Sept. 13, 1966 A. LANGAS 3,272,267

WALKING STICK FOR FASTENING TOOL

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Fig. 2

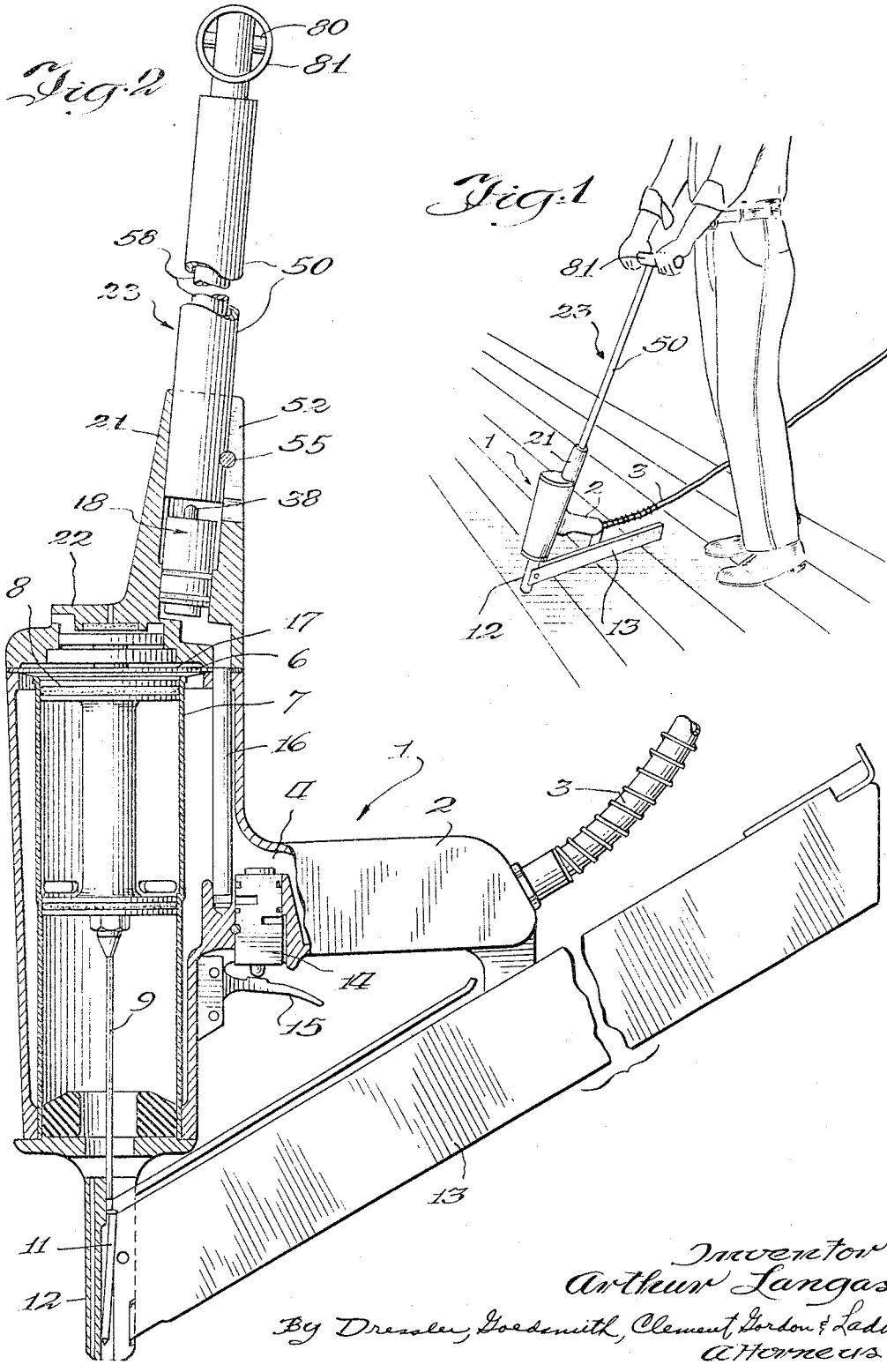


Fig. 1

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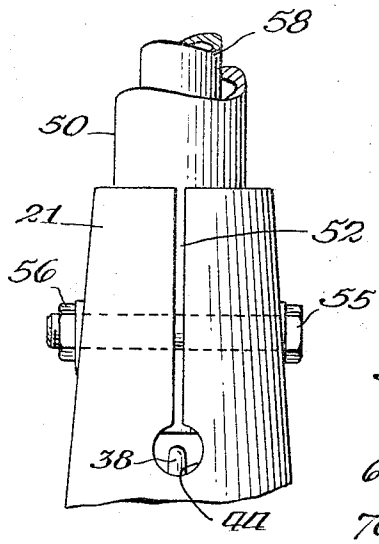


Fig. 6

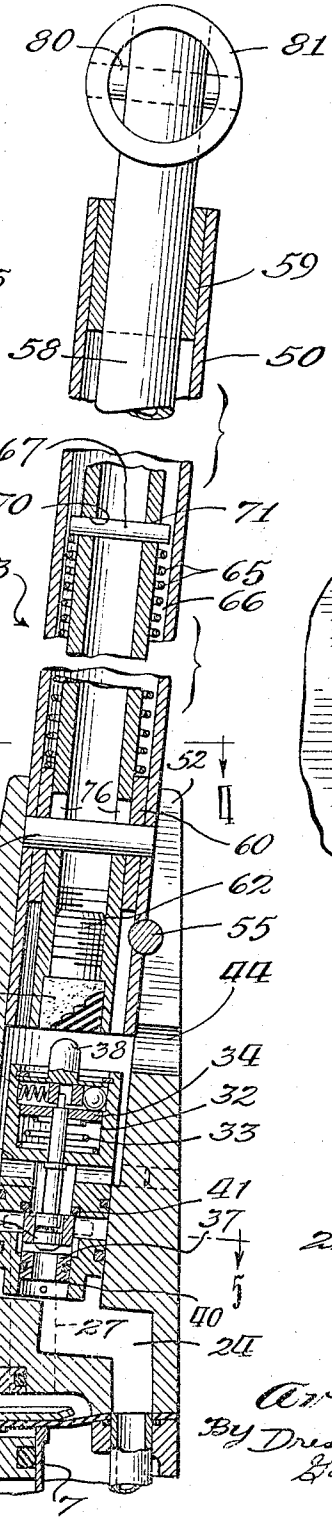


Fig. 3

Fig. 4

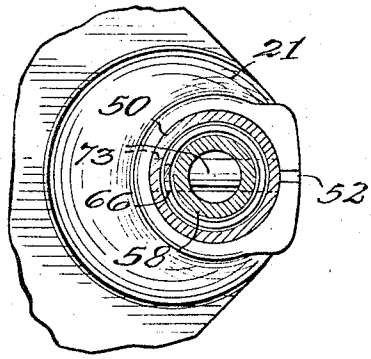
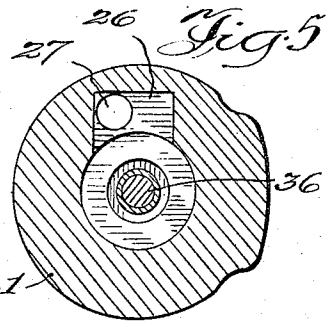


Fig. 5



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United States Patent Office 3,272,267 Patented Sept. 13, 1966

3,272,267

WALKING STICK FOR FASTENING TOOL

Arthur Langas, Chicago, Ill., assignor to Signode Corporation, a corporation of Delaware

Filed Oct. 21, 1963, Ser. No. 317,701
2 Claims. (Cl. 173—170)

This invention relates to a pneumatically operated fastening tool and, particularly, to a mechanism which enables the operator to control the firing of the tool from an upright position.

Pneumatically operated fastening tools are currently being used to drive heavy duty staples, T-nails and "common" nails. These tools are usable in a large number of different industries such as construction, packaging, upholstering, etc. These tools are primarily trigger controlled and the trigger is usually located in the handle of the tool for ease of operation. The tools are very compact and relatively light in weight so that they are portable and can be conveniently transported by the operator.

Where such tools are used in nailing flooring or other types of construction work wherein the tool is continuously moved along, it would be extremely desirable from the human engineering standpoint for the operator to be able to control the tool from an upright position. Such an arrangement would obviously reduce the fatigue involved in operating the tool since the operator would not then be required to move along on his knees or in some other uncomfortable position, which would be very tiresome.

In accordance with the present invention, there is provided a novel control mechanism, which in combination with a valve located in a cap of the tool can be used to operate the tool from a standing position when the tool is brought into contact with the work piece into which a fastener is to be driven. The novel control mechanism or "walking stick" attachment is designed so that when the tool is placed in contact with the work, a slight movement thereof will fire the tool. The basic tool need not be changed, since all that is required is that a supplemental valve be added near the top of the tool or some other convenient place. The added valve which becomes the control for the tool is operated by the reciprocal movement of the operating mechanism controlled by the operator to fire the tool. The application of the novel remote control mechanism does not effect the operation of the basic tool and thus if it is desired to fire the tool in a conventional manner by using the trigger, this mode of operation is still available to the operator.

Other advantages of the tool will be apparent from the attached drawings which illustrate a preferred embodiment of applicant's invention and, in which:

FIGURE 1 is a view showing the tool being controlled by an operator standing in an upright position;

FIGURE 2 is an elevation view, partially in section, of the tool and actuating mechanism therefor;

FIGURE 3 is a cross-sectional view of the cap illustrating the relationship between the valve controlling the flow of air under pressure to the driving piston and the actuating mechanism;

FIGURE 4 is a view taken along line 4—4 of FIGURE 3;

FIGURE 5 is a view taken along line 5—5 of FIGURE 3; and

FIGURE 6 is a partial elevation view showing the means for clamping the operating mechanism in place relative to the tool cap.

Referring first to FIGURE 1, there is illustrated a tool being operated in accordance with the present invention as it is positioned when used to drive nails into flooring. The construction worker performing this job is shown

standing in an upright position with his hands gripping the handle portion of the operating mechanism. The driving tool pictured is a pneumatic nailer, but this representation is merely exemplary of a family of pneumatic fastening tools to which the instant invention can be applied.

The pneumatic fastening tool disclosed is shown in some detail in FIGURE 2, and with the exception of the modified cap secured thereto is generally of the type described in United States Patent No. 3,106,136, granted on October 8, 1963, to Arthur Langas and Harrison C. Lingle, and assigned to the assignee of the present invention. The details of this tool are clearly set forth in said patent, and only such portions of the tool will be described in the instant application as is necessary to understand the present invention.

Briefly, the tool **1** includes a hollow handle portion **2** into which air under pressure is supplied through a conduit **3**. The reservoir **4** located within the hollow handle **2** is in direct communication with the underside of a diaphragm assembly **6** that acts to close the open end of a cylinder **7**. Located within the cylinder **7** is a driving piston **8** and interconnected driver blade **9**. When the piston **8** is exposed to the air from reservoir **4**, it is moved in a downward direction to drive the blade **9** into engagement with a nail **11** located in the nose **12** of the tool **1**. The nail **11** is the end nail of an adhered strip of nails located in a magazine **13** secured to the tool **1**. The high impact forces exerted against the piston **8** move the driver **9** against the nail **11** to drive the nail into the members to be joined.

When used as a portable hand tool, the operation thereof was determined by a valve **14** which was controlled by a trigger **15** located on the underside of the handle **2** adjacent the juncture of the handle and the nose portion of the tool.

Prior to the trigger being pulled, the valve **14** is positioned to admit air from the reservoir **4** into the conduit **16** that communicates with the chamber **17** located above the diaphragm **6**. This results in air pressure being exerted on the upper surface of the diaphragm **6**, the area of which was larger than that located outwardly of the cylinder **7**, with the resultant unbalanced force acting to retain the diaphragm seated on cylinder **7**. When the trigger **15** was pulled the conduit **16** was closed off from reservoir **4** and opened to atmosphere whereby chamber **17** above diaphragm **6** was vented. This series of steps created an unbalanced condition whereby the fluid under pressure in reservoir **4** acting on the underside of diaphragm **6** moved diaphragm **6** away from cylinder **7** and exposed piston **8** to the air under pressure in reservoir **4**. The explosive force acting on piston **8** moved it and blade **9** downwardly at a rapid rate to drive a nail into the members to be joined.

This method of operation could still be practiced when incorporating the present invention, since as will be set forth more clearly hereinafter, conduit **16** is still in communication with chamber **17** prior to the operation of the tool whether the tool is fired by use of the trigger, or the handle operating mechanism hereinafter described. Thus, notwithstanding the modifying of the tool to incorporate the present invention, the tool can be operated, if desired, as a trigger-controlled portable fastening tool. However, if this dual operation was not required, the valve **14** and trigger **15** could be eliminated and conduit **16** placed in direct communication with reservoir **4**.

Turning now to the present invention, there is provided a remote control mechanism, or "walking stick," that permits the operator to fire the tool from an upright position. Generally speaking, this is accomplished by providing an elongated actuating handle assembly **23** that extends upwardly from the tool to where the operator can com-

fortably reach it while standing, as shown in FIGURE 1.

To effectuate this "remote" method of operation, there is incorporated within the handle an actuating mechanism which takes the place or acts in the same manner as the trigger **15**. That is to say, there is a valve and control assembly provided for regulating the flow of air into and out of chamber **17**, which in turn determines the firing sequence of the tool.

One way of accomplishing the above is to provide the cap **22** of the tool with a valve **18** that is similar in structure and method of operation to valve **14**. The valve **18** is interposed between conduit **16** and chamber **17** and functions to control the operation of diaphragm **6** in exactly the same manner as previously described when discussing valve **14**. The valve **18**, as shown in FIGURE 3, is identical to valve **14**, but is turned around so that it will be operated by a downward pressure, rather than by the upward pressure exerted by the trigger **15**.

The valve **18** is positioned so that conduit **16** is in communication with chamber **17** through passageway **24**, port **26**, and passageway **27** in cap **22** prior to operation or actuation of valve **18**. While a valve of the type herein used is disclosed in detail in aforementioned Patent No. 3,106,136 and was previously referred to herein, it is believed that a brief review of the operation of this valve is in order.

Valve **18** includes a housing **31** within which there is formed a recess **32** containing a spring **33** that acts against plate **34** to normally bias valve **36** out of engagement with seat **37** to permit communication between passageway **24** in cap **22** and port **26** in housing **31**. Port **26** in turn communicates with chamber **17** through passageway **27**. Thus, prior to actuating valve **18**, air under pressure is free to flow from reservoir **4** through conduit **16** into chamber **17**. As indicated previously, valve **14** is normally positioned to permit the flow of air from reservoir **4** into conduit **16**. Accordingly, prior to the actuation of either trigger **15** or handle **23**, chamber **17** will be filled with air under pressure and diaphragm **6** will be positively seated against cylinder **7**.

The handle assembly **23**, to be described in detail hereinafter, is positioned to engage button **38** when moved in a downward direction. Inward movement of button **38**, which is operatively connected to valve **36**, moves valve **36** into engagement with valve seat **37** to close off the flow of air between conduit **16** and chamber **17** by closing off port **26** from passageway **24**. Further movement of button **38** moves valve stem **36** and sleeve **40**, which defines valve seat **37**, away from upper valve seat **41** surrounding passageway **42**. Passageway **42** is in communication with passage **43** leading to vent **44**, which places port **26** in communication with passageway **42** to vent the air under pressure in chamber **17**. It remains to note that valve **18** along with valve **14** is a "cycling" valve, which means that it is designed to automatically return to its starting position after the aforementioned method of operation is completed, whereby fluid will again be admitted to the upper side of the diaphragm to close cylinder **7** and permit piston **8** to be returned to its driving position. This method of operation eliminates the need for the operator to lift the tool from the work in order to drive a subsequent fastener. Obviously, the invention is not limited to use with a cycling valve.

Thus, it can be seen that the operation of valve **18**, through movement of button **38**, will effect firing of the tool by venting chamber **17**, which permits the air acting on the underside of diaphragm **6** to raise the diaphragm and act against the upper side of piston **8**.

The handle assembly **23**, which enables the operator to fire the tool from the upright position, includes an outer sleeve **50** that is slidably fitted into the upwardly extending boss **21** of cap **22**. The sleeve **50** is long enough to extend from the tool to where the operator's arms can reach a cross piece secured to the upper end of the handle without stooping.

As shown in FIGURE 6, the boss **21** is split at **52** to permit insertion of the tube **50**. The boss **21** is then clamped to retain the tube **50** in place in the cap by a bolt and nut assembly **55**, **56**, respectively, extending through the boss at one side thereof.

Disposed within tube **50** is an inner tube **58** which is slidably supported relative to tube **50** by a pair of longitudinally spaced bushings **59**, **60**. Secured within the lower portion of tube **58** is a bumper **61** adapted to engage button **38** to actuate the valve **18** and fire the tool when tube **58** is moved downwardly relative to tube **50**. The position of the bumper relative to the end of the tube is adjusted by adjustable screw **62** threaded into the inner end of tube **58**. The screw **62** is positioned so that in the inoperative position the bumper is spaced approximately $\frac{1}{16}$ inch from the valve button **38**.

The tube **58** and bumper **61** are normally biased out of engagement with button **38** by a compression spring **65** located within the annular chamber **66** formed between the outer wall of tube **58** and the inner wall of tube **50**. The spring is located between the upper surface of bushing **60** and the lower surface of a pin **67** extending transversely through aligned openings **70**, **71** in tube **58**.

The upward movement of tube **58** is limited by a pin **73** which extends in a transverse direction through aligned openings in sleeve **50** and bushing **60**, and aligned elongated slots **76** in tube **58**. The length of the slots **76** determines the travel of tube **58** relative to tube **50**. Thus, the inner tube **58** will be moved upwardly until the bottom of slots **76** comes into contact with pin **73**, and the downward movement of tube **58** will be limited by the engagement of pin **73** with the upper end of slots **76**.

Connected to the upper end of tube **58** by a pin **80** is a transversely extending handle member or cross piece **81**. The handle **81** is long enough to provide room for the operator to grip it on both sides of tube **50**.

Thus, it can be seen that the tool can be operated by an operator standing in an upright position by merely placing the nose of the tool into engagement with the work to be fastened and moving the cross piece **81** and tube **58** downwardly against the action of spring **65** to move bumper **61** into engagement with button **38** to position valve **18** to fire the tool.

It can be appreciated that other modifications can be employed and that the invention is not limited to the particular details of the control valve or the tool, since it is only necessary that there be provided a mechanism which can be operated by longitudinal movement of an operating mechanism readily accessible to an operator standing in an upright position.

It is, of course, intended to cover by the appended claims all such modifications as fall within the true spirit and scope of the invention.

I claim:

1. A walking stick for a fastening tool whereby the valve controlling the operation of the tool can be operated from a remote position, said walking stick including a first tube secured to the tool, a second tube slidably mounted within said first tube, bushings spacing said second tube from the wall thereof to define an annular chamber, said second tube defining a pair of aligned elongated slots, first pin means extending through aligned openings defined by said first tube and said elongated slots for limiting the longitudinal movement of the second tube relative to said first tube, second pin means longitudinally spaced from said first pin means and extending through aligned openings in said second tube, spring means disposed in the annular chamber and in engagement with said second pin means to bias said second tube out of engagement with said valve, bumper means adjustably mounted in the end of said second tube and adapted to engage said valve, and a transversely extending handle secured to the upper portion of said second tube whereby the walking stick can be gripped and

operated by an operator standing in an upright position.

2. A walking stick for a fastening tool whereby the tool can be operated from a remote position, the fastening tool including a driver blade, a cylinder housing said driver blade, a cap on one end of said cylinder, a boss extending outwardly from said cap, a valve and actuator therefor in said boss for controlling the operation of said tool, said walking stick including a first tube secured to the boss, a second tube slidably mounted within said first tube adapted to engage the actuator to operate the valve and spaced from the wall thereof to define an annular chamber, said second tube defining a pair of aligned elongated slots, first pin means extending through aligned openings defined by said first tube and said elongated slots for limiting the longitudinal movement of the second tube relative to said first tube, second pin means longitudinally spaced from said first pin means and extending through aligned openings in said second tube, spring means disposed in the annular chamber and positioned to engage the second pin means to bias said second tube out of engagement with said

valve actuator, bumper means adjustably mounted in the end of said second tube adapted to engage said valve, and a transversely extending handle secured to the upper portion of said second tube whereby the walking stick can be gripped and operated by an operator standing in an upright position.

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