

[54] GRIPPING AND STARTING TOOL

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[57] ABSTRACT

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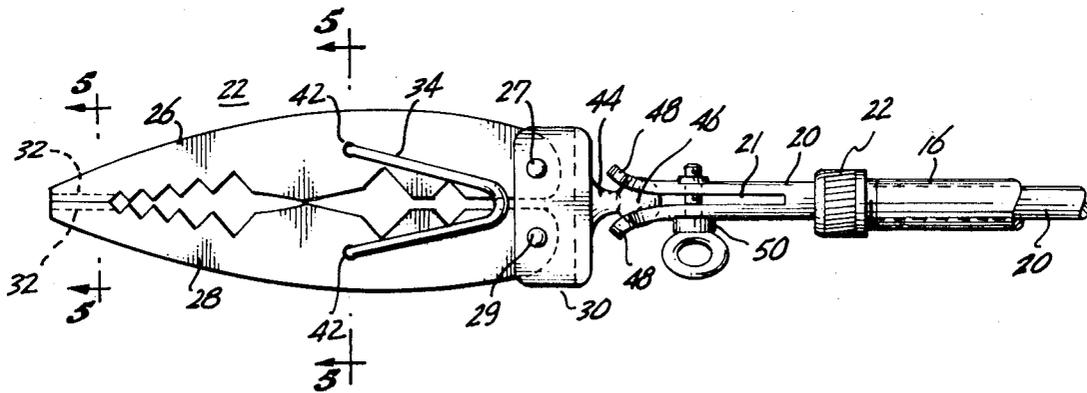
A gripping and starting tool, particularly useful for small fastener elements, is disclosed to comprise an elongated manipulatable member adapted at its proximate end to be manually grasped and having multi-choice fastener-gripping means at its distal end. Adjustable ball and socket means between the elongated member and the gripping means permit variable disposition of the latter with respect to the axis of the elongated member. The gripping means comprise a pair of individually pivoted, serrated-face jaws biased by a hairpin spring toward each other in a gripping relationship to an object placed therebetween. This abstract is neither intended to define the invention of this application which, of course, is measured by the appended claims, nor is it intended to be limiting as to the scope of the invention in any way.

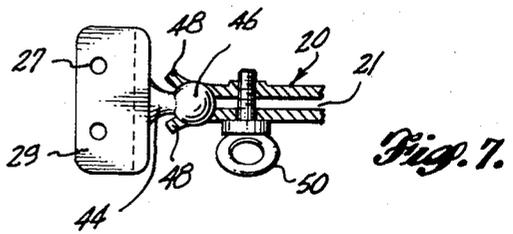
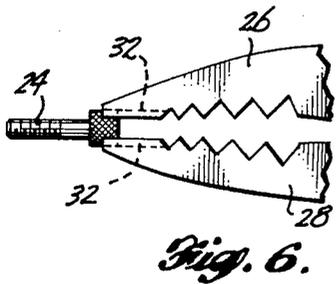
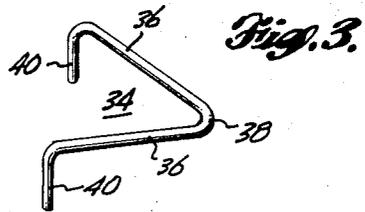
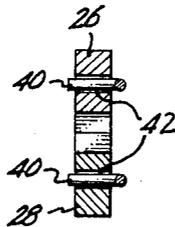
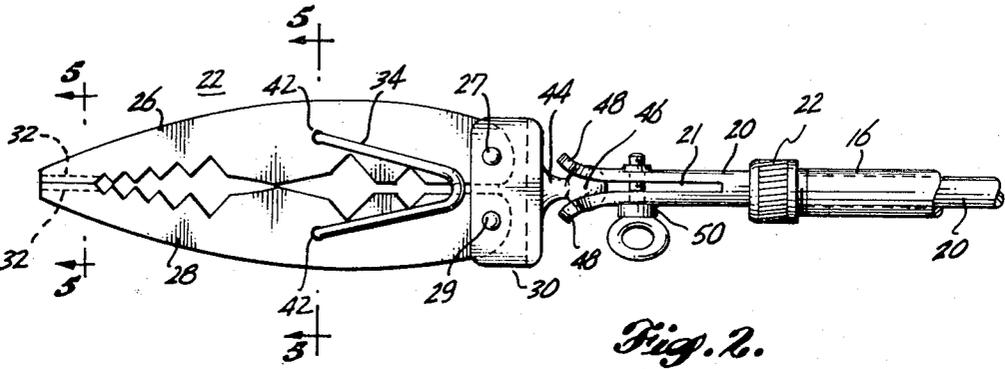
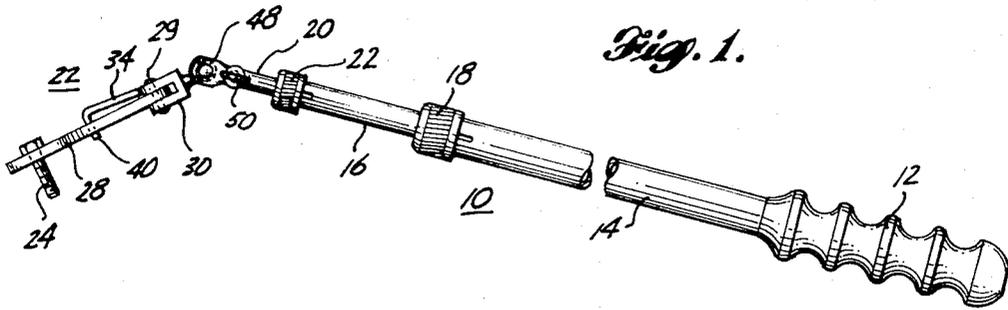
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4 Claims, 7 Drawing Figures





## GRIPPING AND STARTING TOOL

## BACKGROUND OF THE INVENTION

## Field of the Invention

This invention relates to a gripping and starting tool 5 useful in the assembly of hardware, mechanical apparatus of all kinds and in do-it-yourself operations about the home or office. It is particularly concerned with holding small fastening elements such as screws, bolts, nuts and the like for placement in difficult and remote, 10 hard to reach places, often those disposed or arranged in angular positions with respect to space or passage-way serving for entry purposes.

In assembling mechanical apparatus such as stoves, washing machines, clothes dryers, automobiles, and 15 like machinery, it very often occurs that it is desirable for the workman to locate and align the small fastener elements with respect to mating elements or to holes or the like. The problem of eventually mating such fastening parts is particularly difficult when the parts are not 20 physically or visibly accessible because of intervening structure or mechanical elements. Very often such an operation must be conducted at a considerable distance from the closest point accessible manually to the workman.

It is therefore a primary object of this invention to provide a gripping and starting tool capable of being variously extended and capable of receiving a great 25 manner of fastener elements, and of rigidly holding them in various angular relationships to the longitudinal axis of the elongated member at points very remote and often extremely inaccessible.

Other objects and advantages of the invention will become apparent during the course of the following description of a preferred embodiment of this invention. 35

The features of the instant invention which are believed to be novel are set forth with particularity in the claims that follow. It will be observed that the principles of the invention are applicable to other similar manipulating tools. The invention, both as to its organiza- 40 tion and manner of operation, together with further objects and advantages thereof, may be understood by reference to the following detailed description, taken in connection with the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of the gripping and starting tool for small fasteners;

FIG. 2 is an enlarged view of the adjustable fastener-gripping means;

FIG. 3 is a perspective view of a hairpin spring used in said tool;

FIG. 4 and FIG. 5 are cross-sections in planes 4—4 and 5—5 respectively of FIG. 2;

FIG. 6 is a detailed view showing the tool gripping a small fastener; and

FIG. 7 is a view partially in section illustrating details of a ball-and-socket connection.

## DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 1, it will be seen that the tool of this invention comprises an elongated member 10 adapted at its proximate end to be grasped manually as by handle 12 at the rear of the tube 14. Telescopically fitted in tube 14 is extension tube 16 which may be variously 65 withdrawn from within tube 14 and extended and secured tightly in its extended position or otherwise by

the collet nut 18. Similarly within tube 16 is fitted the telescoped tube 20 likewise secured by the collet nut 22. At the distal end of elongated member 10 is the fastener element, the bolt 24 being typically shown at a considerable distance and in otherwise practically inaccessible places for insertion into a hole or otherwise.

The fastener-gripping means 22 is shown in plan detail in FIG. 2 to opposed comprise jaws 26, 28, each pivotally secured by pins 27 and 29 respectively in the U-shaped yoke 30.

The opposed faces of jaws 26, 28 are serrated or notched as shown in FIG. 2 to accept and securely grip various types of fastenings, whether they be bolts or nuts or screws or other small fastener elements. At the forward end of the jaws as shown in FIG. 4 there are longitudinally extending opposed grooves 32 to hold a fastener in the manner shown in FIG. 6 in extension of the jaws.

A hairpin spring 34 comprises a pair of arms 36, 36 integrally joined by curved bend 38. Each of the arms has a down-turned leg 40 which fit into holes 42 one in each of the jaw members 26 or 28.

York 30 has rearward standing pin 44 supporting ball 46. The forward end of tubular member 20 is split at 21 and formed to provide jaws 48, 48 (see FIG. 2) which engage opposite surfaces of ball 46. The jaws 48, 48 are drawn towards each other by means of thumbscrew 50. When the fastener-gripping device is placed in a selected disposition relative the axis of the elongated member 10, it may be tightly held in that relation by tightening screw 50.

An object to be gripped and held at some distance is placed between the jaws 26, 28 which may be opened against the inward bias provided by hairpin spring 34. This spreading of the spring-pressed jaws may be accomplished manually or with the aid of a screw driver or similar tool which can be placed between serrations of the jaws and twisted sideways to exert lateral force 40 to open the jaws. By reason of the various sizes and shapes of serrations between the jaws square or hexagonal or round objects in the line of fasteners are easily accommodated.

While a particular embodiment of the invention has been shown and described herein, it will be obvious and apparent to those skilled in the art that changes and modifications may be desirable for special purposes, and without departing from the broader aspects of this invention. It is therefore the aim in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of this invention literally construed with respect to the doctrine of equivalents.

What is claimed is:

1. A gripping and starting tool for small fasteners, comprising:
  - an elongated member adapted to be grasped at its proximate end, and having fastener-gripping means at its distal end;
  - adjustable ball-and-socket means connecting said gripping means to the distal end of said member and permitting said gripping means to be variably disposed relative the axis of said elongated member;
  - said gripping means comprising a yoke having an opposed pair of serrated face, jaw members pivoted thereto; and

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spring means between said jaw members biasing each toward the other.

2. The structure of claim 1 in which the elongated member is telescopic.

3. The structure of claim 2 in which the opposed jaws are individually pivoted in said yoke on parallel spaced-

apart pivot pins.

4. The structure according to claim 1 in which the spring means comprise a hairpin spring juxtaposed to common faces of said jaw members and having its arms biased to close and each anchored to one of said jaws.

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