June 24, 1958 E. F. PFAFF 2,839,754

FASTENER DRIVING TOOL

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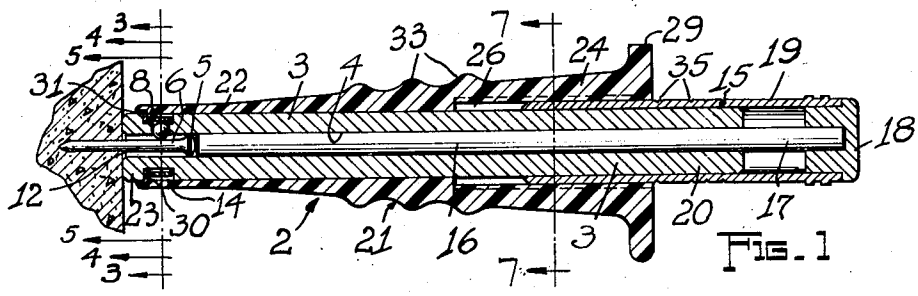


Fig. 1

Fig. 2

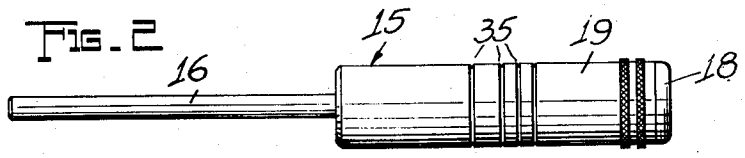


Fig. 3

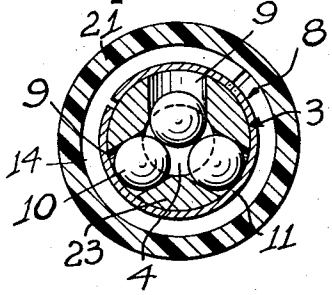


Fig. 4

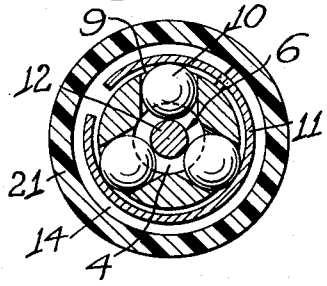
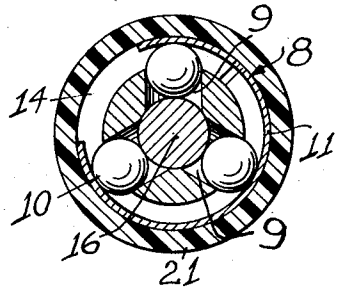


Fig. 5



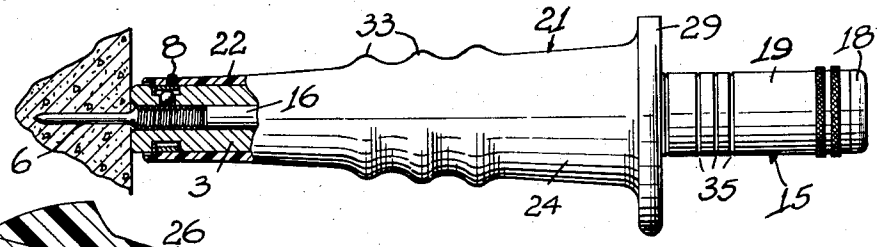


Fig. 6

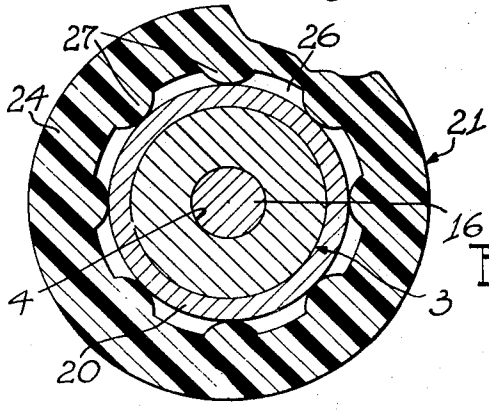


Fig. 7

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FASTENER DRIVING TOOL

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4 Claims. (Cl. 1—47)

This invention relates in general to driving tools for fasteners, nails, pins, studs, and the like, to be driven into wood, concrete, steel, and other materials, and, more particularly, to driving tools constructed to include tubular fastener guide members and driving punch members axially shiftably arranged in the guide members to propel fasteners and drive same into the material when the driving punch members are forcibly advanced by hammer blows.

A driving member of this type guides the head portions of the fasteners in the bore of the tubular guide member and the shank portions of such fasteners in supplemental guide means preferably arranged near the front portion of the guide member, which supplemental guide means are constructed to yield in order to permit passing of the fastener heads and front portions of the driving punch members therethrough.

However, thus constructed driving tools operate with substantial rebound of their driving punch members and must be striken by blows of heavy hammers with the effect of reducing the general application of these driving tools and with substantial danger for the operator.

The general object of this invention is the provision of an improved fastener driving tool embodying a tubular guide member, driving punch member within said guide member, a flexible housing encompassing the guide member and the driving punch member, and checking means associated with the driving punch member and the flexible housing and arranged to effect dampening of the rebound of the driving punch member whenever propelled by hammer blows.

This general object of the invention is attained by a tubular friction element attached to one end portion of the driving punch member, which friction element encircles the said one end portion in spaced relation, is sleeved upon the tubular guide member and frictionally extends into the recessed end of the flexible housing to effect frictional dampening of rebounds of the driving punch member when forcibly driven forward in the tubular guide member.

Another object of the invention therefor is the provision of a fastener driving tool of the type referred to, in which the driving punch member has attached thereto a tubular friction element arranged to encircle one end portion of the driving punch member in spaced relation with respect thereto, in which the flexible housing has its outer end recessed, and in which the tubular friction element is dimensioned to frictionally engage the recessed portion when extended thereinto by forcibly advancing the driving punch member in the tubular guide member.

A further object of the invention is the provision of a fastener driving tool of the type referred to, in which the supplemental guide member at the front portion of the tubular guide member embodies a spring-controlled three ball guiding arrangement constructed to properly guide the shank of fasteners and yieldingly open up to permit advancing of fastener heads and part of the driving punch member through the three ball guiding arrangement.

Still other objects of the invention lie in the arrangement of indices on the exposed end of the driving punch member, which indices visibly disclose the depth of penetration of fasteners into material, and the arrangement of finger rests in the flexible housing to properly position the driving tool in the hand of an operator.

Additional other objects and novel features of construction, combinations and relations of parts by which the objects in view have been attained will appear and are set forth in detail in the course of the following specification. The drawing, accompanying and forming part of the specification, illustrates a certain practical embodiment of the invention, but it will be apparent as the specification proceeds that the illustrated structure may be modified and changed in various ways without departure from the true spirit and broad scope of the invention.

In the drawing:

Fig. 1 is a longitudinal sectional view through a fastener driving tool constructed in accordance with the invention, the tool being shown in working position.

Fig. 2 is a plan view of the combined driving punch member and the friction element of the fastener driving tool shown in Fig. 1.

Fig. 3 is a cross sectional view on line 3—3 of Fig. 1, the section being shown without a fastener.

Fig. 4 is a cross sectional view on line 4—4 of Fig. 1.

Fig. 5 is a cross-sectional view on line 5—5 of Fig. 1, the section being shown with the driving punch member advanced to partly extend through the three ball guide arrangement.

Fig. 6 is a side view partly in section through the fastener driving tool, the view showing the tool while driving a threaded stud and indicating by indices the position of the driven stud in a wall.

Fig. 7 is an enlarged sectional view taken on line 7—7 of Fig. 1.

Referring now to the exemplified form of the invention illustrated in the drawing, fastener driving tool 2 comprises a cylindrical guide member 3 which is provided with an axial bore 4 sized to fit the heads 5 of fasteners 6 to be driven. This guide member 3 is made of hardened steel tubing and includes near its front end 7 a supplemental guide arrangement 8 embodying in three radial bores 9 three steel balls 10. Radial bores 9 intersect bore 4 in guide member 3 at right angles and intersect each other at equal angles to effect proper relation of steel balls 10 with respect to each other when yieldingly forced by spring split ring member 11 toward axial bore 4 to grip shank 12 of fastener 6 advancing in axial bore 4 during driving operations. Spring split ring member 11 is positioned in a circular recess 14 of guide member 3, which recess is aligned with radial bores 9.

Guide member 3 shiftably supports in bore 4 driving punch member 15 embodying an elongated striker rod 16 which is dimensioned to fit axial bore 4. This striker rod 16 mounts on its exposed rear end 17 a striker head 18 and supports an elongated tubular friction member 19 secured to the rear end 17 of striker rod 16 in axial alignment therewith. Tubular friction member 19, which is sleeved upon the rear portion 20 of guide member 3, cooperates with flexible housing 21 to frictionally dampen in fastener driving operations rebounds of driving punch member 15, as will be later described.

Flexible housing 21 is made of polyethylene plastic, rubber, or other suitable material and encompasses guide member 3. This housing 21 grips with its front portion 22 the front portion 23 of guide member 3 and encircles with its rear portion 24 the rear portion 20 of the guide member in spaced relation with respect

thereto to permit tubular friction member **19** to enter into the cylindrical space **26** between housing **21** and rear portion **20** when driving punch member **15** is shifted forward in bore **4**.

Housing **21** includes at the inner wall of its rear portion **24** a plurality of ribs **27** frictionally contacting the tubular friction member **19**, which ribs provide air passages **28** and prevent friction member **19** from being air-locked in cylindrical space **26**.

The cone-shaped flexible housing **21** embodies at its rear portion **24** a hand guard **29** and is held in place on guide member **3** by split ring **30** arranged in circular recess **14** and entered into a recess **31** in front portion **22** of the flexible housing. Flexible housing **21** furthermore embodies ridges **33** for the hand of an operator.

The fastener driving tool **2** is loaded with a single fastener entered at the rear of the guide member **3** after driving punch member **15** with friction member **19** has been withdrawn from bore **4**. The position of such fastener in bore **4** is indicated by indices **35** (colored grooves, etc.) on the periphery of tubular friction member **19**.

In operation, the driving tool is firmly placed against the material and then fastener **6** is driven into the material by blows on the striker head **18**. Any rebounds of driving punch member **15** are frictionally absorbed by the friction between ribs **27** of housing **21** and the tubular friction member **19**, which friction may be controlled by the pressure applied on the housing **21** by an operator.

Driving tools of the type described can be used to drive fastener studs, nails, or pins to any desired depth into a material and indicating the depth by the indices **35** on the peripheral surface of tubular friction member **19**.

Having thus described my invention, what I claim is:

1. In a fastener driving tool an elongated guide member having an axial bore, a driving punch member shiftably arranged in the bore of said guide member adapted to engage a fastener when placed in the bore of the guide member, a housing encompassing the guide member and tubular friction means coupled with said driving punch member and encircling same in spaced relation with respect thereto, said tubular friction means extending into said housing and being engaged thereby.

2. A fastener driving tool as described in claim 1, wherein the tubular friction means is sleeved upon the rear end portion of the tubular guide and slidably engaged therewith.

3. A fastener driving tool as described in claim 1, wherein the housing is made of flexible material to permit by manual deformation of the housing control of the friction between the housing and the tubular friction means.

4. A fastener driving tool as described in claim 1, wherein the housing is made of flexible material and provided with preshaped gripping areas to permit an operator by pressure-gripping of these areas control of the friction between the housing and the tubular friction means.

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