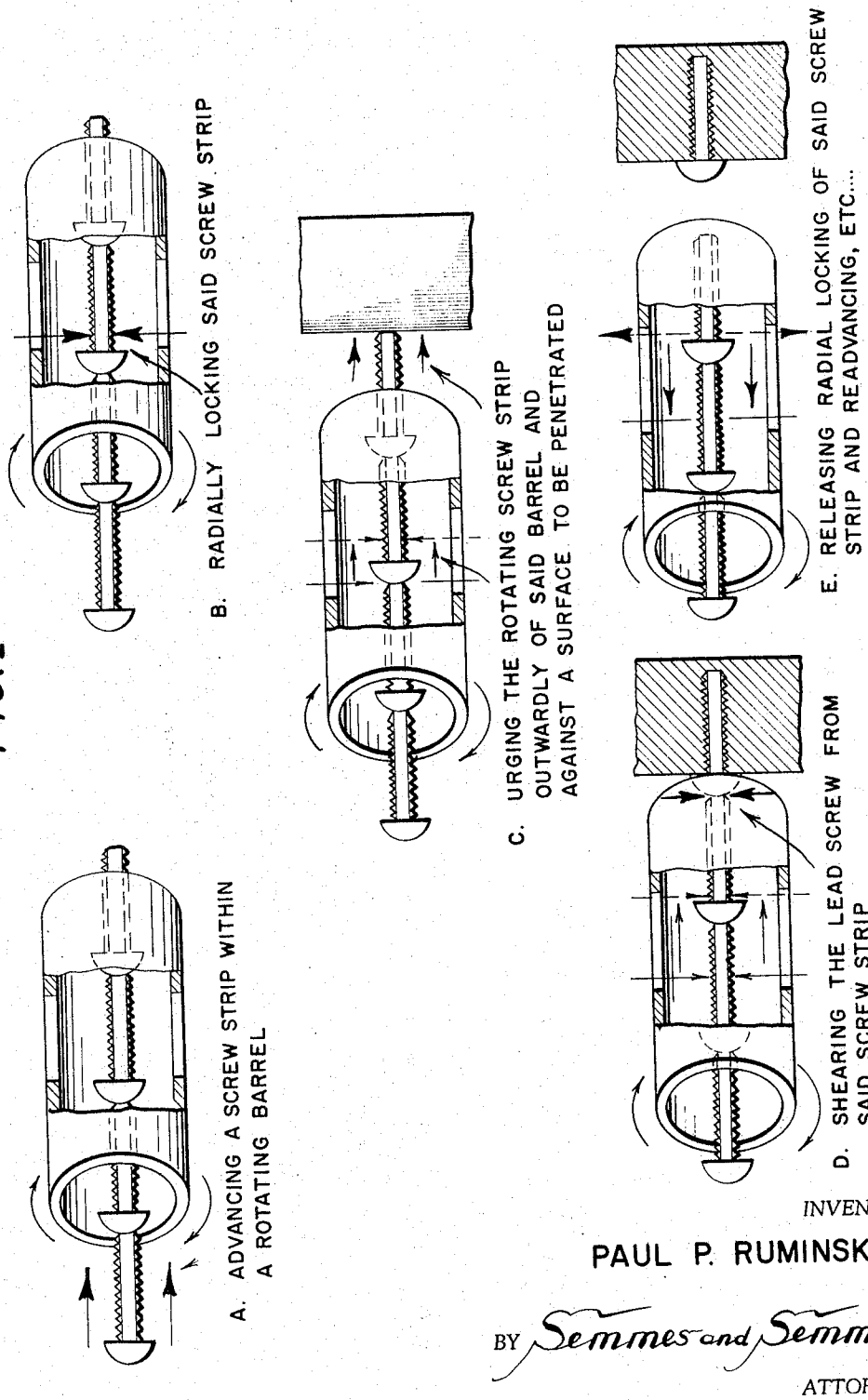
Jan. 24, 1967 P. P. RUMINSKY 3,299,499

METHOD FOR DRIVING SCREWS

Original Filed March 5, 1963 3 Sheets-Sheet 1

FIG. 1



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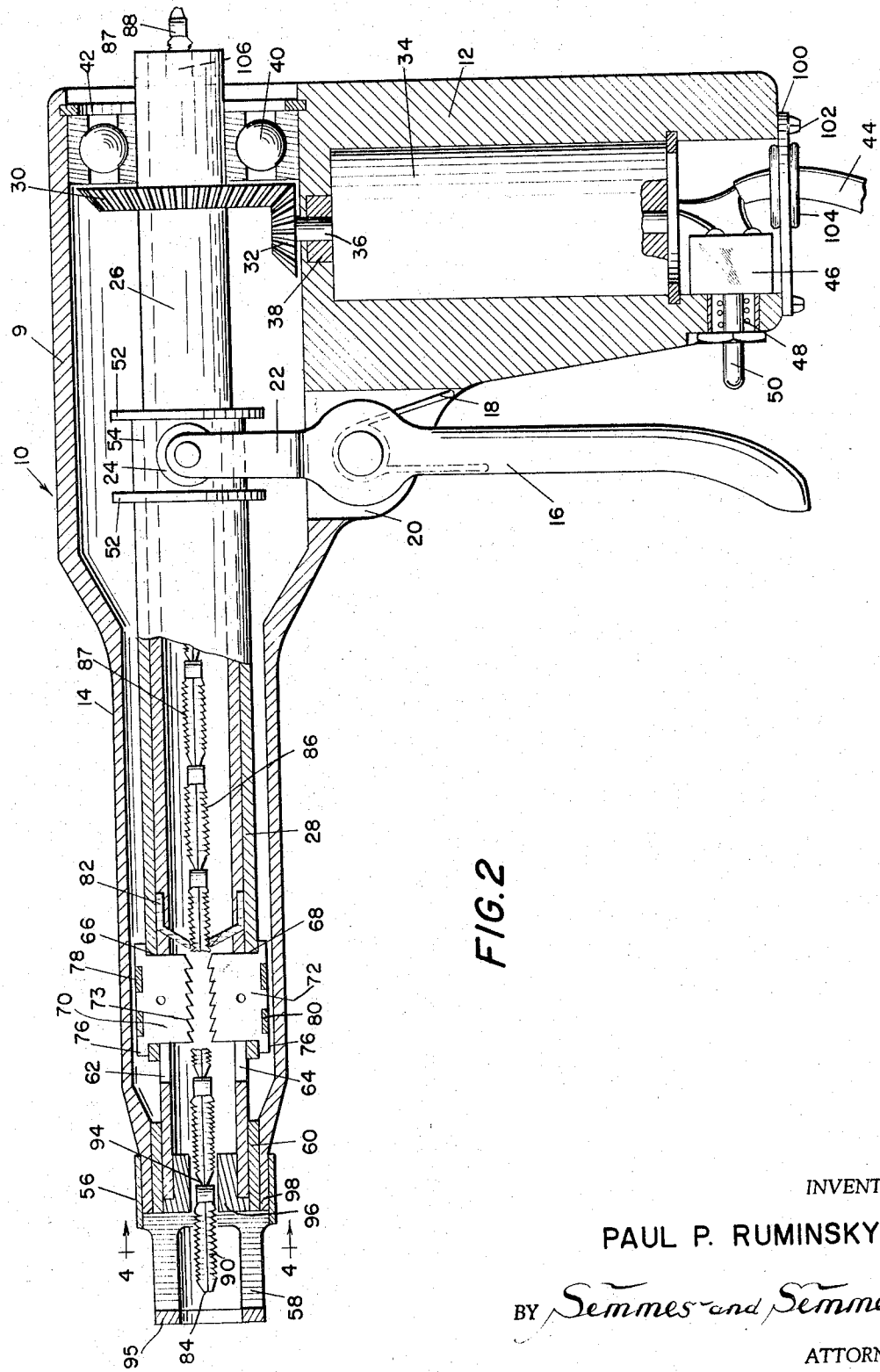


FIG. 2

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METHOD FOR DRIVING SCREWS

Original Filed March 5, 1963 3 Sheets-Sheet 3

FIG. 3

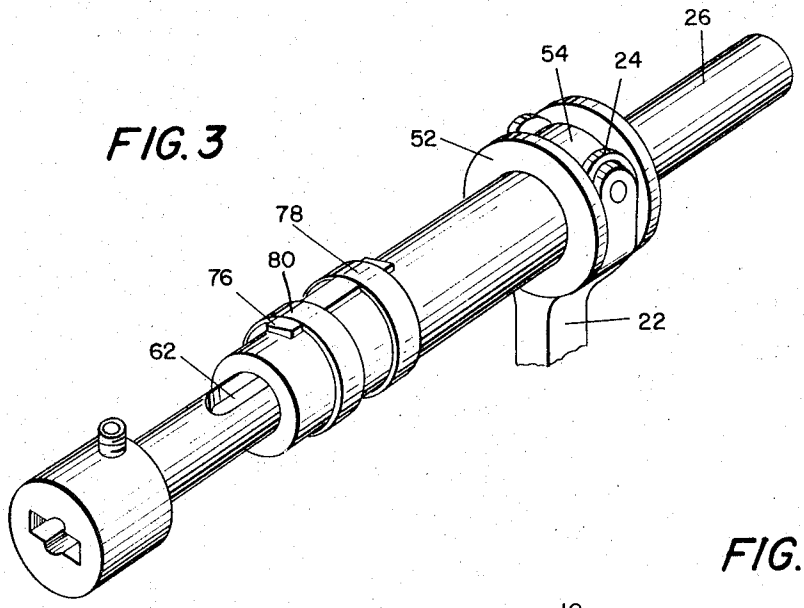
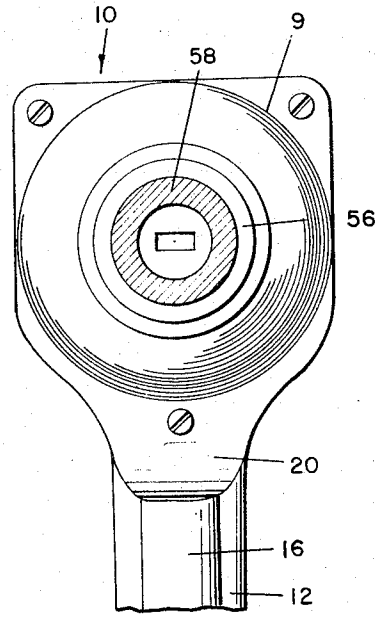


FIG. 4



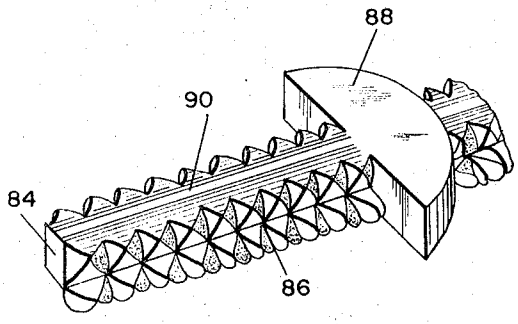


FIG. 5

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United States Patent Office 3,299,499 Patented Jan. 24, 1967

3,299,499

METHOD FOR DRIVING SCREWS

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Continuation of abandoned application Ser. No. 263,025, Mar. 5, 1963. This application Aug. 1, 1966, Ser. No. 573,747

1 Claim. (Cl. 29—413)

The present application relates to a method of driving screws, particularly a method for driving of screws of the type that are formed integrally in an end to end relationship known as a "screw strip."

This application is a continuation of applicant's application Serial No. 263,025, entitled, Method for Driving Screws, and filed March 5, 1963, now abandoned.

Previous inventors, notably Ptak 2,820,972 and British 650,741 have devised flat shanked screws which are continuously formed from a flat bar stock or round wire. Although these inventors have provided for the relatively inexpensive formation of such screws, a method for efficiently driving such screws has not yet been devised. According to the present method, a "screw strip" of threaded screws integrally formed in end to end relationship is developed according to applicant's Patent 3,127,625, entitled, Method of Forming Screws from Flat Bar Stock, issued April 7, 1964. The screw strip may contain any desired number of screws, which have a simple head without special notches or screw-driving slots. A strip of such screws is axially advanced within the rotating barrel of the screw driving gun and a locking force is applied radially against the screw strip so as to induce rotation of the screw strip with the barrel. In turn, the rotating screw strip is advanced axially so that the lead screw is presented outwardly of the barrel and against a surface to be penetrated. The rotation of the screw strip causes the lead screw to drive itself into the desired surface and to shear from the screw strip as the lead screw head is secured firmly against the surface to be penetrated. The radial locking force may then be withdrawn so as to relieve the screw strip of rotation, then re-applied as the screw strip is again axially advanced for driving of the next screw in line. Significantly, there is eliminated any necessity for centering or indexing of the screwing gun upon the head of any single screw to be driven. This results in an economy in production of the screw, as well as the screw driving gun. It will be seen that the present method of driving screws can be widely utilized in industrial application where appearance is not a factor, for example in the installation of TV set, refrigerator, home dryer and washer and many automotive components.

Accordingly, it is an object of invention to provide a method of driving screws independently of their head formation.

Another object of invention is to provide a method for driving of a screw strip.

Another object of invention is to provide a method for driving and separating a lead screw from a screw strip.

Yet, additional objects of invention will become apparent from the ensuing specification and attached drawings wherein:

FIG. 1 is a schematic view of the steps of the present method;

FIG. 2 is a side elevation, partially in section showing a possible gun construction for carrying out the present method;

FIG. 3 is exploded perspective of the rotating barrel within the gun;

FIG. 4 is a vertical section taken along section line 4—4 of FIG. 2; and

FIG. 5 is a fragmentary perspective showing a strip of individual screws having shank **90**, head **88** and threads **86**, the screws being integrated in end to end relationship as a screw strip **87** and driven according to the present method.

In FIG. 2 screw driving gun **10** is illustrated as comprising housing **9** which may be molded integrally with handle **12**. Housing **9** includes a muzzle **14** through which extends rotating barrel **26**. Rotating barrel **26** has a screw strip entry port **106** and a keyhole piece **96** connected inwardly of barrel **26** by means of flanges **98**. Barrel **26** has upper and lower opposed longitudinal slots **62** and **64**. Barrel **26** is rotated by means of motor **34**, powered through power cable **44** and driving shaft **36** in support bushing **38**. End plate **100** containing power cable bushing **104** may be mounted in handle **12** by means of screws **102**. Miter gear **32** attached to the end of shaft **36** engages gear **30** which is secured about barrel **26**. A micro limit switch **46** embodying coil spring **48** and push trip **50** may be employed to turn motor **34** on and off as trigger **16** is pivoted. Locking sleeve **28** is supported about barrel **26** and includes opposed apertures **66** and **68**. Locking jaws **70** and **72** having flanges **76** and forwardly angled teeth **73** extend radially through openings **66** and **68** as well as corresponding barrel openings **62** and **64**. A pair of annular springs **78** and **80** are used to urge jaws **70** and **72** inwardly of sleeve **28**. The unnumbered apertures in jaws **70** and **72** are not functional but were necessitated for handling in heat treating of the jaws. Teeth **73** being angled forwardly lock with the individual screw threads **86** and cause axial advancement of the screw strip **87** as sleeve **28** is axially advanced.

At the introductory end of sleeve **28** flanges **52** define track **54** in which yoke **22** having wheels **24** is played upon pivoting of trigger **16**. Coil spring **18** is provided at the point of pivot of trigger **16** within the gun handle aperture **20**. As trigger **16** is closed against gun handle **12** micro limit switch **46** is tripped causing the barrel **26** to rotate and simultaneously locking sleeve **28** is axially advanced. Jaws **70** and **72** thus axially advance with screw strip **87** so that lead screw tip **84** is presented against a surface in which the screw is to be driven. The locking of jaws **70** and **72** about screw threads **86** and the encompassment of keyhole piece **96** induce rotation of the entire screw strip, the individual screw tip **84** and shank **90** working itself into the surface to be penetrated. As the screw head **88** contacts the surface being penetrated, the screw is sheared at point **94** from the succeeding screw. Trigger **16** may then be released with the result that motor **34** is stopped, barrel **26** ceases rotating and spring **18** pivots trigger **16** to urge barrel **28** to slide reversely. In reverse axial motion, jaws **70** and **72** slip over the screw threads **86** while split ring spring **82** locks the screw strip itself against reverse axial movement.

At the forward end of barrel **26** bushing **60** may be provided and at the rearward end ballbearing assembly **40** may be secured by snap ring **42**. End indexing piece **58** having a resilient, open cushion **95** may be secured to muzzle **14** by means of ring **56**. According to the present method the barrel **26** is rotated and the screw strip axially advanced only upon squeezing or pivoting of trigger **16** within aperture **20** against gun handle **12**. As trigger **16** is released the rotation of the barrel **26** and screw strip **87** ceases, and jaws **70** and **72** are axially reversed to reengage the strip in preparation for another rotating axial advance of the strip as trigger **16** is squeezed. The present structure enables utilizing the open cushion **95** as the pushing surface, inasmuch as the screw drives itself once tip **84** enters the surface to be penetrated. It is believed that only 2 or 3 lbs. pressure upon the gun itself is required to initiate driving of the screw. It is estimated that screw strips of 25 to 30 screws each may be screwed within the gun and the barrel may be rotated at approximate speeds of 2600 r.p.m. The shear point of individual

screws may be determined by the speed of rotation, as well as the construction of the screw itself. It is contemplated that voltage controls may be employed to vary the motor speed and barrel rotation. Also, variously configured support cups may be employed and the guide piece keyway may be altered to fit various screw lengths and configurations. According to present method there have been driven No. 6–32 screws, formed from $\frac{3}{32} \times \frac{1}{4}$ inch stock and having 32 threads per inch.

Manifestly, various modifications in the proposed gun structure may be employed without departing from the spirit and scope of invention, as defined in the subjoined claim.

I claim:

A method for driving a screw strip of the type including a plurality of threaded screws integrally formed in end to end relationship, each screw having a head lying substantially in a single plane, comprising:

(A) longitudinally advancing a strip of said threaded screws attached in end to end relationship in a rotating chamber;

(B) rotating and locking said strip against reverse longitudinal movement by radially engaging the threads of at least one of said screws with means on said rotating chamber, the portion of said threads being radially engaged being normal to the screw head;

(C) urging the lead screw of said rotating strip longitudinally forward against a surface to be penetrated; and

(D) penetrating said surface with the lead screw on said strip and shearing said lead screw from the strip as the head thereof abuts the surface penetrated.

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