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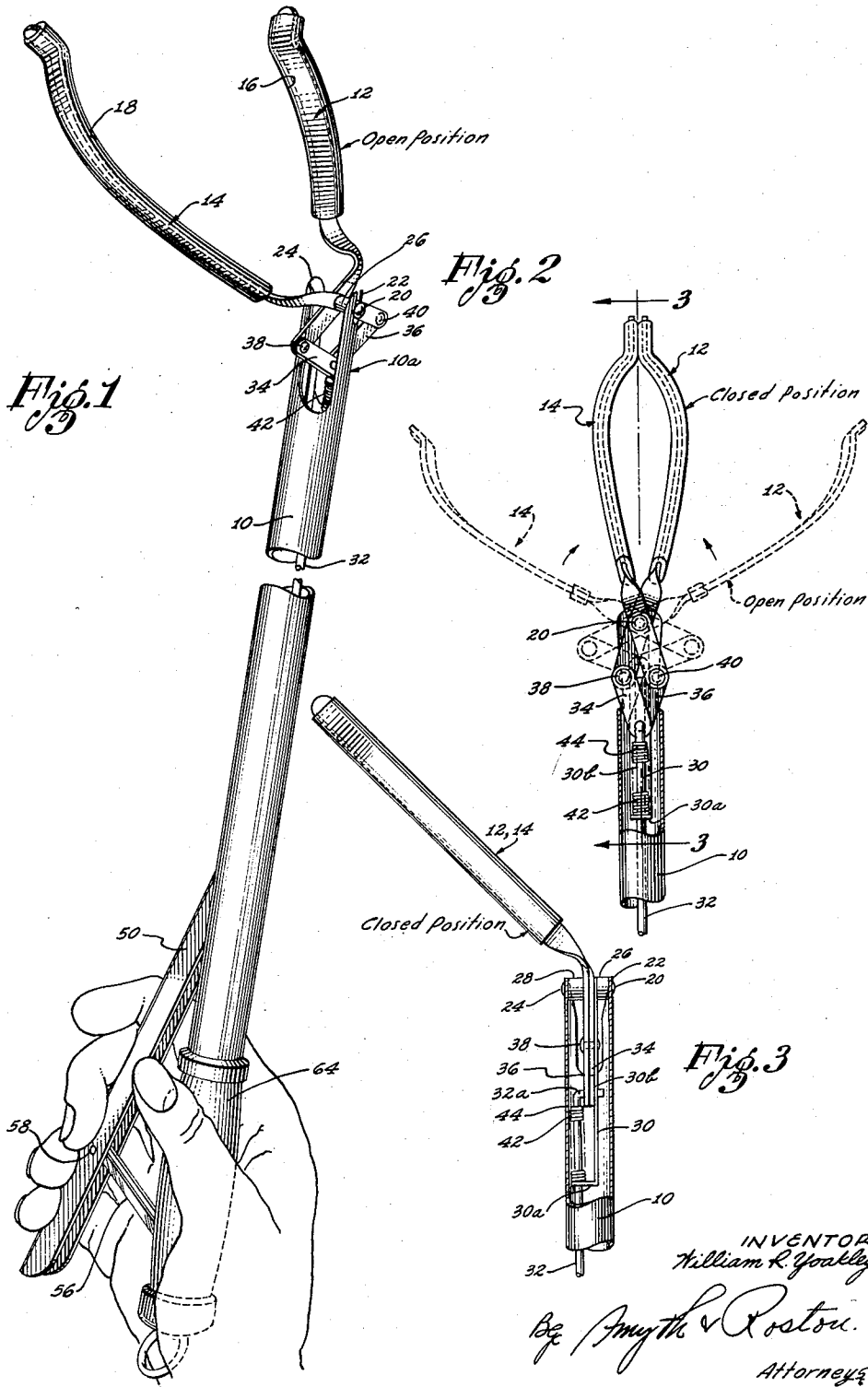
W. R. YOAKLEY, JR

2,869,914

EXTENSION ARM

Filed July 10, 1956

2 Sheets-Sheet 1



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Fig. 4

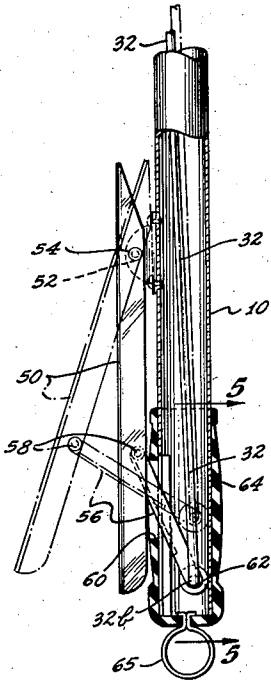
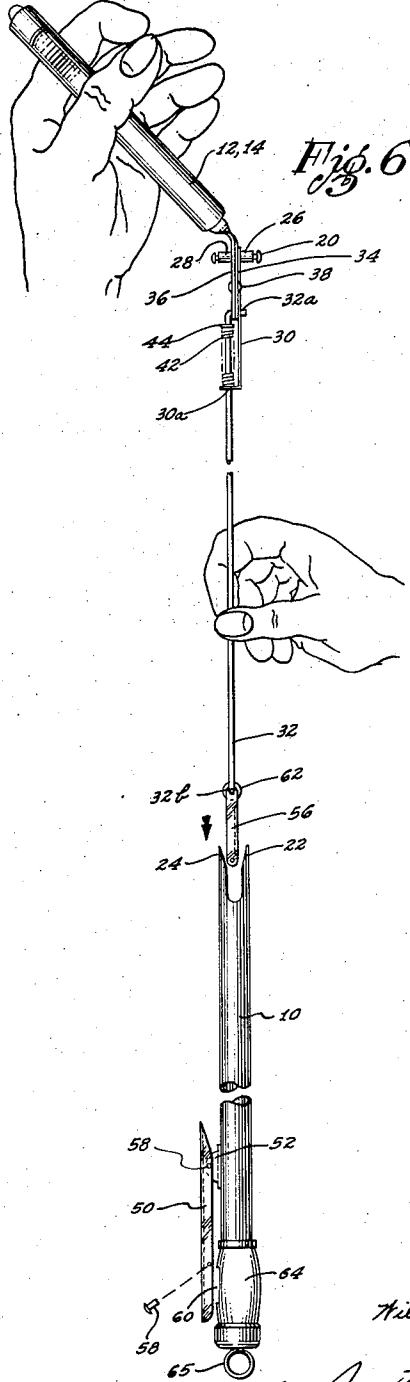
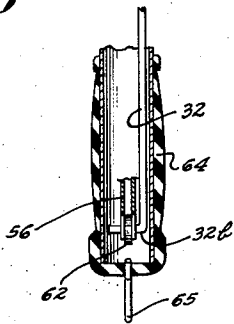


Fig. 5



INVENTOR:
William R. Yoakley, Jr.

By Amy Th & Poston.
Attorneys

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EXTENSION ARM

William R. Yoakley, Jr., Inglewood, Calif.

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3 Claims. (Cl. 294—22)

The present invention relates to extension arms for grasping articles which would otherwise be out of convenient reach.

Extension arms in general are known and have found general use in retail grocery stores for removing packages and the like from high shelves. An assembly of this general type usually comprises an elongated handle with a pair of grasping tongs mounted at one end. The handle also has some sort of actuator mounted at its other end, with a control rod running up its side from the actuator to the tongs. Most of the prior art assemblies have been extremely crude in their construction, and these have had little appeal or popularity outside of a few limited fields such as the one mentioned above.

There is, however, a pressing need around the home and in other instances for extension arms that are well constructed and easy to operate. For example, the housewife is continually reaching for relatively inaccessible articles. Moreover, she is continually bending to pick up toys and other articles from the floor. An important object of the present invention is to provide an improved and unique extension arm that is extremely simple, foolproof and convenient to operate. Moreover, the improved extension arm of the invention is most capable and efficient in grasping extraneous objects, thus rendering it eminently suited for use around the home and in other general applications.

A particular feature of the invention is the provision of a spring biased construction for the extension arm so that its tongs are normally spring biased to an open condition. This enables the assembly to be used with a convenient "snap" action. That is, when an object is to be grasped, an actuator on the device is gripped so as to move the tongs inwardly against the spring bias. The object may then be released, merely by relaxing the grip on the actuator. This spring biased feature of the assembly of the invention adds materially to the ease and quickness with which many objects can be picked up and later released by the extension arm of the invention.

A further feature of the improved extension arm of the present invention is the fact that it is constructed of relatively few component parts. In addition, its components are readily available and are relatively inexpensive. These factors contribute to enable the extension arm of the invention to be manufactured at a relatively low cost. It follows, therefore, that the assemblies can be sold at a low price.

Another feature contributing to the relatively low manufacturing cost of the improved extension arm of the invention is the ease with which the arm can be assembled. In a manner to be described, all the major components of the extension arm can be preassembled without the requirement for a multiplicity of riveting or other fastening operations. The preassembled components may then be slipped into a hollow tubular

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handle structure, and they are supported within the handle structure by an exceedingly simple fastening means. The components are so interrelated that the handle itself serves to retain them in an assembled condition. That is, the various major components of the assembly are held together without riveting or the like, and the arrangement is such that these components cannot become disengaged with one another once they are in place within the handle.

The various features and advantages of the invention will be understood from the following detailed description considered with the accompanying drawings.

In the drawings, which are to be regarded as merely illustrative:

Figure 1 is a perspective view on a somewhat reduced scale of the improved extension arm of the invention, showing the arm grasped in the hand of an operator and particularly illustrating the linkage between a pair of pivotally mounted tongs of the assembly and an actuating pull rod for the tongs;

Figure 2 is a fragmentary view, partly in section, of the tong end of the extension arm illustrating the linkage between the tongs and the pull rod, the solid lines in this figure showing the tongs in a closed or actuated position and the broken lines showing the tongs in their spring biased open position;

Figure 3 is a fragmentary view, substantially along the line 3—3 of Figure 2, partly in section, of the tong end of the extension arm, with the tongs in their spring-biased open condition and illustrating particularly a combined retainer, guide and brace for the actuating mechanism of the extension arm;

Figure 4 is a fragmentary view, partly in section, of the actuator end of the extension arm and illustrating particularly the linkage between the actuator and the pull rod;

Figure 5 is a fragmentary view of the actuator end of the arm substantially on the line 5—5 of Figure 4; and

Figure 6 is a diagram showing the operating components of the extension arm in the process of being assembled, and illustrating how these components may be preassembled and then slipped into the tubular handle portion of the extension arm.

With particular reference now to the accompanying drawings, it will be seen that the improved extension arm of the invention includes a main body 10. This body is in the form of a hollow tubular handle composed, for example, 24 gauge $\frac{3}{4}$ " steel tubing. Moreover, the handle may have a convenient length of, for example, two feet. The handle has a slotted end portion 10a. A pair of tongs 12 and 14 are pivotally mounted in this slotted end portion. These tongs, for example, may be composed of steel strips, these strips being bent to the illustrated configuration to facilitate the grasping properties of the tongs. The tongs themselves are covered by suitable gripping tubes 16, 18 composed of any appropriate plastic or rubber material.

The tongs 12 and 14 are mounted in a crossed manner to have their grasping portions extending from diametrically opposite sides of the slotted end portion 10a of the handle 10. The tongs also have respective end portions which extend in the opposite direction to their respective grasping portions through the slotted end portion 10a.

A rivet 20 extends through the crossover point of the tongs and through the end portion 10a of the handle. This rivet serves as a transverse pivot pin to mount the tongs pivotally on the handle. The rivet 20 is conveniently supported in diametrically opposed longitudinal slots 22, 24 in the end portion 10a, these slots extending

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to the extremity of the end portion. The use of slots such as the slots 22, 24 facilitates the fabrication of the extension arm in a manner to be described. The rivet 20 is, for example, a $\frac{1}{8} \times \frac{7}{8}$ " rivet, and it is spaced from the sides of the handle by a pair of coaxial spacers 26, 28 (Figure 3). These spacers may conveniently have a $\frac{3}{8}$ " diameter and a $\frac{3}{16}$ " length.

A sway brace and spring retainer 30 is supported by the rivet 20, and the brace extends longitudinally down the interior of the handle 10 from that rivet. The brace 30 has an apertured bent-over end portion 30a remote from the rivet pin 20, and this end portion extends across the interior of the handle 10. The brace 30 also has a slot 30b formed therein, and this slot extends longitudinally along the brace.

A pull rod 32 extends up the interior of the tubular handle 10. This pull rod has a bent-over end portion 32a at its upper extremity, and the pull rod extends through the apertured end portion 30a of the brace 30 with its bent-over end portion extending into the longitudinal slot 30b in the brace to be slidably guided in that slot.

A pair of links 34 and 36 are pivotally mounted by respective rivets 38, 40 to the ends of the tongs 12 and 14. The rivets 38 and 40 may, for example, be $\frac{1}{8} \times \frac{1}{4}$ " rivets. The ends of the links 34 and 36 remote from the rivets 38 and 40 are pivotally mounted on the bent-over end portion 32a of the pull rod 32. These links are interposed between the pull rod 32 and the brace 30 so that they may be retained on the end portion 32a of the pull rod.

A resilient coil spring 42 is mounted coaxially on the pull rod 32 between its bent-over end portion 32a and the bent-over end portion 30a of the brace. A spring retaining washer 44 is crimped to the pull rod 32, and this washer urges the spring against the end portion 30a of the brace. This causes the pull rod to be normally biased towards the tong end of the handle 10. The tongs 12 and 14 are therefore normally, spring-biased and held in their open position shown by the broken lines of Figure 2.

An external actuating lever 50 is provided at the end of the handle 10 remote from the tongs. A bracket 52 is spot welded or otherwise secured to the external surface of the handle, and one end of the actuating lever 50 is pivoted to this bracket by means, for example, of a $\frac{5}{8}$ " rivet 54. A channel-shaped actuating bar 56 has one end pivoted to an intermediate point on the lever 50 by means, for example, of a $\frac{3}{8}$ " rivet 58. The actuating bar 56 extends into the interior of the handle 10 through an appropriate slot 60 in the handle, and the bar extends away from the tong end of the handle towards its other extremity.

The pull rod 32 has a bent-over end portion 32b at its extremity remote from the bent-over end portion 32a. This bent-over portion 32b of the pull rod extends through apertures in the end of the actuating bar 56 remote from the lever 50. A disc-like roller 62 is rotatably mounted on the bent-over end portion 32b, and the roller is embraced and held on this portion by the sides of the channel-like actuating bar 56. This is most clearly shown in Figure 5. A hand grip 64 is slipped over the actuator end of the handle 10. This hand grip may be composed of rubber or of any suitable plastic.

The extension arm may be gripped at the hand grip 64 as shown in Figure 1. As long as the grip on the lever 50 is relaxed, the spring 42 biases the tongs 12, 14 to their open position (as shown by the broken lines of Figure 2). However, when the grip is tightened, the roller 62 is rolled along the internal surface of the handle 10 away from the tong end and towards the other extremity of the handle. This pulls the pull rod 32 longitudinally against the bias of the spring 42 and causes the tongs to assume their closed position. A convenient snap action can be achieved with this construction. That is,

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the tongs 12 and 14 can be closed over an object merely by tightening the grip on the lever 50, and the object can be later released merely by relaxing the grip.

A resilient metallic ring 65 is inserted in a hole in the end of the hand grip 64. This ring serves as a means for hanging the arm to facilitate storing.

As shown in Figure 6, the major components of the extension arm are susceptible to convenient preassembly. This, as previously noted, aids the ease and simplicity with which the unit can be assembled.

In the preassembly the tongs 12, 14 and the brace 30 are supported on the rivet 20 between the spacers 26, 28. The pull rod 32 is hooked through the apertured bent-over end portion 30a of the brace, the spring 42 is set in place, and the retaining washer 44 is crimped to the pull rod. The bent-over end 32a of the pull rod may then be passed through the apertured ends of the links 34 and 36, so that the preassembly assumes the illustrated assembled condition.

The bracket 52 is welded to the handle 10, and the lever 50 is pivotally mounted on the bracket. The actuating bar 56, together with the roller 62, are hung on the lower bent-over end portion 32b of the pull rod 32. The preassembled components are then slipped down into the hollow tubular handle 10, and the actuating bar 56 is turned out through the aperture 60. The end of the actuating bar is then pivoted to the lever 50 by the rivet 58.

The fact that the rivet 20 is held in the slots 22, 24 enables it to be incorporated into the preassembly to hold the preassembled components together. Then, as these components are slid into place, the rivet 20 is passed into the slots 22 and 24, and it is then firmly riveted to the handle 10.

It should be noted that the tubular handle itself holds all the preassembled components together as soon as they are slipped into place. That is, the pull rod 32 is held with its bent-over end portion 32a extending into the slot 30b in the brace 30 to hold the links 34 and 36 in place. Also, the actuating bar 56 is retained by the handle on the end portion 32b of the pull rod to hold the roller 62 in place. This assures that none of the preassembled components can ever become disassembled during the fabrication process and thereby interrupt the process and cause work stoppages. It also obviates the need for a multiplicity of rivets and fastening operations for the preassembly.

The invention provides, therefore, a new and improved extension arm. This arm is sturdy and rugged in its construction, yet it uses relatively few components and may be assembled in a simple and expedient manner. In addition, the assembly is simple and convenient to operate, and it is eminently suited in accomplishing its intended purposes.

Although a particular embodiment of the invention has been shown and described, it is to be understood that the invention is not to be limited to that embodiment for it is susceptible to changes in form and detail within the scope of the appended claims.

I claim:

1. An extension arm including: an elongated hollow tubular handle having a slotted end portion; a pair of crossed tongs having respective grasping portions extending from diametrically opposite sides of said slotted end portion, and said tongs having respective end portions extending in the opposite direction to said grasping portions through said slotted end portion; a transverse pivot pin extending through the cross-over point of said tongs and through said handle pivotally to mount said tongs at the slotted end of said handle; a brace supported in said handle by said pivot pin and extending longitudinally along the interior of said handle from said pin, said brace having a longitudinal slot therein and having an apertured bent-over end portion remote from said pin extending across the interior of said handle; a pull rod ex-

tending along the interior of said handle and through the aperture in the end portion of said brace, said pull rod having a bent-over end portion extending into the longitudinal slot in said brace; linkage means connected between the bent-over end portion of said pull rod and said end portions of said tongs to pivot said tongs about said pin upon longitudinal motion of said pull rod in said handle; a resilient coil spring surrounding said pull rod between the bent-over end portion thereof and the bent-over end portion of said brace; a retainer for said spring mounted on said pull rod to enable said spring to bias said pull rod in the direction of the slotted end portion of the handle; an actuating lever pivotally mounted on the external surface of said handle at the end of said handle remote from said tongs; a disc-like roller; and an actuating bar coupling said lever to said roller; said pull rod having a second bent-over end portion extending through said actuating bar and through said roller, so that actuation of said lever causes said actuating bar to move said roller along the internal surface of the handle in a direction to pull said pull rod against the bias action of said coil spring.

2. An extension arm including: an elongated hollow tubular handle having a slotted end portion; a pair of crossed tongs having respective grasping portions extending from diametrically opposite sides of said slotted end portion, and said tongs having respective end portions extending in the opposite direction to said grasping portions through said slotted end portion of said handle; a transverse pivot pin extending through the cross-over point of said tongs and through said end portion of said handle pivotally to mount said tongs at the slotted end of said handle; a brace supported in said handle by said pivot pin and extending longitudinally along the interior of said handle from said pin, said brace having a longitudinal slot therein and having an aperture bent-over end portion remote from said pin extending across the interior of said handle; a pull rod extending along the interior of said handle and through the aperture in the end portion of said brace, said pull rod having a bent-over end portion extending into the longitudinal slot in said brace; a pair of links pivotally mounted on said bent-over end portion of said pull rod and on the respective extremities of said end portions of said tongs; said links being interposed on said bent-over end portion of said pull rod between said pull rod and said brace; a resilient coil spring surrounding said pull rod between the bent-over end portion thereof and said bent-over end portion of said brace; a disc-like retainer for said spring mounted on said pull rod to urge said spring against the bent-over end portion of said brace and cause said spring to bias said pull rod towards said slotted end portion of said handle; an actuating lever pivotally mounted on the external surface of said handle at the end of said handle remote from said tongs; a disc-like roller; and an actuat-

ing bar coupling said lever to said roller; said pull rod having a second bent-over end portion extending through said actuating bar and through said roller, so that actuation of said lever causes said actuating bar to move said roller along the internal surface of the handle in a direction to pull said pull rod against the bias action of said coil spring.

3. An extension arm including: an elongated hollow tubular handle having a first end portion; a pair of crossed tongs having respective grasping portions extending from diametrically opposite sides of the first end portion of said handle, said tongs having respective end portions extending in the opposite directions to the corresponding grasping portions; a transverse pivot pin extending through the cross-over point of the tongs and through the end portion of the handle to pivotally mount the tongs on the end portion of the handle; a brace supported in the handle by the pivot pin and extending longitudinally along the interior of the handle from the pivot pin, said brace having a longitudinal slot therein and having an apertured end portion extending across the interior of the handle; a pull rod extending along the interior of the handle and having a first end portion extending through the apertured end portion of the brace, the first end portion of the pull rod also extending into the longitudinal slot in the brace; linkage means connected between the first end portion of the pull rod and the respective end portions of the tongs to pivot the tongs about the pivot pin upon longitudinal movement of the pull rod in the handle; a resilient coil spring surrounding the first end portion of the pull rod and engaging said end portion of the brace; an actuating lever pivotally mounted on the external surface of said handle at a position remote from the first end portion of the handle; and linkage means coupling said actuating lever to said pull rod, so that actuation of the lever causes said linkage means to move the pull rod in a direction to pull said pull rod against the bias action of said resilient coil spring.

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