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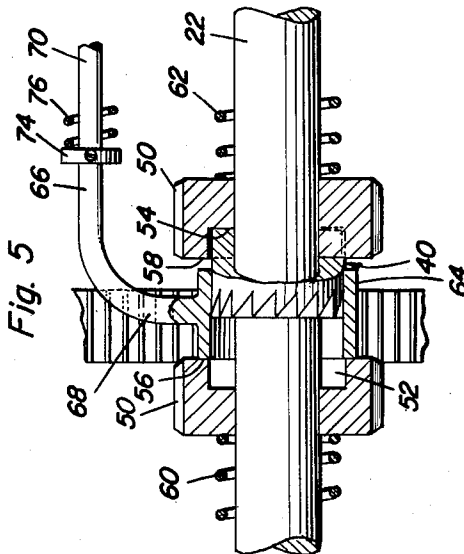
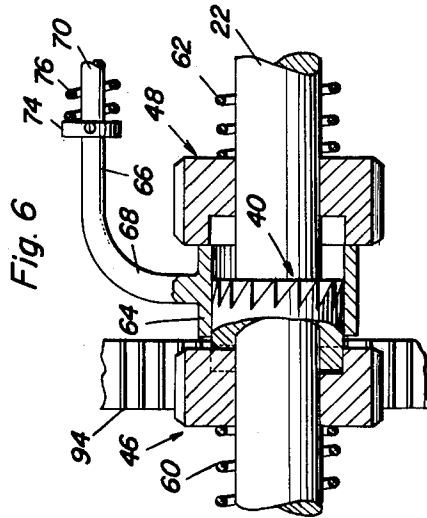
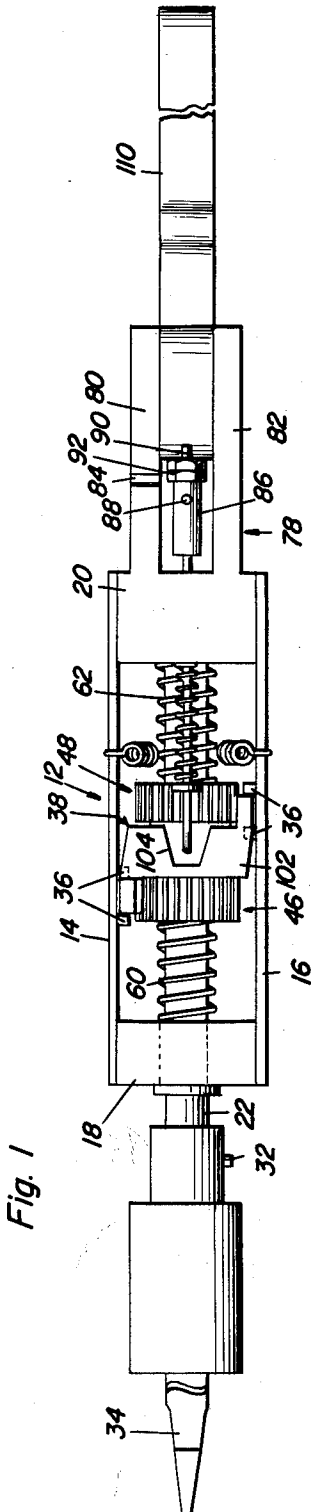
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RATCHET DRIVE MECHANISM

Filed Aug. 4, 1961

3 Sheets-Sheet 1



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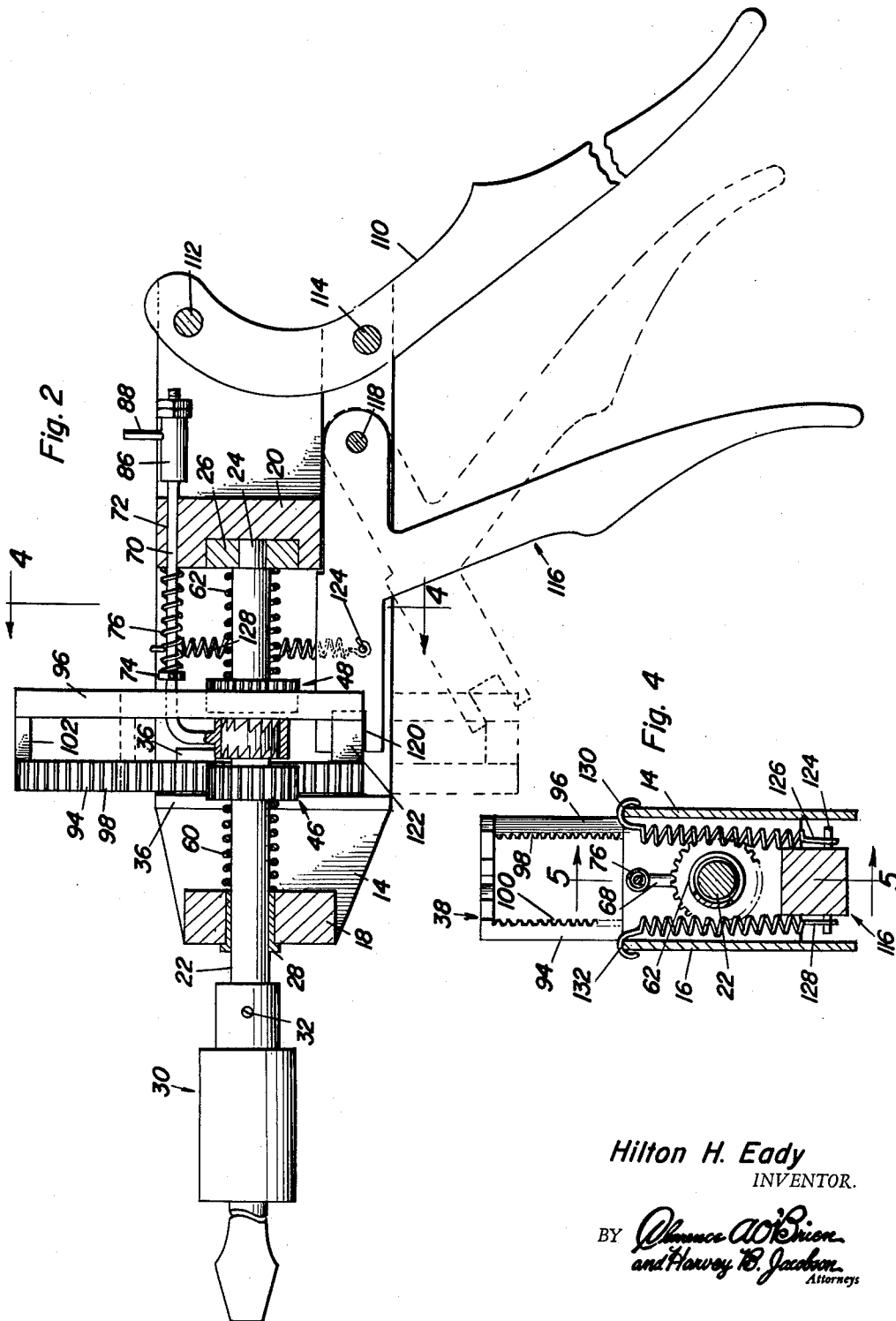
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RATCHET DRIVE MECHANISM

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3 Sheets-Sheet 2



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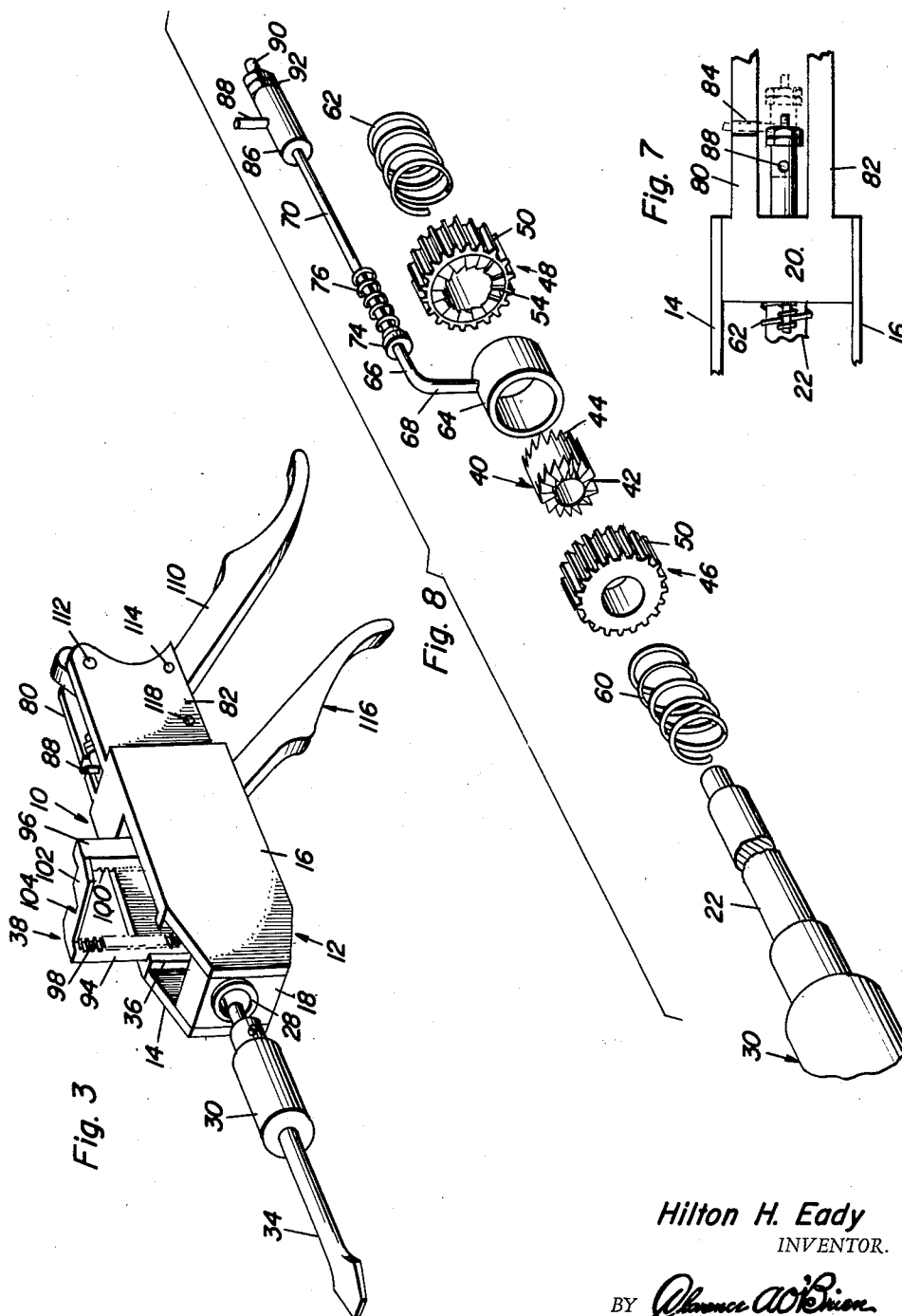
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RATCHET DRIVE MECHANISM

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3 Sheets-Sheet 3



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RATCHET DRIVE MECHANISM

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7 Claims. (Cl. 74-130)

This invention relates to a novel and useful pistol grip ratchet type drive and more specifically to a piston grip type tool including a rotatably mounted drive shaft and means for effecting rotation of the drive shaft in selected directions of rotation. The ratchet type drive includes a housing in which the drive shaft is rotatably mounted and one end of the housing is provided with a laterally directed handle portion. The means for effecting rotation of the drive shaft includes an actuator and the actuator comprises a lever arm which projects laterally to the same side of the housing to which the handle portion projects and which is pivotally secured to the handle at its inner end and operatively connected to the drive shaft of the ratchet type drive. The lever arm generally parallels the laterally directed handle portion and is disposed in close proximity to the handle portion whereby both the handle portion and the lever arm may be gripped by the hand of a user in order that the user of the ratchet type drive may encircle the lever arm and the handle portion by closing his hand about both the lever arm and the handle portion. The drive means operatively connecting the lever arm with the drive shaft includes means for establishing a ratchet drive connection with the drive shaft whereby if a screw being turned by the drive shaft becomes hard to turn, the user of the ratchet type drive may grasp both the lever arm and handle portion and oscillate the two about the longitudinal axis of the drive shaft whereby the oscillatory movement of the housing of the ratchet type drive will intermittently rotate the drive shaft relative to the housing in the desired direction.

The main object of this invention is to provide a pistol grip ratchet type drive tool which may be conveniently used as a ratchet type screwdriver or the like and to rotate screw type fasteners selectively in either direction merely by the user of the tool opening and closing his hand which encircles the lever arm and handle portion of the tool.

A further object of this invention, in accordance with the immediately preceding object, is to provide a means whereby the entire tool may be oscillated about the longitudinal axis of the drive shaft of the tool by means of the laterally directed lever arm and handle portion in order that considerable leverage may be applied to intermittently rotate the drive shaft of the tool relative to its housing.

Still another object of this invention is to provide a pistol grip ratchet type tool which will lend itself to be used in connection with various types of rotating work-engaging tools.

A final object to be specifically enumerated herein is to provide a pistol grip ratchet type drive in accordance with the preceding objects which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a top plan view of the pistol grip ratchet type drive;

FIGURE 2 is a longitudinal vertical sectional view

taken substantially upon a plane passing through the longitudinal centerline of the ratchet type drive;

FIGURE 3 is a perspective view of the ratchet type drive shown with a screwdriver blade operatively connected to the quick change chuck carried by the drive shaft of the ratchet type drive;

FIGURE 4 is a transverse vertical sectional view taken substantially upon a plane indicated by the section line 4-4 of FIGURE 2;

FIGURES 5 and 6 are fragmentary enlarged vertical sectional views taken substantially upon a plane passing through the longitudinal centerline of the ratchet type drive and showing the manner in which the rack gear may be utilized to rotate the drive shaft selectively in opposite directions;

FIGURE 7 is a fragmentary enlarged top plan view of a rear portion of the ratchet type drive showing the manner in which the drive may be adjusted to rotate the drive shaft thereof in opposite directions; and

FIGURE 8 is an exploded perspective view of the component parts of the ratcheting mechanism of the ratchet type drive.

Referring now more specifically to the drawings the numeral 10 generally designates the pistol grip ratchet type drive tool of the instant invention. The tool 10 includes a housing generally referred to by the reference numeral 12 and it may be seen from FIGURES 1 and 2 of the drawings that the housing 12 includes a pair of opposite side walls 14 and 16 which are interconnected at the front and rear ends of the tool 10 by means of a front wall 18 comprising a journal support and a rear wall 20 which also comprises a journal support.

The side walls 14 and 16 may be secured to the front and rear walls 18 and 20 in any convenient manner or the housing 12 may be of one piece construction.

The diametrically reduced rear end portion 24 of a drive shaft 22 is rotatably journaled in a bearing 26 secured in the rear wall 20. The forward end portion of the drive shaft 22 is rotatably journaled in a sleeve 28 secured through the front wall 18. The forward terminal end of the drive shaft 22 has a quick change chuck assembly generally referred to by the reference numeral 30 secured thereto by means of pin 32 and the chuck assembly 30 may be utilized to mount a plurality of work-engaging tools such as screwdriver blade 34 on the drive shaft 22 for rotation therewith.

With attention now directed to FIGURES 1 and 2 of the drawings, it may be seen that each of the side walls 14 and 16 is provided with a pair of longitudinally spaced and vertically extending inwardly projecting ribs 36.

A generally U-shaped rack member referred to in general by the reference numeral 38 has its opposite leg portions slidably received between the pairs of ribs 36 whereby the rack member 38 is mounted for vertical reciprocatory movement in the housing 12 at right angles to the longitudinal axis of the drive shaft 22.

The drive shaft 22 has a driven member generally referred to by the reference numeral 40 mounted thereon and for rotation with the drive shaft 22. The driven member 40 comprises a ratchet gear having ratchet teeth 42 and 44 formed on opposite end faces thereof and it will be noted that the ratchet teeth 42 and 44 open in opposite directions of rotation of the shaft 22.

A pair of drive members generally referred to by the reference numerals 46 and 48 are rotatably and slidably received on the shaft 22 on opposite sides of the ratchet gear 40. Each of the drive members 46 and 48 comprises a drive wheel having peripheral gear teeth 50. The adjacent end faces of the drive wheels 46 and 48 are provided with ratchet teeth 52 and 54 respectively and it will be noted that the outer peripheral portions of the adjacent

end faces of the drive wheels 46 and 48 include outer annular abutment faces 56 and 58.

A compression spring 60 is disposed between the confronting surfaces of the forward wall 18 and the drive member 46 and normally resiliently urges the drive member 46 into ratcheting driving engagement with the teeth 42 of the driven member 40. Additionally, a compression spring 62 is disposed about the shaft 22 and between the confronting surfaces of the rear wall 20 and the drive member 48 and normally resiliently urges the drive member 48 into ratcheting driving engagement with the teeth 44 of the driven member 40. However, control means in the form of a sleeve member 64 rotatably receives the driven member 40 and is mounted for reciprocal movement longitudinally of the shaft 22 by means of an L-shaped support rod 66. The L-shaped support rod 66 includes an upstanding leg 68 whose lower end is secured to the sleeve 64 in any convenient manner and a rearwardly extending horizontal leg 70 which is slidably received in the bore 72 formed in the rear wall 20. The upper and forward ends of the legs 68 and 70 are joined together in any convenient manner and a stop member 74 is carried by the leg 70. A compression spring 76 is disposed between the confronting surfaces of the stop member 74 and the rear wall 20. In this manner, the sleeve 64 may be reciprocated longitudinally of the shaft 22 in order to move a selected one of the driving members 46 and 48 out of engagement with the driven member 40.

It will be noted that the rear wall 20 includes a bifurcated portion 78 between whose furcations 80 and 82 the rear end of the leg 70 extends. The upper surface of the furcation 80 has an upwardly opening and transversely extending notch 84 formed therein and an adjustable stop member 86 is carried by the rear end of the leg 70 and includes a laterally directed stop finger engageable in the slot 84 in order to retain the sleeve 64 in a rearmost position maintaining the drive member 48 out of engagement with the driven member 40. It will be noted that the adjustable stop member 86 is rotatably carried by the leg 70 and that the rear end of the leg 70 is externally threaded as at 90 and has at least one adjusting nut 92 threadedly engaged therewith in order to limit rearward movement of the adjustable stop member 86 along the leg 70.

The inner faces of the legs 94 and 96 of the rack member 38 include rack gear teeth 98 and 100 respectively and these rack teeth are engaged with the teeth 50 formed about the outer periphery of the drive members 46 and 48 respectively. The bight portion 102 of the rack member 38 is provided with a rearwardly opening notch 104 for receiving the leg 68 when the rack member 38 is disposed in its lowermost position and from FIGURE 4 of the drawings it may be seen that the legs 94 and 96 and the rack teeth 98 and 100, by their engagement with the gear teeth 50 on the outer periphery of the drive members 46 and 48 guidingly support the rack member 38 for reciprocal movement at right angles to the longitudinal axis of the shaft 22.

It will be noted that the legs 94 and 96 of the rack member 38 are spaced longitudinally of the shaft 22 in order that the leg 94 may be operatively engaged with the drive member 46 and the leg 96 may be drivingly connected to the drive member 48.

With attention now directed to FIGURE 2 of the drawings it will be seen that a laterally directed handle portion 110 is secured between the furcations 80 and 82 by means of fasteners 112 and 114 and also that the handle portion 110 projects below the housing 12.

A lever arm generally referred to by the reference numeral 116 is pivotally secured at its inner end by means of pivot fastener 118 between the furcations 80 and 82 and is also provided with a slot 120 in which a laterally projecting lug 122 carried by the rack member 38 is held captive. Accordingly, a pin and slot connection is es-

tablished between the lever arm 116 and the rack member 38 whereupon oscillatory movement of the lever arm 116 will effect reciprocatory movement of the rack member 38.

A retaining pin 124 is secured through and projects from opposite sides of the inner end of the lever arm 116 and the lower ends of a pair of expansion springs 126 and 128 are secured to the opposite ends of the retaining pin 124. The upper ends of the expansion springs 126 and 128 are engaged over the upper surfaces of the side walls 14 and 16 respectively as at 130 and 132. In this manner, the expansion springs 130 and 132 tend to return the lever arm 116 to the position illustrated in solid lines in FIGURE 2 of the drawings with the rack member 38 disposed in an uppermost position.

It will be observed that the legs 94 and 96 are in constant driving engagement with the driving members 46 and 48 respectively and that the sleeve 64 is merely utilized to urge the selected drive member far enough away from the driven member 40 in order to disengage that drive member from the driven member 40.

In addition, the opposite end faces of the sleeve 64 engage the abutment surfaces 56 and 58 of the drive members 46 and 48 and from FIGURE 5 of the drawings it may be seen that the drive member 46 is first disengaged from the driven member 40 and then the drive member 48 is engaged with the driven member 40 upon movement of the sleeve 64 in the direction of the arrow. Inversely, and with attention invited to FIGURE 6, it will be seen that upon rearward movement of the sleeve 64 that the drive member 48 will first be disengaged from the driven member 40 and then the drive member 46 will be engaged with the driven member 40. Thus, only one of the drive members 46 and 48 may be drivingly connected to the driven member 40 at a given time.

If the screwdriver shank 34 is being utilized to drive a screw into a workpiece and the force required to continue driving the screw home exceeds that which may be conveniently effected by movement of the lever arm 116 toward the handle portion 110, the lever arm 116 and the handle portion 110 may be simultaneously gripped and the housing 12 may be oscillated about the longitudinal axis of the shaft 22 whereby greater leverage to complete the driving of the screw home may be effected by the lever defined by the lever arm 116 and the handle portion 110.

Although the sleeve 64 has been illustrated and described as the means provided for effecting movement of the drive members 46 and 48 toward and away from the driven member 40, it is to be noted that other means could be provided without departing from the spirit of the invention.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed is new is as follows:

1. A pistol grip drive comprising a housing, a drive shaft rotatably journaled in said housing, a driven member mounted on said shaft for rotation therewith and against axial shifting relative thereto, first and second drive members rotatably and slidably mounted on said shaft on opposite sides of said driven member and individually drivingly engageable with the latter upon movement of a selected one of said drive members axially of said shaft toward said driven member, driving means movably supported from said housing and operatively engaged with each of said drive members and effecting opposite rotation of said drive members about the longitudinal axis of said shaft upon movement of said driving means relative to said housing, means yieldingly urging each of said

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drive members axially of said shaft toward driving engagement with said driven member, and reversible control means selectively engaged with the other of said drive members and operative to maintain the other of said drive members out of engagement with said driven member while said selected one of said drive members is in driving engagement with said driven member.

2. The combination of claim 1 wherein each of said drive members includes means for establishing a one way ratchet driving connection with said driven member.

3. The combination of claim 1 wherein said driven member includes a ratchet gear having ratchet teeth formed on opposite side faces thereof opening in opposite directions of rotation of said shaft, said drive members each having ratchet teeth formed thereon confronting and complementary to the ratchet teeth on the adjacent side of said ratchet gear.

4. The combination of claim 3 wherein said control means includes a sleeve member rotatably receiving said ratchet gear and mounted for reciprocation longitudinally of said shaft, the adjacent faces of said drive members include smooth outer annular abutment faces, the opposite ends of said sleeve member being registrable with said abutment surfaces, and actuator means operatively connected with said sleeve for selectively positioning said sleeve member longitudinally of said shaft.

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5. The combination of claim 1 wherein said driving means includes a double rack gear member movably supported from said housing for movement transversely of the axis of rotation of said shaft disposed in constant mesh with said drive members.

6. The combination of claim 5 wherein said housing includes a laterally directed handle portion extending to one side of said housing.

7. The combination of claim 6 wherein said driving means includes a laterally directed lever arm pivotally secured at its inner end to said housing and operatively connected to said rack gear member with its outer free end projecting toward said one side of said housing and generally paralleling and in close proximity to said handle portion.

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