

April 22, 1958

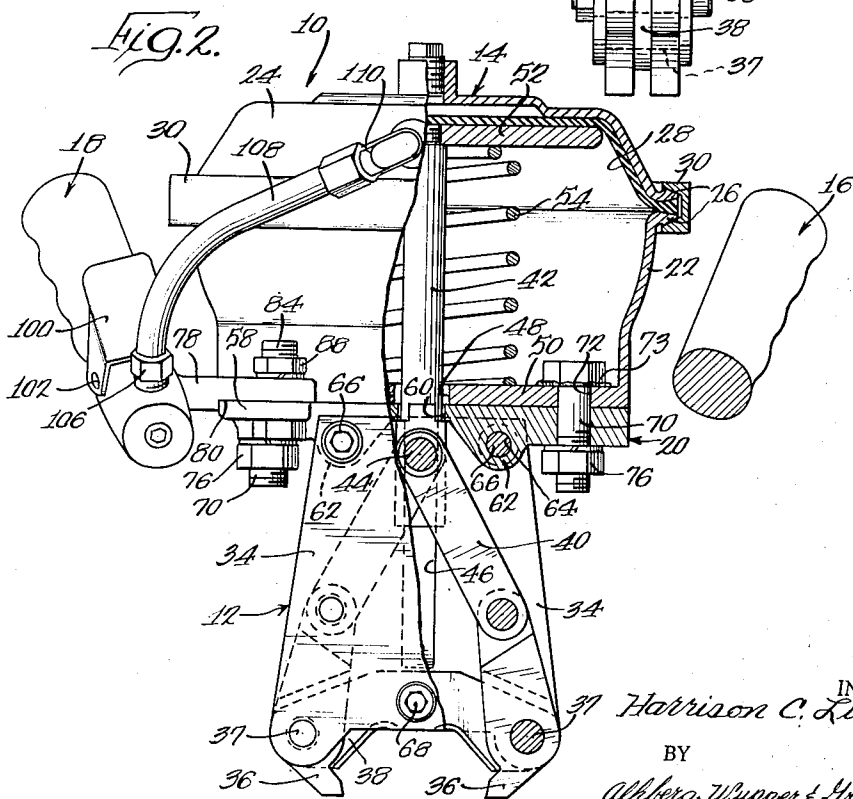
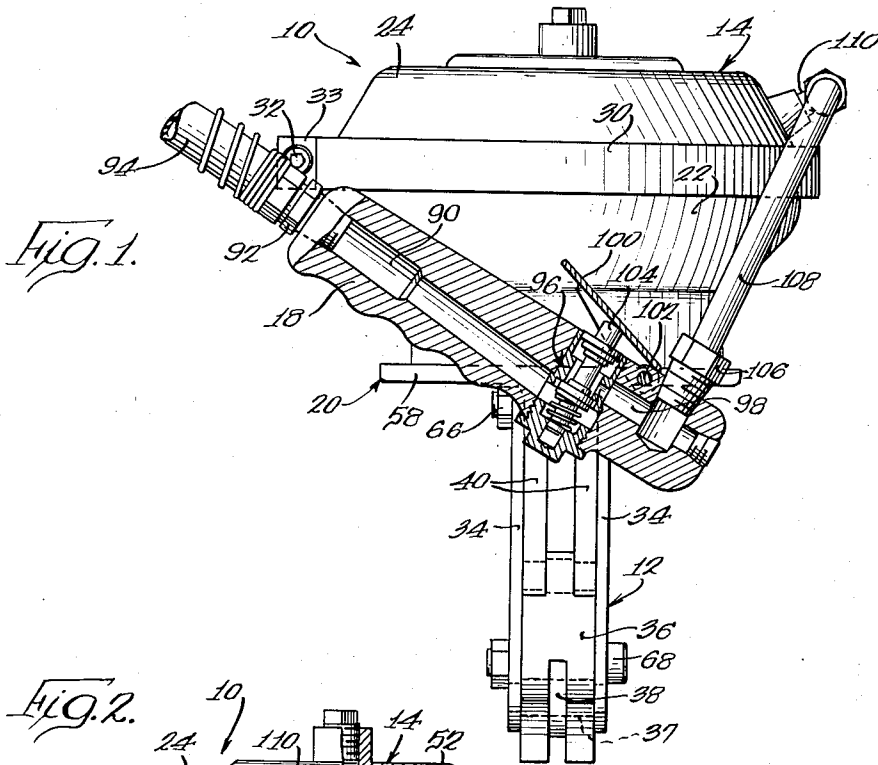
H. C. LINGLE

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PNEUMATIC JOINT FORMING TOOL

Filed Dec. 18, 1956

2 Sheets-Sheet 1



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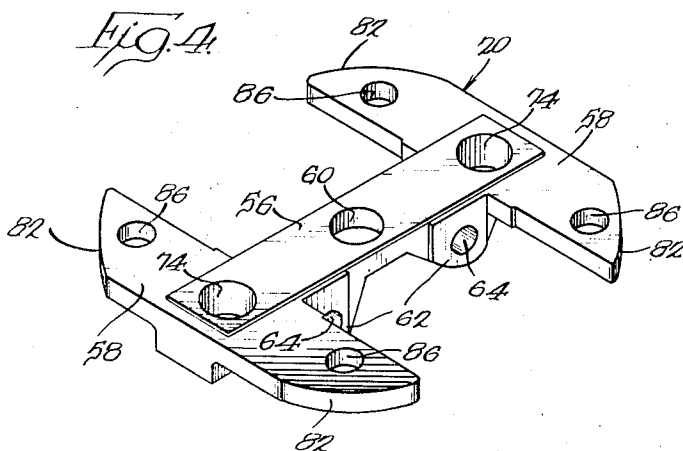
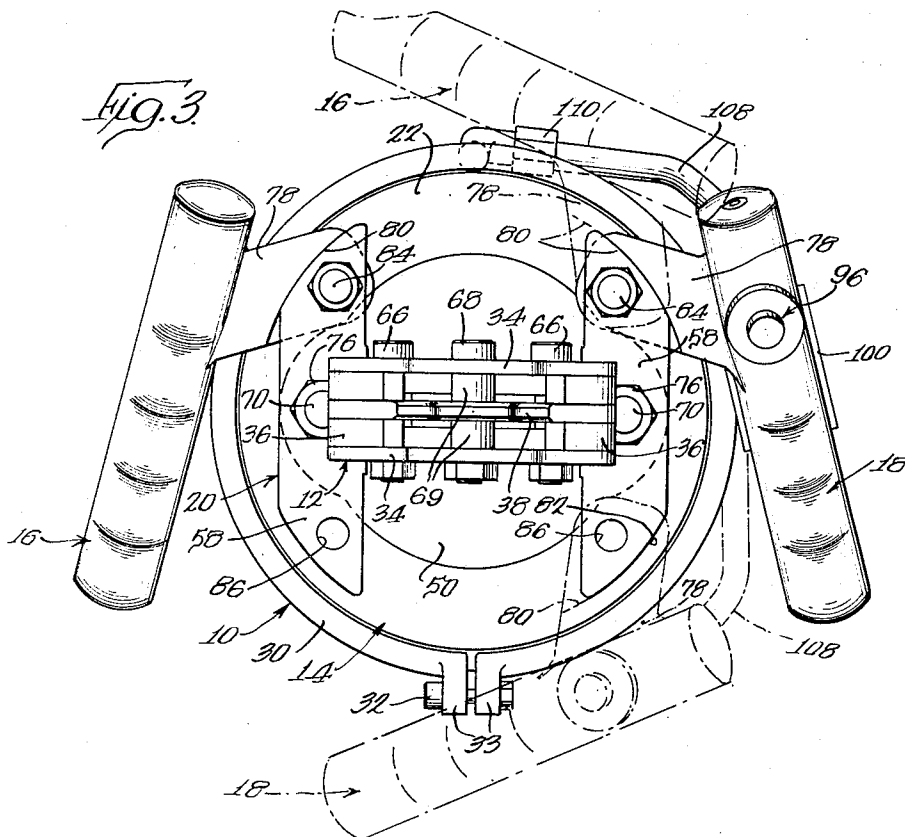
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PNEUMATIC JOINT FORMING TOOL

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6 Claims. (Cl. 81—9.1)

The present invention relates to improvements in pneumatically powered tools for forming a tension resisting joint in the overlapping ends of bundle encircling strapping and an embracing seal.

It has at times been difficult to insure the formation of a fully completed joint between the overlapping ends of heavy duty strapping and an embracing seal when it is done manually, that is, with a tool having manually powered handles connected to the joint forming jaw assembly.

It is, therefore, a principal object of the present invention to provide a new and improved pneumatically powered tool for forming a tension resisting joint between the overlapping ends of heavy duty strapping and an embracing seal, particularly for strapping one and one-quarter inches wide or wider and .035 inch thick or thicker.

Another object of the present invention is to provide a new and improved pneumatically operated joint forming tool which is easy in its action and forms a uniform high strength joint in the strapping ends.

Another object is to provide a new and improved pneumatic joint forming tool which is comparatively light in weight, compact, and easily handled.

Another object is to provide a new and improved pneumatically operated joint forming tool wherein the position of the handles relative to the jaw assembly might be changed so as to provide the most convenient application of the jaw assembly to the strapping which is to be sealed.

Another object is to provide a new and improved pneumatically powered joint forming tool wherein the position of the handles relative to the jaw assembly may be readily changed to provide convenience for the operator in manipulating the tool.

Another object is to provide a new and improved pneumatically operated joint forming tool which is sturdy in construction and has a long life.

Other objects and advantages will become apparent from the following description taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a side elevational view of the tool, showing one of the handles broken into section better to illustrate the air control valve;

Fig. 2 is a side elevational view partially broken into section to show the connection between the jaw assembly and the pneumatic motor and the handle mounting, and may be considered generally as being taken from the right hand side of Fig. 1;

Fig. 3 is a face or end view of the joint forming mechanism from the under side of Figs. 1 and 2 and showing the handles arranged in one position in full lines and in another position in phantom lines; and

Fig. 4 is a perspective view of the plate for mounting the handles and jaw assembly to the pneumatic motor.

The joint forming tool, indicated generally by the reference character 10, includes a joint forming jaw

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assembly 12, a pneumatic cylinder or motor 14 of the flexible diaphragm type, a pair of handles 16 and 18 and a plate means 20 for securing the joint forming jaw assembly 12 and the handles 16 and 18 to the motor

5 14.

The pneumatic cylinder or motor 14 may be of the well known type and comprises a first or base cup 22 the interior of which is at atmospheric pressure, and a pressure plate or cup 24, the cups 22 and 24 having meeting flanges 26 between which is clamped the edge of a diaphragm 28. The assembly of the base cup 22, the pressure plate 24 and the diaphragm 28 is secured by a C-shaped clamping ring 30, fitted with a bolt and nut combination 32 passing through apertured ears 33 on the ring 30.

The joint forming jaw assembly 12 is a known type, modified for the formation of joints in heavy duty strapping in the order of 1¼" to 2", and for mounting on the pneumatic motor 14. The jaw assembly includes a pair of spaced side plates 34 between which are pivoted a pair of jaws 36 which cooperate with a notcher 38 in the formation of the joint, the jaws being pivoted on fixed shouldered pins carried by the plates 34, and the notcher 38 mounted on the pins 37. The jaws 36 are connected to the motor 14 by links 40 and a ram 42. The links 40 are pivotally connected to the jaws and are pivoted to the ram 42 by a single pin 44 which has its ends guided in slots 46 formed on the inner faces of the plates 34.

The ram slidably projects through a hole 48 formed in the bottom wall 50 of the base cup 22 and has its inner end fixed to a push plate 52. The push plate is urged to retracted position and away from the wall 50 by a spring 54 confined between the wall 50 and the plate 52, thereby urging the jaw assembly 12 to open position, which is that shown in the drawings.

The mounting plate 20 is a casting having a generally H shape, as seen best in Fig. 4, and comprises a center bar 56 integral with a pair of legs 58. The center bar 56 is formed with an opening 60 at its center to accommodate the ram 42. At either side of the opening 60, the center bar 56 is formed with a pair of outstanding bosses 62 apertured at 64 to receive bolts 66 which pass therethrough and through holes in the inner ends of the jaw assembly side plates 34. Thus, the jaw assembly at its inner end is fixed to the mounting plate 20 and the bosses 62 accurately space the plates 34. The outer ends of the plates 34 are also secured in spaced relation by a bolt 68 which extends through the notcher 38 and spacers 69.

The mounting casting 20 is secured to the bottom wall 50 of the base cup 22 by a pair of bolts 70 which extend through openings 72 in the bottom wall and openings 74 in the juncture between the bar 56 and the legs 58 of the mounting plate 20. The bolts 70 are welded at 73 to the wall 50, and suitable nuts 76 and lock washers insure the permanent affixation of the mounting plate to the motor 14 so that it does not loosen during the normal operation of this tool, and the jaw assembly 12 is properly and accurately fixed to the motor 14.

The handles 16 and 18 are preferably made of cast aluminum and are designated as the left and right handles, respectively, when viewed from the top of the tool (the top of Figs. 1 and 2). Each of the handles 16 and 18 is provided with an arm 78 projecting inwardly toward the motor from the handle and at an angle to the longitudinal center line of the handle. Each arm 78 is formed with an arcuate recess 80 at its under side to receive the arcuate outer ends or ears 82 of the casting legs 58, thereby properly locating the handles with respect to the casting. The arms 78 are suitably apertured to receive mounting bolts 84 which also pass through apertures 86 in the ends of the mounting plate legs 58. Suitable nuts

88 and lock washers prevent the handles from loosening during the normal operation of the tool.

The handle 18, which is the right handle, is formed with an air passage 90, at the outer end of which is secured a fitting 92 to which the conventional air hose may be coupled. The inner end of the passage 90 leads to an air valve 96 of the three-way type, that is, in its normal position it is closed against the ingress of air, and when it is operated it opens to permit the air to be passed to the space between the flexible diaphragm 28 and the pressure plate 24. When the valve is released it moves to its original position, thereby dumping pressure from the pressure side of the motor to the atmosphere. The valve controls communication between the air passage 90 and passage 98.

The valve 96 is operated by a lever 100 which is pivoted at 102 to the handle 18 and lies above the valve operating button 104 which projects to the upper side of the handle 18. The valve operating lever 100 is in a convenient position on the handle 18 to be operated by the thumb of the operator.

The passage 98 in the handle is connected by a fitting 106, an angled pipe 108 and an elbow fitting 110 to the pressure plate 24 and thereby conducts the pressurized air to and from the space in the motor between the pressure plate 24 and the flexible diaphragm 28.

As shown in the full lines in the drawings, with particular reference to Fig. 3, it will be observed that the orientation of the handles 16 and 18 and the jaw assembly 12 is such that when the tool 10 is held by the operator and the jaw assembly is moved toward the strap, the strap would be on the bundle so that it extends vertically with respect to the operator; that is, in the up-and-down direction. This would be the usual position of strap encircling a bundle of logs or securing a load on a railroad flat car. Should, however, the strapping extend horizontally, the tool could be held so that one of the operator's hands is above the other. However, this is an awkward position particularly when applying the tool to strapping of the heaviest gauges and sizes, such as two-inch strapping having a thickness of 0.050". Therefore, it is advisable that the handles be moved to the positions shown in phantom lines in Fig. 3, so that the strapping would extend across the operator's hands rather than between them. This change is accomplished by loosening the bolt and nut connection 32 for the clamping ring 30 and by removing the bolts 84 and nuts 88 securing the handle mounting arms 78 to the mounting casting 20. When this has been done, the pressure plate 24, handle 18, valve 96 and connections can be rotated 90° relative to the base plate 22 and the joint-forming jaw assembly 12. When this assembly has been rotated sufficiently, the handles are then secured in the positions shown in the phantom lines in Fig. 3. For example, the handle 16 would be secured to the end of the leg 58 to which the handle 18 had previously been secured, which is the opposite leg from that to which the handle 16 was originally fastened. Then the handle 18 would be fastened to the opposite end of the same leg 58. This, of course, is merely a suggested change, as the rotation of parts could have been in the counterclockwise direction, as seen in Fig. 3, rather than in the clockwise direction.

It is thus clear that this tool has great versatility and is better adapted for all working conditions than any other pneumatically operated joint forming tool of the portable type.

It should also be observed that the tool is relatively light, aluminum parts being used wherever possible to minimize the weight of a portable tool of this character. It is, however, extremely strong and is capable for forming the joint in the heaviest duty strapping now in use. It is obvious, therefore, that the objectives which were claimed for the invention at the outset of this description have been fully attained.

While a preferred embodiment of the pneumatic joint forming tool constituting this invention has been shown and described, it will be apparent that numerous modifications and variations thereof may be made without departing from the underlying principles of the invention. It is, therefore, desired by the following claims to include within the scope of the invention all such variations and modifications by which substantially the results of this invention may be obtained through the use of substantially the same or equivalent means.

What is claimed as new and desired to be secured by United States Letters Patent is:

1. In a pneumatic tool for forming a tension resisting joint in the overlapping portions of a bundle or the like encircling band of strapping having a strap deforming jaw assembly and a pneumatic motor connected to and operating the jaw assembly, which comprises a mounting plate secured to the pneumatic motor and having a plurality of apertured ears arranged radially outwardly from the center thereof, a pair of handles, and means connecting said pair of handles to selected adjacent ones of said ears so that said handles may be grasped by the operator conveniently to apply the jaw assembly to strapping disposed in either the vertical or horizontal position with respect to the operator.

2. In a pneumatic tool for forming a tension resisting joint in the overlapping portions of a bundle or the like encircling band of strapping having a strap deforming jaw assembly and a pneumatic motor connected to and operating the jaw assembly, the improvement which comprises a mounting casting secured to the pneumatic motor, and having a plurality of apertured ears arranged radially outwardly from the center thereof, a pair of handles, means removably connecting said pair of handles to selected adjacent ones of said ears so that said handles may be grasped by the operator conveniently to apply the jaw assembly to strapping disposed in either the vertical or horizontal position with respect to the operator, an air control valve in one of said handles connected to control the flow of pressurized air to and from the motor, and a valve control trigger pivoted to said one handle.

3. In a pneumatic tool for forming a tension resisting joint in the overlapping portions of a bundle or the like encircling band of strapping having a strap deforming jaw assembly and a pneumatic motor for operating the jaw assembly, the motor being provided with a flexible diaphragm, the improvement which comprises a mounting casting secured to the pneumatic motor, a pair of apertured bosses on said casting, means securing the jaw assembly to said bosses, an opening in the casting between said bosses, a ram operatively interconnecting the jaw assembly and the flexible diaphragm and extending through said casting opening, a plurality of apertured ears on said casting arranged radially outwardly from the center thereof, a pair of handles, and means connecting said pair of handles to selected adjacent ones of said ears so that said handles may be grasped by the operator conveniently to apply the jaw assembly to strapping disposed in either the vertical or horizontal position with respect to the operator.

4. In a pneumatic tool for forming a tension resisting joint in the overlapping portions of a bundle or the like encircling band of strapping having a strap deforming jaw assembly and a pneumatic motor for operating the jaw assembly, the motor being provided with a flexible diaphragm, the improvement which comprises a mounting casting secured to the pneumatic motor, a pair of apertured bosses on said casting, means securing the jaw assembly to said bosses, an opening in the casting between said bosses, a ram operatively interconnecting the jaw assembly and the flexible diaphragm and extending through said casting opening, a plurality of apertured ears on said casting arranged radially outwardly from the center thereof, a pair of handles, means connecting said pair of handles to selected adjacent ones of said ears so that said handles may

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be grasped by the operator conveniently to apply the jaw assembly to strapping disposed in either the vertical or horizontal position with respect to the operator, an air control valve in one of said handles to control the flow of pressurized air to and from the motor, and a valve control trigger pivoted to said one handle.

5. In a pneumatic tool for forming a tension resisting joint in the overlapping portions of a bundle or the like encircling bands of strapping, the combination comprising a pneumatic motor having a flexible diaphragm, a strap deforming jaw assembly having a pair of spaced side plates, a mounting casting secured to said pneumatic motor, a pair of apertured bosses on said mounting casting, means securing said jaw assembly plates to said bosses which space said plates, an opening in said casting between said bosses, a ram interconnecting said jaw assembly and said flexible diaphragm and extending through said casting opening, a plurality of apertured ears on said casting arranged radially outwardly from the center thereof, a pair of handles, and means connecting said pair of handles to selected adjacent ones of said ears so that said handles may be grasped by the operator conveniently to apply said jaw assembly to strapping disposed in either the vertical or horizontal position with respect to the operator.

6. In a pneumatic tool for forming a tension resisting joint in the overlapping portions of a bundle or the like encircling band of strapping, the combination comprising a pneumatic motor having a pair of cup shaped plates clamping a flexible diaphragm therebetween, one of said

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cup shaped plates and said diaphragm forming a pressure space, a strap deforming jaw assembly having a pair of spaced side plates, a mounting casting secured to said pneumatic motor, a pair of apertured bosses on said mounting casting, means securing said jaw assembly plates to said bosses which space said plates, an opening in said casting between said bosses, a ram interconnecting said jaw assembly and said flexible diaphragm and extending through said casting opening, a plurality of apertured ears on said casting arranged radially outwardly from the center thereof, a pair of handles, means removably connecting said pair of handles to selected adjacent ones of said ears so that said handles may be grasped by the operator conveniently to apply said jaw assembly to strapping disposed in either the vertical or horizontal position with respect to the operator, an air control valve in one of said handles, conduit means connecting said valve to said one motor cup shaped plate and said pressure space, and a valve control trigger pivoted to said one handle so as to enable the operator to control the flow of pressurized air to and from said motor, a change in position of said handles relative to said jaw assembly being effected by shifting them and said one cup shaped motor plate relative to said base cup and said mounting casting approximately 90°.

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