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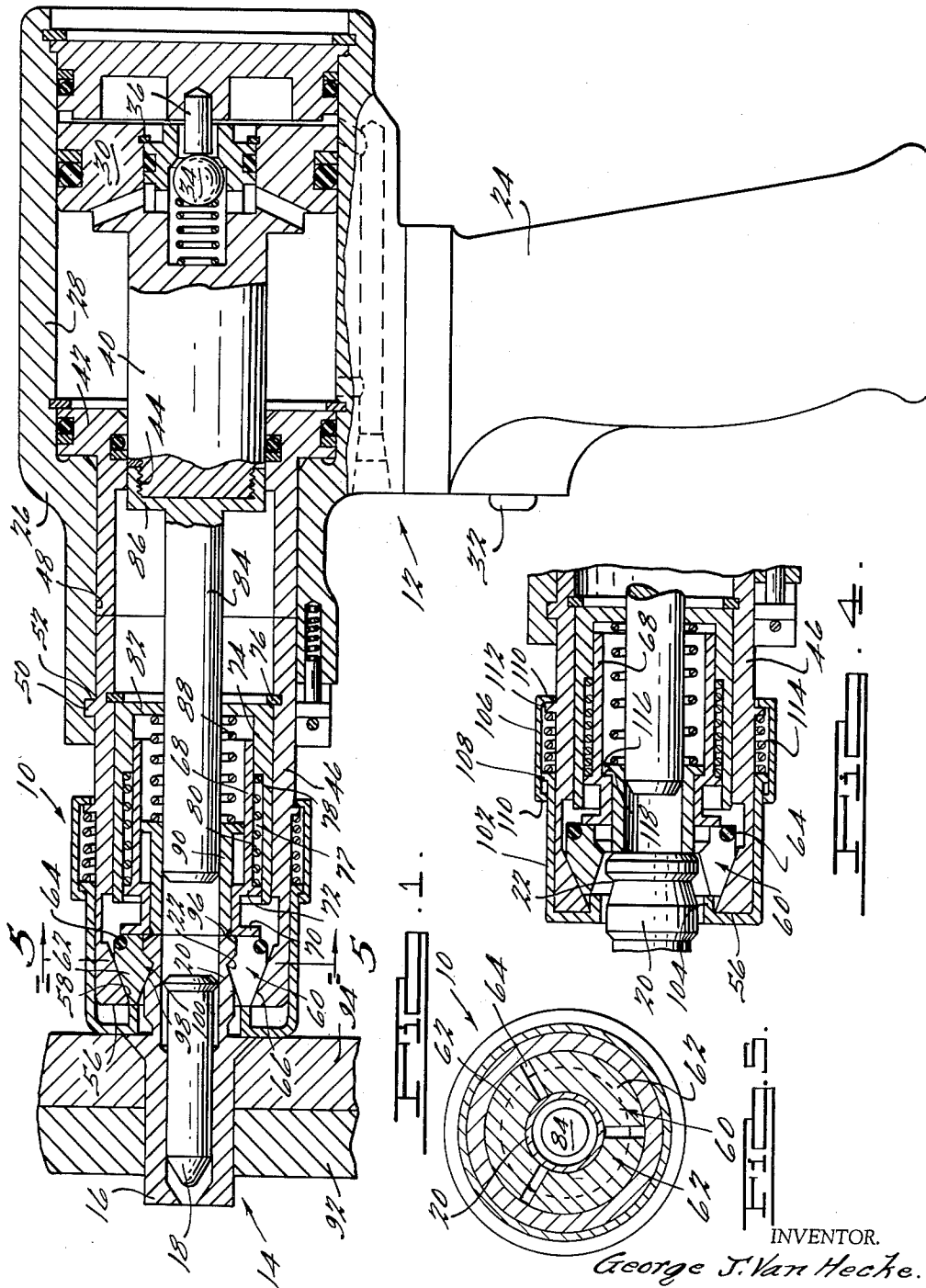
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NOSE ASSEMBLY FOR FASTENER APPLYING TOOLS

Filed June 12, 1958

2 Sheets-Sheet 1



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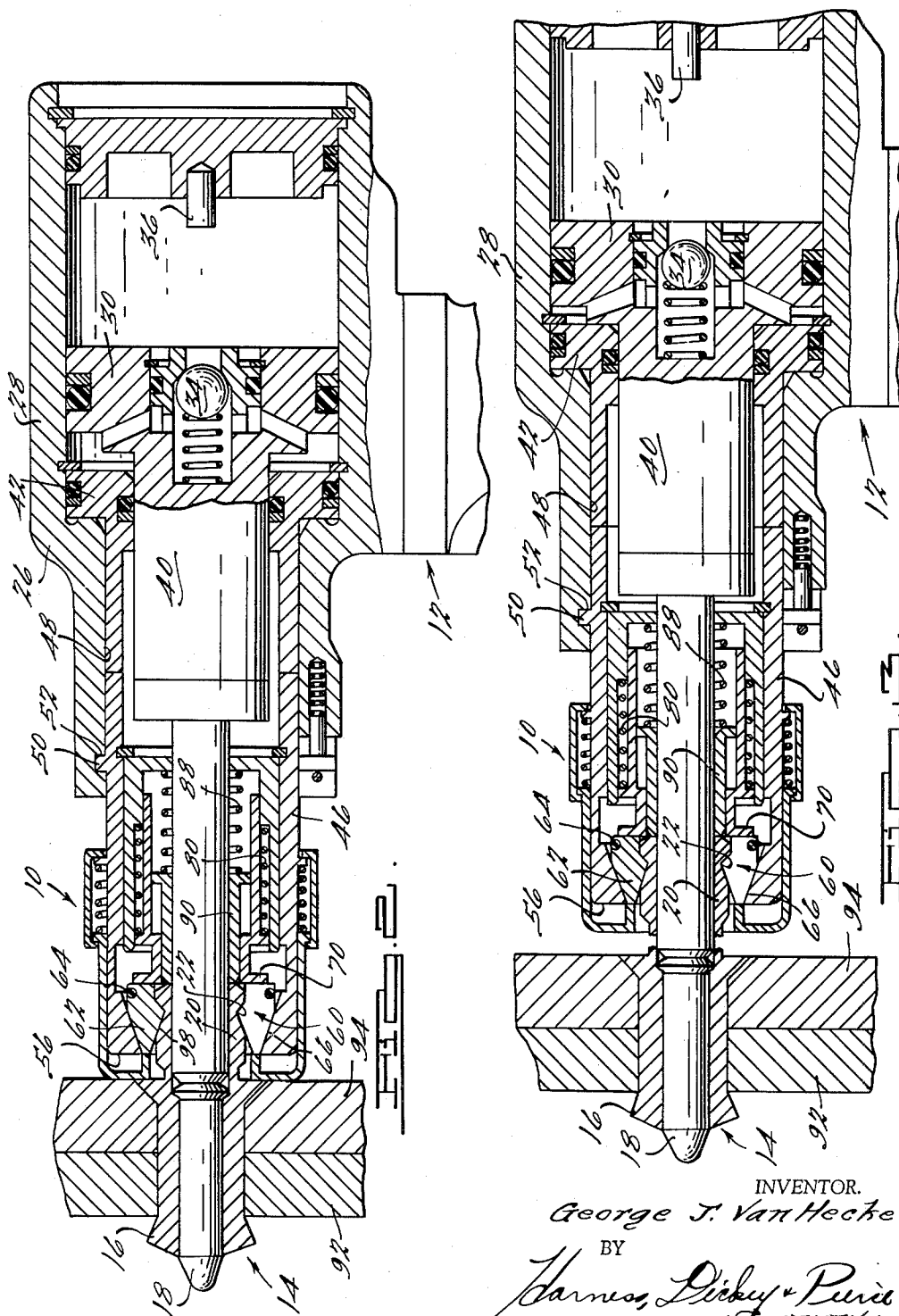
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1

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NOSE ASSEMBLY FOR FASTENER
APPLYING TOOLS

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This invention relates generally to fastener applying tools, and more particularly to a nose assembly for adapting such a tool for applying drive pins.

It has been found desirable to apply drive pins with power, and a pin especially adapted for this purpose is shown in application Serial No. 737,139, filed May 22, 1958, now Patent Number 2,991,681, owned by the assignee of this application.

The principal object of this invention, therefore, is to provide a nose assembly for a fastener applying tool having general utility which adapts the tool for applying drive pins of the type shown in the above application.

A further object of this invention is to provide a nose assembly of the above type which is relatively simple in construction, economical to manufacture, and efficient in operation in applying drive pins.

Further objects, features, and advantages of this invention will become apparent from a consideration of the following description, the appended claims, and the accompanying drawing in which:

FIGURE 1 is an elevational view of the nose assembly of this invention, showing the assembly mounted on a fastener applying tool and applied to a drive pin, with some parts broken away and other parts shown in section for the purpose of clarity;

FIGS. 2 and 3 are views, illustrated similarly to FIG. 1, showing successively moved positions of the nose assembly in applying a drive pin;

FIG. 4 is a fragmentary, longitudinal sectional view of the nose assembly illustrating the manipulation thereof necessary to release a pintail; and

FIG. 5 is a transverse sectional view taken along the line 5—5 of FIG. 1.

With reference to the drawing, the nose assembly of this invention, indicated generally at 10, is illustrated in FIG. 1 mounted on a fastener applying tool or gun 12 and applied to a drive pin assembly 14 consisting of an expansible collar 16 and a drive pin 18. The drive pin assembly 14, which includes a collar extension or tail 20 having a pull groove 22, is described in detail in the copending application referred to above. The tool 12, which is described in detail in application Serial No. 729,349, filed April 18, 1958, also owned by the assignee of this application, includes a handle 24 and a body portion 26 formed with a cylinder 28 in which a piston 30 is slidably mounted.

The cylinder 28, on opposite sides of the piston 30, is connected with a source of fluid under pressure associated with a trigger 32 on the handle 24 so that when the trigger 32 is depressed, the piston 30 is moved by the fluid under pressure toward the right, as viewed in FIG. 1, to a limit position in which a ball valve 34 mounted on the piston 30 is moved off its seat by a stationary pin 36 at the right hand end of the cylinder 28. Unseating of the valve member 34 provides for fluid communication of the cylinder 28 on both sides of the piston 30 so that the piston remains at the right hand end of the cylinder 28.

On release of the trigger 32, fluid under pressure is admitted to the cylinder on the right side of the piston 30 for moving the piston 30 to the left, as viewed in FIG. 1. The piston 30 has an axial extension 40 which is slidably supported in a seal member 42 at the left end of the

2

cylinder 28 and terminates in an externally threaded portion 44.

The nose assembly 10 consists of a tubular barrel 46 of a diameter such that it can be inserted in a bore 48 at the forward end of the body member 26. A locking ear 50 on the barrel 46 is removably positioned in a groove 52 in the body member 26 for releasably locking the barrel 46 to the body member 26 in a position in which the barrel 46 is in a coaxial relation with the piston 30.

The barrel 46 is formed at its end 56, hereinafter referred to as its front end for convenience, with a tapered inner surface portion 58 which is of a progressively increasing diameter in a direction inwardly of the barrel 46. Positioned within the surface portion 58 is a tubular jaw assembly 60 consisting of three jaws 62 maintained in a tubular form by a connector ring 64. Each jaw 62 has a tapered outer surface 66 of an inclination corresponding to the inclination of the inner surface portion 58 of the barrel. Consequently, the jaws 62 are movable axially of the barrel 46, with their inclined surfaces 66 in engagement with the barrel surface 58, between expanded and contracted positions. When the jaw assembly 60 is fully contracted, it is of a size to be retained within the barrel 46 adjacent the end 56 thereof, as shown in FIG. 1.

A jaw follower or contracting sleeve 68 has a flange 70 at one end engaged with the inner end of the jaw assembly 60 and a spacer flange 72 disposed inwardly of the end flange 70. An adapter collar 74 retained in the barrel 46 by a retainer ring 76 extends about the follower sleeve 68 and is of a size to provide an annular space 77 about the follower sleeve 68 between the flange 72 and a shoulder 78 formed on the adapter collar 74. A spring 80 in the space 77 extends between the flange 72 and the shoulder 78 and urges the follower sleeve 68 forwardly in the barrel 46 against the inner end of the jaw assembly 60.

At its inner end, the adapter collar 74 has an inwardly directed annular flange 82 of a size such that it acts as a guide for an elongated plunger 84 having an enlarged internally threaded portion 86 at its inner end which is threaded onto the piston portion 44. A spring 88 positioned about the plunger 84 engages the inner end of an ejector sleeve 90 slidably supported in the follower sleeve 68. The ejector sleeve 90 is of a size such that it acts as a guide for the plunger 84.

In the operation of the nose assembly 10 with the tool 12 to set the drive pin assembly 14 so as to connect a pair of plates 92 and 94, shown in FIG. 1, the operator first depresses the tool trigger 32 to move the piston 30 to the position at the right end of the cylinder 28 shown in FIG. 1. The nose assembly 10 is applied to the drive pin assembly 14 by moving the nose assembly 10 axially of the collar tail 20 so that the outer end of the tail engages the inclined inner surfaces 98 of the jaw members 62 and moves the jaw members axially inwardly of the attachment against the resistance of spring 80 and expands the jaw assembly 60. The jaw assembly 60 is expanded to a position in which it will telescope over the pintail 20 and will then be moved forwardly by spring 80 to a position in which it will contract and move the teeth 100 thereon into the pull groove 22 in the tail 20.

On release of the trigger 32, the piston 30 forces the plunger 84 to the left, as viewed in FIG. 1, so that it engages the drive pin 18 and drives it axially of the collar 16 so as to expand the collar as shown in FIG. 1. The reaction to the driving force exerted on the drive pin assembly 14 by the plunger 84 is applied to the tail 20 by the jaws 62 as a pulling force on the tail 20. When the pin 18 has been moved to the fully driven stop position shown in FIG. 2, this reaction force is increased rapidly,

3

because the head on the drive pin 18 engages the sleeve 16 so that the pin 18 can no longer move forwardly, to a point at which it fractures the tail 20 at a position adjacent the collar 16, as illustrated in FIG. 3. The operation of the nose assembly 10 and the tool 12 to set the drive pin assembly 14 has then been completed.

In order to remove the collar tail 20 from the assembly 10, it is necessary to manually manipulate a jaw releasing sleeve 102 slidably mounted on the barrel 46 at a position about the end 56 thereof. The sleeve 102 has an inwardly directed tubular nose section 104 of a diameter to extend within the barrel end 56 and engage the outer end of the jaw assembly 60. A retaining ring 106 extends about the inner end of the sleeve 102 which is provided with an outwardly directed flange 108. The retaining ring 106 has intumed side flanges 110 engageable with the flange 108 and a similar flange 112 on the barrel 46. A spring 114 extends between the flanges 108 and 112 for normally urging the sleeve 102 outwardly to the position illustrated in FIGS. 1, 2 and 3 in which the nose section 104 thereof is positioned outside the barrel 46. To expand the jaw assembly 60 so that it will release the collar tail 20, the sleeve 102 is manually moved inwardly of the barrel 46, against the pressure of the spring 114, so that the jaw teeth 100 ride upwardly out of the pull groove 22 in the tail 20.

The spring 88 which urges the ejector sleeve 90 in a direction outwardly of the barrel 46 is of a strength such that during expansion of the jaw assembly 60, the sleeve 90 is continually urging the collar tail 20 out of the nose assembly 10. When the jaw assembly 60 has been expanded, as shown in FIG. 4, to a position in a clearance relation with the collar tail 20, the ejector sleeve 90 operates to force the collar tail 20 out of the nose assembly 10. A flange 116 on the inner end of the ejector sleeve 90 engages a shoulder 118 on the inner side of the follower sleeve 68 for preventing movement of the ejector sleeve 90 out of the nose assembly 10.

From the above description, it is seen that this invention provides a nose assembly 10 which is readily applied to a fastener applying tool 12 having general utility for applying fasteners of different types. When the nose assembly 10 is thus applied to the tool 12 it is readily usable to power-drive the drive pin assembly 14. The assembly of the jaws 62 with the collar tail 20 automatically aligns the drive plunger 84 with the drive pin 18 so that on operation of the tool 12, the drive pin 18 is power-driven by the plunger 84 and the reaction to this driving force is utilized to fracture the collar tail 20 from the drive pin assembly 14 to complete the setting operation and provide for a connection of the plates 92 and 94 by working from only one side of the plates.

It will be understood that the specific construction of the improved nose assembly for applying drive pins which is herein disclosed and described is presented for purposes of explanation and illustration only and is not intended to indicate limits of the invention, the scope of which is defined by the following claims.

What is claimed is:

1. In a fastener applying tool, a tubular barrel having an outer end adapted to be telescoped over a fastener, an expandable and contractible annular jaw assembly disposed coaxially within said barrel end, said jaw assembly having radially inwardly extending projection means comprising radially and axially inwardly inclined surface portions on the inner portion of said jaw assembly so that on movement of a fastener axially inwardly of said barrel outer end into engagement with said surface portions said jaw assembly is expanded, means operatively associated with said jaw assembly and said barrel outer end for urging said jaw assembly toward a forward and contracted position for moving said projection means into gripping engagement with a fastener disposed concentrically therein, a plunger mounted in a coaxial relation with said jaw assembly for movement between a position within the jaw

4

assembly and a position spaced axially inwardly of the barrel from said jaw assembly, and means operatively associated with said plunger and said barrel for applying an axial force to said plunger relative to said barrel for driving the fastener.

2. In a fastener applying tool, a tubular barrel having an outer end adapted to be telescoped over a fastener, said outer end having an inner surface portion which is of a progressively increasing diameter in an axially inward direction, an expandable and contractible annular jaw assembly disposed coaxially within said barrel end and having an outer surface which is of a progressively increasing diameter in an axially inward direction and is supported on said barrel inner surface, spring means engaged with said jaw assembly urging it axially outwardly of said barrel against said inner surface portion thereof, said jaw assembly having radially inwardly extending projection means comprising radially and axially inwardly inclined surface portions on the inner surface of said jaw assembly so that on movement of a fastener axially inwardly of said barrel outer end into engagement with said surface portions said jaw assembly is expanded, means operatively associated with said jaw assembly and said barrel outer end for urging said jaw assembly toward a forward and contracted position for moving said projection means into gripping engagement with a fastener disposed concentrically therein, a plunger mounted in a coaxial relation with said jaw assembly for movement between a position within the jaw assembly and a position spaced axially inwardly therefrom, and means operatively associated with said plunger and said barrel for applying an axial force to said plunger relative to said barrel for driving the fastener.

3. In a fastener applying tool having a tubular barrel provided with a tapered inner surface portion at one end which is of an increasing diameter in a direction inwardly of the barrel, a tubular jaw assembly positioned within said tapered barrel portion and movable axially thereof to contracted and expanded positions, a jaw follower sleeve slidably mounted in said barrel and yieldably engaged with the inner end of said jaw assembly for urging said jaw assembly axially outwardly of said barrel along said tapered surface portion to a fully contracted position, a drive plunger movable axially of said barrel to a position within said jaw assembly, a combination plunger guide and collar tail ejector sleeve extending about said plunger in a supporting relation therewith and slidably supported in said follower sleeve, means urging said ejector sleeve outwardly of said nose attachment, and means operatively associated with said drive plunger and said barrel for applying an axial force to said drive plunger relative to said barrel for driving the fastener.

4. In a fastener applying tool, a tubular barrel, an expandable and contractible tubular jaw assembly positioned within said barrel, taper means on said tubular barrel and on said jaw assembly for causing expansion and contraction of said jaw assembly responsively to relative axial movement between said jaw assembly and said barrel, spring means mounted in said barrel and yieldably engaged with said jaw assembly for urging said jaw assembly forwardly to a fully contracted position, a drive plunger movable axially of said barrel, a combination plunger guide and collar tail ejector sleeve extending about said plunger in a supporting relation therewith and slidably supported in said barrel, means urging said ejector sleeve in a direction outwardly of said barrel, and means operatively associated with said drive plunger and said barrel for applying an axial force to said drive plunger relative to said barrel for driving the fastener.

5. In a fastener applying tool, means for setting a drive pin assembly consisting of an expansible collar having a tubular tail formed as an integral part of one end thereof and a drive pin movable axially of the collar for expanding the collar, said means comprising a tubular barrel having a radially inwardly expanding tapered portion at the

5

outer end thereof, a contractible and expandable tubular jaw assembly positioned within said tapered barrel portion and movable axially thereof to contracted and expanded positions, a jaw follower sleeve slidably mounted in said barrel and yieldably engaged with the inner end of said jaw assembly for urging the jaw assembly axially outwardly of the barrel to a fully contracted position, a drive plunger movable axially of said barrel to a position within said jaw assembly, a collar tail ejecting sleeve extending about the plunger and slidably supported in said follower sleeve for engagement with said collar tail during setting of said drive pin assembly, means urging said ejector sleeve outwardly of said barrel, a jaw expanding sleeve assembly mounted on said barrel and provided with a nose section which extends inwardly of the barrel at said outer end thereof into engagement with said jaw assembly for selective movement in one direction to expand the jaw assembly, and means operatively associated with said drive plunger and said barrel for applying an axial force to said drive plunger relative to said barrel for driving the fastener.

6. In a fastener applying tool for setting a drive pin assembly consisting of an expansible collar having a tubular tail formed as an integral part of one end thereof and a drive pin movable axially of the collar for expanding the collar, a tubular barrel having a radially inwardly expanding tapered portion at the outer end thereof, a contractible and expandable tubular jaw assembly positioned within said tapered barrel portion and movable axially thereof to contracted and expanded positions, a jaw follower sleeve slidably mounted in said barrel and yieldably engaged with the inner end of said jaw assembly for urging the jaw assembly axially outwardly of the barrel to a fully contracted position, a drive plunger movable axially of said barrel to a position within said jaw assembly, a collar tail ejecting sleeve extending about the plunger and slidably supported in said follower sleeve for engagement with said collar tail during setting of said drive pin assembly, means urging said ejector sleeve outwardly of said barrel, a jaw expanding member mounted on said barrel and provided with a nose section which extends inwardly of the barrel at one end thereof into engagement with said jaw assembly for movement in one direction to expand the jaw assembly, spring means positioned about the barrel and engaging said jaw expanding member for urging it in an opposite direction, and means operatively associated with said drive plunger and said barrel for applying an axial force to said drive plunger relative to said barrel for driving the fastener.

7. In a fastener applying tool, a tubular barrel having a forward face adapted to be telescoped over a fastener, jaw assembly means disposed coaxially within said barrel and movable axially relative to said barrel for receiving a fastener inserted coaxially relative to said jaw assembly means and said barrel and being radially expandable and contractible for gripping the fastener responsively to movement of the fastener axially inwardly of said barrel forward face, taper means on said barrel and on said jaw assembly means for causing expansion and contraction of said jaw assembly means responsively to relative axial movement between said jaw assembly means and said barrel, a drive plunger mounted in a coaxial relation with said jaw assembly means for movement between a position within said jaw assembly means and a position spaced axially inwardly of said barrel from said jaw assembly means, and means operatively associated with said drive plunger and said jaw assembly means for applying an axial force to said drive plunger relative to said barrel for driving the fastener.

8. In a fastener applying tool, a body member, a tubular barrel fixedly secured at one end to said body member and having a forward face adapted to be telescoped over

6

a fastener, jaw assembly means disposed coaxially within said barrel and movable axially relative to said barrel for receiving a fastener inserted coaxially therein and being radially expandable and contractible for gripping the fastener responsively to movement of the fastener axially inwardly of said barrel forward face, taper means on said tubular barrel and on said jaw assembly means for causing expansion contraction of said jaw assembly means responsively to relative axial movement between said jaw assembly means and said barrel, a drive plunger mounted in a coaxial relation with said jaw assembly means for axial movement relative to said jaw assembly means, and means operatively associated with said drive plunger and said body member for applying an axial force between said body member, and hence said barrel, and said drive plunger for driving the fastener.

9. In a fastener applying tool for driving a fastener of the type having an expandable collar and a pin, the combination comprising a body member, a tubular barrel fixedly secured at one end to said body member and having a forward face adapted to be telescoped over the collar, jaw assembly means disposed coaxially within said barrel and movable axially relative to said barrel for receiving the collar inserted coaxially therein and being radially expandable and contractible for gripping the collar responsively to movement of the fastener axially inwardly of said barrel forward face, taper means on said tubular barrel and on said jaw assembly means for causing expansion and contraction of said jaw assembly means responsively to relative axial movement between said jaw assembly means and said barrel, a drive plunger mounted in a coaxial relation with said jaw assembly means for axial movement relative to said jaw assembly means, means operatively associated with said drive plunger and said body member for applying an axial force between said body member, and hence said barrel, and said drive plunger for driving the fastener, collar ejector means for ejecting the collar from said barrel including ejection means disposed coaxially within said barrel for resiliently urging the collar axially outwardly from said barrel, and further including actuating means disposed about the outer end of said tubular barrel and being selectively movable axially relative to said tubular barrel into engagement with said jaw assembly means for moving said jaw assembly means axially in a direction to radially expand said jaw assembly means whereby said ejection means ejects the collar from said barrel.

10. The tool of claim 9 in which said ejection means includes an inner sleeve engageable with the collar and a spring member resiliently urging said inner sleeve axially outwardly and into engagement with the collar and in which said actuating means includes an outer sleeve disposed about the outer end of said tubular barrel, said outer sleeve having an axially inwardly extending flange portion selectively engageable with said jaw assembly means, and a spring member resiliently urging said outer sleeve and said flange portion axially outwardly away from engagement with said jaw assembly means.

References Cited in the file of this patent

UNITED STATES PATENTS

1,361,340	Ledwinka	Dec. 7, 1920
2,061,086	Nord	Nov. 17, 1936
2,229,868	Newell	Jan. 28, 1941
2,353,451	Fischer	July 11, 1944
2,401,724	Dowdle	June 11, 1946
2,457,930	Smith	Jan. 4, 1949
2,864,525	Hamlin et al.	Dec. 16, 1958

FOREIGN PATENTS

564,929	Great Britain	Oct. 19, 1944
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