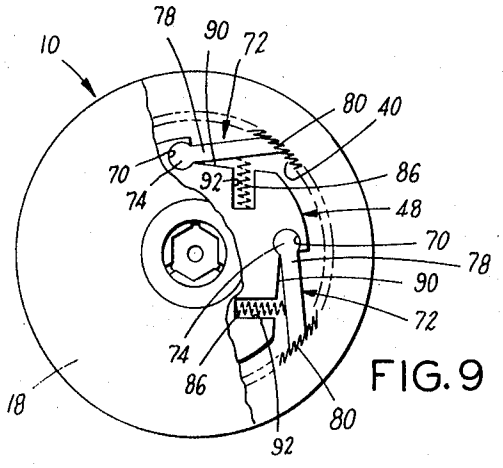


FIG. 9

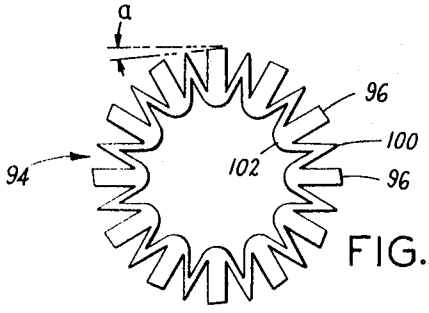


FIG. 11

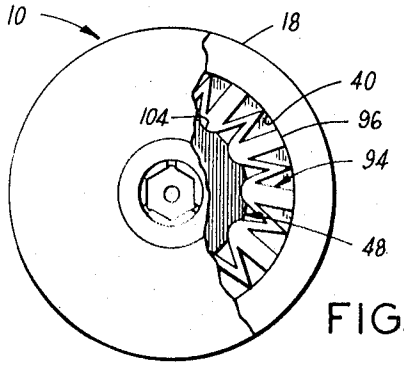


FIG. 10

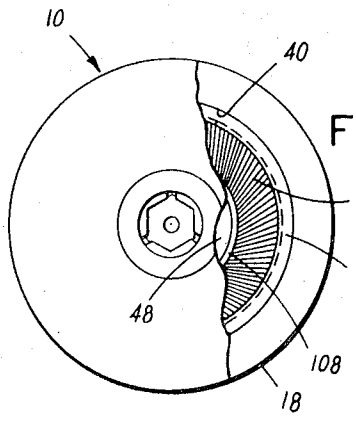
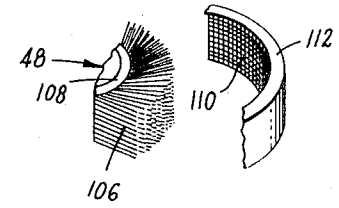


FIG. 12

FIG. 13



Inventor
Carlton L. Whiteford

By Peter L. Costas
Attorney

REVERSIBLE DRIVE RATCHET HAND TOOL WITH SPHERICAL HANDLE

BACKGROUND OF THE INVENTION

It is well known to incorporate one-way clutch mechanisms into hand tools having relatively rotatable parts, such as in screwdrivers, wrenches, twist drills, augers, taps, and the like, to render them operative in a single direction. Some tools employ direction-reversing mechanisms or means to lock a bidirectional clutch in order to permit use of the tool in both directions; in some instances the direction of effective operation may be reversed simply by disposing the tool bit within the tool in the opposite direction along the axis of rotation. Regardless of the directional control means employed, such prior art tools usually have a handle which is elongated either perpendicular to the axis of rotation of the bit or coaxially therewith.

In tools with perpendicular handles there is usually no means of applying axial force unless it is specifically designed for that purpose (e.g., as in the conventional brace and bit-type of tool); also, use where space is limited is frequently precluded. Tools with coaxial handles tend to be quite uncomfortable to grip, do not permit the applied forces to be utilized with maximum effectiveness, and often cause considerable frictional discomfort to the user, especially during prolonged usage.

Accordingly, it is the primary object of the present invention to provide a novel hand tool for driving a tool member which is comfortable to grip, which permits excellent application of the user's applied force, which is rotationally effective in one direction and which permits ready reversal of the tool member for driving in different directions.

It is also an object of the invention to provide such a tool which employs a handle assembly that is relatively inexpensive and facile to manufacture, and that may be permanently lubricated.

Another object is to provide a tool of the foregoing type having a housing which is relatively resistant to impact and chemcial attack, and which minimizes frictional discomfort upon the user's hand even during periods of prolonged usage.

SUMMARY OF THE INVENTION

It has now been found that the foregoing and related objects of the invention are readily attained in a reversible hand tool comprising a handle assembly including a generally spherical housing having an interior chamber and diametrically opposed passages thereinto, and a drive member seated within the chamber of the housing for rotation about the axis of the passages. The drive member has a tool member-engaging aperture axially aligned with and extending inwardly from each of the passages. The handle assembly also includes clutch means in the chamber of the housing engaging the drive member to prevent rotation thereof relative to the housing in one direction, while permitting free relative rotation in the opposite direction. The shank of a tool member extends through one of the passages and is engaged in the cooperating aperture of the drive member for turning in a first direction by the handle assembly. The tool member is removable from the "one" aperture for insertion of its shank through the other passage and into the other aperture of the drive member for turning thereof, by the handle assembly, in the direction opposite the first direction.

In the preferred embodiments of the invention, the drive member has an elongated, generally cylindrical body and is seated within the housing for rotation about the longitudinal axis thereof. In such a tool, the clutch means includes interengagable clutch elements on the drive member which are located about the circumference of the body thereof, and clutch elements on the housing within the chamber thereof. Most desirably, the clutch elements of the drive member comprise a multiplicity of pawls pivotably mounted at spaced locations about the body, and having free outer end portions that are engagable with the housing clutch elements. Each of the pawls extends from the pivot point thereof in the same direction and generally tangent to the body. The pawls are biased outwardly from the body to urge the free ends thereof into contact with the housing clutch elements, and the handle assembly has means restraining further movement of the pawls therebeyond. Upon movement of the housing in the direction of pawl extension, relative to the drive member, the clutch elements of the housing cam the pawls inwardly against the baising force acting thereon to permit free rotation. On the other hand, relative rotation in the reverse direction is prevented by abutting interengagement of the clutch element of the housing and drive member.

It is particularly preferred that the drive member of the tool have, adjacent each of the spaced locations about the body, a rigid finger extending outwardly therefrom and curved in the direction of pawl extension to define, in cooperation with the body and at each of the pivot points of the pawls, a circular socket having an opening thereinto adjacent the tip of the associated finger. Each of the pawls has at its inner end a generally circular knob dimensioned and configured for pivotable seating in one of the sockets, and a shank portion between the inner and outer ends thereof. The shank portion extends through the opening of the socket, and the finger tip is positioned to contact the shank portion to restrain the associated pawl against such further movement beyond the clutch elements of the housing.

The chamber of the housing may advantageously be circular in cross section along the plane of the diameter thereof perpendicualr to the axis of the passages, with the clutch elements thereof being provided by a circumferential toothed portion of the sidewall that defines the chamber therein. Ideally, the chamber of the housing is dimensioned and configured to provide a spacing about the intermediate portion of the drive member seated therewithin. A sealing element is provided between the portions of the drive member and the housing defining the aligned apertures and passages, respectively; the resulting sealed cavity contains a lubricant to provide a permanently sealed and lubricated unitary handle assembly.

In a particularly desirable embodiment of the invention, the clutch means comprises a multiplicity of clutch elements on the drive member and on the housing. The clutch elements on the drive member are provided by a unitary annular member mounted on the drive member and fabricated of a relatively resilient synthetic resinous material that exhibits substantial rigidity in relatively thick sections thereof. The annular member comprises a multiplicity of outwardly extending fingers of relatively thick section which have outer end portions adapted to engage the clutch surface of the housing. A multiplicity of relatively thin-sectioned

and resilient biasing elements are positioned between the fingers, and urge them toward a radially extending position. The drive member provides rigid radial support for the fingers, and the clutch surface of the housing comprises a circumferential surface portion thereof in the chamber and exposed for contact by the outer end portions of the fingers. The radial distance between the drive member and the clutch surface is slightly less than the length of the fingers, so that the fingers are canted in one direction by contact therewith.

Preferably, in such an embodiment, each of the fingers is of substantially rectangular cross section and has a beveled outer end to provide a relatively sharp leading edge thereon for engagement with the housing clutch elements. In addition, each of the biasing elements is of substantially V-shaped configuration and is disposed with the apex thereof outwardly directed and with each of its spaced ends joined to the base of the adjacent finger. The drive member has a multiplicity of surface recesses thereon, and the base of each of the fingers is seated in one of the surface recesses for limited pivotal movement therein. Most desirably, the annular member is an integrally formed polyolefin extrusion.

The spherical housing of the tool is desirably fabricated of a synthetic resinous material having a high level of impact resistance, and a glass fiber reinforced polycarbonate resin is a particularly good material for that purpose. Preferably, the exterior of the housing is configured with a multiplicity of axially extending surface flats, spaced about the circumference of the diametrical plane that is perpendicular to the axis of the passages thereinto; this enhances the grip and also prevents undesirable rolling of the tool on flat surfaces. In addition, the exterior surfaces of the handle about the passages should be relatively smooth to enhance the comfort of the grip thereon. In most instances, the apertures of the drive member will be of polygonal cross section, and will extend only partially thereinto to provide an internal shoulder therebetween for abutment of the tool member. In such a construction, the shoulder may have a passageway therethrough interconnecting the apertures and the shank of the tool member will be of similar polygonal cross section for cooperative interengagement therein. Preferably, the apertures are of reduced cross section adjacent the outer ends thereof and are defined by a multiplicity of resiliently deformable elements, the elements frictionally engaging the shank of the tool member in the apertures of the drive member.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an elevational view of a hand tool embodying the present invention with the handle assembly in partial section to illustrate the internal construction thereof;

FIG. **2** is a plan view of the tool of FIG. **1**;

FIG. **3** is an elevational view of the drive member employed in the handle assembly thereof;

FIG. **4** is a sectional view along line **4—4** of FIG. **1** drawn to an enlarged scale with the clutch elements interengaged to prevent relative rotation of the housing and drive member in a counterclockwise direction;

FIG. **5** is a fragmentary sectional view of a circumferential portion of the assembly of FIG. **4**, drawn to the same scale and with the pawl inwardly biased to permit relative rotation in a clockwise direction;

FIG. **6** is a fragmentary exploded perspective view of a portion of the tool illustrated in FIGS. **4** and **5** and drawn to a scale slightly enlarged therefrom;

FIG. **7** is a fragmentary plan view of the toothed portions of a pawl and of a section of the sidewall of the housing base cooperating therewith, with the parts separated and drawn to a scale greatly enlarged from that of FIG. **1**;

FIG. **8** is an exploded fragmentary view of the bit and drive member employed in the tool of FIG. **1**, drawn to a greatly enlarged scale and with the drive member in partial section to show the reduced dimensions of the aperture at the free ends of the gripping fingers thereof;

FIG. **9** is a plan view of a handle assembly employing another embodiment of clutch mechanism and with a portion of the housing broken away from the exposure thereof;

FIG. **10** is a view similar to FIG. **9** illustrating still another embodiment of clutch mechanism;

FIG. **11** is a plan view of the integrally formed unitary clutch element employed in the handle assembly of FIG. **10**;

FIG. **12** is another view similar to FIG. **9**, illustrating a further embodiment of clutch mechanism; and

FIG. **13** is an exploded, fragmentary perspective view of the clutch elements employed in the embodiment of FIG. **12**.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

Turning now in detail to FIGS. **1–8** of the appended drawings, therein illustrated is a hand tool embodying the present invention and consisting of a unitary handle assembly, generally designated by the numeral **10**, and a screwdriver tool bit, generally designated by the numeral **12**. The bit **12** has a blade portion **14** at one end and a shank **15** with a hexagonal cross section portion **16** at the opposite end for engagement within the handle assembly **10**.

The housing of the handle assembly **10** is comprised of a hemispherical base or clutch section **18** and a complementary interfitting hemispherical cover section **20**, which are interengaged against relative rotation by intermeshing finger portions **22** cooperatively spaced about the inner faces thereof and extending axially toward one another. Extending perpendicularly to the plane of their opposed inner faces, the sections **18, 20** have diametrically opposed passages **38, 39** extending inwardly from the outer surfaces thereof and into which the hexagonal cross section portion **16** of the tool bit **12** may be inserted. Spaced about the circumference of the sections **18, 20** and extending across the intersection thereof in the same direction as the passages **38, 39** are a multiplicity of shallow, but relatively wide, recesses **24** which provide a series of ribs and hollows to minimize the tendency for the tool to roll when placed upon a planar surface, and facilitate finger gripping of the circumference during use. The exterior surface of the sections **18, 20** about the passages **38, 39** are smooth and uniform to minimize abrasive action on the hand of the user during operation.

As best seen in FIG. **1**, the base **18** has a stepped, hollow interior configuration comprised of a series of concentric circular steps **26, 28, 30** which are of progressively smaller diameter inwardly from the inner face of the passage **38**. The cover **20** also has a stepped, hollow interior configuration including a relatively large diam-

eter well 32, at its inner face and similar concentric steps 34, 36 adjacent the passage 39. As seen in FIG. 2, the steps 28 and 34, and the steps 30 and 36 are of substantially equal diameter to provide axially aligned shoulders or riser portions and aligned opposed flats or tread portions. In the flats of the steps 28, 34 of the base and cover respectively are opposed circular grooves, in which are seated sealing elements 46 of the O-ring type.

A drive member generally designated by the numeral 48 is of generally circular cross section and has a generally cylindrical body portion 50 formed from relatively resiliently deformable material, with recesses or apertures 52 of generally hexagonal cross section extending axially inwardly from each end thereof and coaxially with respect to the passages 38, 39. The apertures 52 are interconnected by a short passageway 54 of reduced diameter, thus providing shoulders or abutment surfaces at the inner ends of the apertures 52.

Projecting axially outwardly from each end of the body 50 and spaced about the apertures 52 are three fingers 56 which cooperate to provide gripping means for the tool bit 12 when it is inserted thereinto. As best seen in FIG. 1, the fingers 56 seat on the steps 30, 36 of the sections 18, 20 and the radial surfaces of the ends of the body 50 thereabout seat on the radial portions of the steps 28, 34. The circumferential portion of the body 50 is snugly received at one end on the axial portion of the step 26 of the section 18 and at the other end on the axial portion of the step 34. As best seen in FIG. 8, the fingers 56 provide a portion of the apertures 52 and their inner surfaces 58 taper inwardly from the base thereof to provide entrances of diminished cross section. About the base of the fingers 56 are circular channels 60 in the end surfaces of the body 50, which channels increase the effective length of the fingers 56 and enhance their flexibility. As a result, the fingers 56 may flex outwardly upon insertion of the shank 16 of the tool bit 12 into the apertures 52, and their inherent resiliency will then cause them to bear upon the surfaces of the shank 16 to retain it securely against inadvertent dissassembly. This construction simply effects the retention customarily provided for such interchangeable tool bit assemblies by ball and detent type mechanisms.

Extending radially outwardly about the circumference of the body 50 intermediate the ends thereof is an integrally formed collar 62. Extending axially in the outer surface of the body 50 from the collar 62 to the end thereof disposed in the clutch section 18 are a multiplicity of channels or flutes 64 of arcuate cross section alternating with a multiplicity of grooves 66 of rectangular cross section. Integrally formed on the circumference of the body 50 between the flutes 64 and grooves 66 are a multiplicity of generally radially outwardly projecting and axially extending fingers which are of arcuate cross section and which curve in the same direction of the adjacent flute 64 so as to partially overlie the flute 64 to define therewith a generally circular recess 70.

As best seen in FIGS. 5–7, the entire circumference of the sidewall portion 40 of the base 18 adjacent the step 26 is formed with a multiplicity of teeth 42 which extend generally axially of the passages 38, 39 and which are canted in one direction so that their apices are offset with respect to the centers of their roots. These teeth 42 serve as clutch elements, as will be pointed out more fully hereinafter.

Mounted on the body 50 of the drive member 48 are a multiplicity of pawls generally designated by the numeral 72, which have a generally circular knob 74 at one end seated in one of the recesses 70 for limited pivotal movement therein. Extending from the knob 74 outwardly of the recesses 70 is an intermediate arm portion 78 which terminates in an offset engagement portion 76 at the outer end thereof. The engagement portion 76 of each of the pawls 72 has a toothed surface 80 provided by a multiplicity of teeth 82 which are canted for complementary engagement with the teeth 42 of the sidewall portion 40 of the base 18; the surface 80 extends arcuately circumferentially of the body member 50 and the axis of the intermediate arm portion 78 extends secantally with respect thereto. A short stud 84 projects at an acute angle to the intermediate arm portion 78 from the rear of the engagement portion 76 and has a coil spring 76 seated thereupon. In assembly, the ends of the springs 86 bear upon the body 50 of the drive member 48 with the opposite ends thereof bearing upon the rear of the engagement portion 76 of the pawls 72, forcing the pawls 72 away from the drive member 48 and urging the toothed portions 80 thereof into contact with the sidewall portion 40 of the base 18.

From the foregoing description, it is believed that the assembly and operation of the tool depicted will be evident; as is shown in FIG. 1, the drive member 48 is assembled with the base 18 and cover 20 with its hexagonal apertures 52 in registry with the diametrically opposed passages 38 thereof and with the O-rings 46 sealingly bearing against the end surfaces 88 of the body 50. The well 32 of the cover 20 may then be filled with a lubricant, and the base 18 joined therewith (in the manner previously described) preferably using an adhesive or an appropriate heat or vapor bonding technique to seal the joints therebetween and to permanently secure the assembly. This produces a factory-sealed, self-lubricating handle assembly 10 which affords efficient and relatively quiet operation for the life of the tool.

As will be appreciated, rotation of the housing of the handle assembly 10 in the direction of the arrow in FIG. 5 causes the toothed sidewall surface portion 40 of the base 18 thereof to cam the pawls 72 inwardly against the force of the coil springs 86 (assuming that there is some resistance to rotation of the drive member 48); this permits substantially unimpeded relative rotation between the housing (i.e., the base 18 and cover 20) and the drive member 48.

Rotation of the handle assembly 10 in the opposite direction (i.e., in the direction of the arrow in FIG. 4) causes the facing surfaces of the teeth 42, 82 on the base 18 and the pawls 72, respectively, to abut against one another. Because pivotal movement of the pawls outwardly of the body 50 is restrained (both by virtue of the limited clearance with the sidewall portion 40 of the base 18, and also because of contact of the free ends of the fingers 68 against the rear of the intermediate arm 78 of the pawls 72), the bit 12 will be forced to rotate along with the handle assembly 10. In this manner, a screwdriver bit, for example, may be used to seat or remove a screw by short, twisting movements, of the hand in the plane of the forearm. This enables considerable pressure to be applied while minimizing

strain on the user's arm and hand, and thereby minimizes fatigue during extended periods of use.

It will be evident that removal of the bit **12** to the opposite hexagonal aperture **52** reverses the relationships herein described and permits one-way movement only in the opposite direction.

In the embodiments illustrated in FIGS. **9–13**, the same numbers that were previously used are employed to designate analogous structure. FIG. **9** depicts a handle assembly **10** which also employs a multiplicity of pawls **72** having surfaces **80** that are adapted to engage (in only one direction) with the surface portion **40** of the base **18** thereof. However, primarily by virtue of the design of the drive member **48** and pawls **72**, this structure is somewhat simpler than that illustrated in the preceeding figures. The pawls **72** are substantially rectilinear and have a knob portion **74** at one end seated in a generally circular recess **70** of the drive member **48**. The surface of the drive member **48** is provided with axially extending secantally disposed recesses **90** to accommodate the pawls **72**, and it has a multiplicity of bores **92** extending inwardly from the recesses **90** in which coil springs **86** are seated. The springs **86** bear upon the intermediate portions **78** of the pawls **72** to promote contact between the surfaces **40, 80**, and operation is substantially as has hereinbefore been described.

In FIGS. **10** and **11**, a further embodiment of the invention is illustrated wherein the handle assembly **10** employs a unitary member which has a complex, generally annular cross section and generally designated by the numeral **94**, to provide clutch elements on the drive member **48**. The annular member **94** is fabricated of a relatively resilient synthetic resinous material and includes a multiplicity of axially extending, normally radially projecting fingers **96**, which are of relatively thick cross section and therefore are relatively rigid. The fingers **96** are of substantially rectangular cross section and have slightly beveled outer end surfaces **98** to provide a relatively sharp leading edge thereon (the exaggerated angle *a* represents about a 5° deviation from "square"). Between each pair of adjacent fingers **96** is provided a biasing element **100** of substantially V-shaped cross section. The biasing elements **100** are disposed with their apices directed radially outwardly and with their spaced ends joined to the bases **102** of adjacent fingers **96**. Since the V-shaped biasing elements **100** are of relatively thin section, they are relatively resilient and tend to urge the fingers **96** to radial positions.

As is seen in FIG. **10**, the annular member **94** is used in combination with a drive member **48** which is provided with a multiplicity of axially extending recesses **104** on its circumferential surface; the base **102** of each of the fingers **96** is seated in one of the recesses **104** and is capable of limited pivotal movement therein. In this embodiment, the base **18** of the handle assembly **10** has a smooth inner circumferential surface portion **40**, which is so dimensioned that the spacing between it and the drive member **48** is less than the length of the fingers **96**. As a result, it is necessary to cant the fingers **96** slightly to enable assembly of the annular member **94** with the base **18** and the drive member **48**. It will be appreciated that canting of the fingers **96** in one direction, consistent with the direction of bevel of the surfaces **98** thereon, permits relatively free rotation of the handle about the drive member **48** in the direction of canting, and that movement in the reverse direction will cause the relatively sharp edges of the beveled surfaces **98** to engage on the circumferential surface portion **40** of the base **18** to restrain relative rotation. The circumferential surface portion **40** may be roughened or provided with teeth or other means to enhance the security of interengagement of the fingers **96** thereon in the drive direction.

Finally, with reference to FIGS. **12** and **13**, a fiber clutch mechanism is depicted and employs a drive facing of the type presently available from 3M Company under the Trademark FIBRE-TRAN. In this embodiment, the drive facing consists of numerous short, strong fibers **106** which are bonded to the base **108** and are canted or disposed outwardly therefrom in one direction so as to extend secantally. The base **108** of the drive facing is in turn bonded to the drive member **48** by appropriate means, such as an adhesive. To cooperate therewith, a screen **110** on a suitable backing **112** is secured to a circumferential surface portion **40** of the base **18** of the handle assembly **10**.

As will be apparent, relative rotation opposite to the direction in which the fibers **106** are canted will be impeded by engagement of the fibers **106** in the openings of the screen **110**, whereas rotation in the reverse direction will be relatively free. In addition to the simplicity of manufacture which the handle assemblies illustrated in FIGS. **10** and **11** and **12** and **13** enable, these types of mechanisms also provide a desirable "override" feature; thus, the characteristics of the various elements may be chosen so as to limit to preselected values the levels of torque that can be resisted in the drive direction, as is most advantageous in certain applications.

The materials from which the various parts of the hand tool are fabricated may be selected to achieve an optimum balance of strength, impact and chemical resistance, durability and flexibility, consistent with reasonable expense and facility of manufacture. Although the tool bit will generally be made of metal, and parts of the handle assembly may be of metallic construction, most desirably the handle assembly will be fabricated largely or entirely from synthetic resinous materials since such polymers often afford a most desirable combination of characteristics. Appropriate polymers for the several parts of the tool will be apparent to those skilled in the art; however, the following listing of common polymers is exemplary of those that may be employed advantageously and it will be appreciated that in some instances the resins may be filled with glass fibers or otherwise reinforced to achieve optimal properties: the polycarbonates, the long-chain polyamides, the polyesters (e.g., the polyethylene terephthalate resins), the polyolefins (e.g., polyethylene, polypropylene, etc.) the vinyl and vinylidene resins (e.g., polystyrene, polyvinylchloride, styrene/acrylonitrile copolymers, high impact polystyrene, acrylonitrile/butadiene/styrene graft copolymers, etc), the fluoroplastics (e.g., polytetrafluoroethylene, polychlorotrifluoroethylene, polyvinylidene fluoride,) and the like.

Thus, it can be seen that the present invention provides a novel hand tool for driving a tool member, which is comfortable to grip, which permits excellent application of the user's applied force, which is rotationally effective in one direction, and which permits ready reversal of the tool member for driving in different directions. The handle assembly of the tool is rela-

tively inexpensive and facile to manufacture, and it may be permanently lubricated to provide a long useful life. The housing may be relatively resistant to impact and chemical attack and may minimize frictional discomfort upon the user's hand even during periods of prolonged use.

Having thus described the invention, I claim:

1. A reversible hand tool comprising a handle assembly including a generally spherical housing having an interior chamber and diametrically opposed passages thereinto, a drive member seated within said chamber of said housing for rotation therein about the axis of said passages and having a tool-member engaging aperture axially aligned with and extending inwardly from each of said passages, said generally spherical housing having a substantially spherical configuration except at said passages; clutch means in said chamber engaging said drive member to prevent rotation thereof relative to said housing in one direction and permitting free relative rotation in the opposite direction; and a tool member having a shank extending through one of said passages and engaged in the cooperating aperture of said drive member for turning in a first direction by said handle assembly, said tool member being removable from said one aperture for insertion of said shank through the other of said passages and into the other aperture of the drive member for turning thereof by said handle assembly in the direction opposite said first direction, said spherical configuration of said housing permitting comfortable gripping thereof by fingers of the user and direct application of force to the portion thereof opposite that seating said tool member.

2. The tool of claim **1** wherein said drive member has an elongated generally cylindrical body and is seated within said housing for rotation about the longitudinal axis thereof and wherein said clutch means includes interengagable clutch members on said drive member located about the circumference of said body and cooperating clutch elements on said housing within said chamber thereof, said clutch elements of said drive member comprising a multiplicity of pawls pivotably mounted at spaced locations about said body and having free outer end portions that are engagable with said housing clutch elements, each of said pawls extending from the pivot point thereof in the same direction and generally tangent to said body, said clutch elements of said drive assembly including means biasing said pawls outwardly from said body to urge said free ends into contact with said housing clutch elements and said handle assembly having means restraining further movement of said pawls therebeyond, so that upon movement of said housing relative to said drive member in said same direction said clutch elements of said housing cam said pawls inwardly against the biasing force acting thereon to permit said free rotation, and so that relative rotation in said one direction is prevented by abutting interengagement of said clutch elements of said housing and drive member.

3. The tool of claim **2** wherein said drive member has adjacent each of said spaced locations about said body a rigid finger extending outwardly therefrom and curved in said same direction to define in cooperation with said body and at each of said pivot points, a circular socket having an opening thereinto adjacent the tip of said finger, and wherein each of said pawls has at its inner end a generally circular knob dimensioned and configured for pivotable seating in one of said sockets and a shank portion between said inner and outer ends thereof, said shank portion extending through said opening of said socket with said finger tip being positioned for contact therewith to restrain said pawl against said further movement beyond said clutch elements of said housing.

4. The tool of claim **1** wherein said chamber of said housing is circular in cross section along the plane of the diameter of the housing perpendicular to the axis of said passages, and wherein clutch elements are provided by a circumferential, toothed portion of the sidewall of said housing defining said chamber and cooperate with clutch elements on said drive member located about the circumference of said body for interengagement therewith, and wherein said chamber of said housing is dimensioned and configured to provide spacing about the intermediate portion of said drive member seated therewithin, wherein a sealing element is provided between the portions of said drive member and said housing defining said aligned apertures and passages, respectively, to seal said cavity, and wherein said cavity additionally contains a lubricant, thereby providing a permanently sealed and lubricated unitary handle assembly.

5. The tool of claim **1** wherein said clutch means comprises clutch elements on said drive member and a clutch surface on said housing, said clutch elements being provided by a unitary annular member mounted on said drive member and fabricated of a relatively resilient synthetic resinous material that exhibits substantial rigidity in relatively thick sections thereof, said annular member comprising a multiplicity of outwardly extending fingers of relatively thick section having outer end portions adapted to engage said clutch surface of said housing and a multiplicity of relatively thin sectioned and resilient biasing elements positioned between said fingers and urging each of said fingers toward a radially extending position, wherein said drive member provides rigid radial support for said fingers, and wherein said clutch surface comprises a circumferential surface portion of said housing in said chamber and exposed for contact by said outer end portions of said fingers, the radial distance between said drive member and said clutch surface being slightly less than the length of said fingers, causing said fingers to be canted in said one direction by contact therewith.

6. The tool of claim **5** wherein each of said fingers is of substantially rectangular cross section and has a beveled outer end to provide a relatively sharp leading edge thereon for engagement with said housing clutch elements, wherein each of said biasing elements is of substantially V-shaped configuration and is disposed with the apex thereof outwardly directed and with each of its spaced ends joined to the base of the adjacent finger; and wherein said drive member has a multiplicity of surface recesses thereon, said base of each of said fingers being seated in one of said surface recesses for limited pivotal movement therein.

7. The tool of claim **1** wherein the exterior of said housing is configured with a multiplicity of axially extending surface flats spaced about the circumference of the diametrical plane perpendicular to the axis of said passages thereinto, and wherein the exterior surfaces thereof about said passages are relatively smooth to enhance the comfort of the grip thereon.

8. The tool of claim **1** wherein said apertures of said drive member are of polygonal cross section and ex-

tend only partially thereinto to provide an internal shoulder therebetween for abutment of said tool member, said shoulder having a passageway therethrough interconnecting said apertures, and said shank of said tool member being of similar polygonal cross section for cooperative interengagement thereof and wherein said apertures are of reduced cross section adjacent the outer ends thereof and are defined by a multiplicity of resiliently deformable elements, said elements frictionally engaging said shank of said tool member in said one aperture thereof.

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