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DUAL DRIVE MEANS FOR A CAULKING DEVICE

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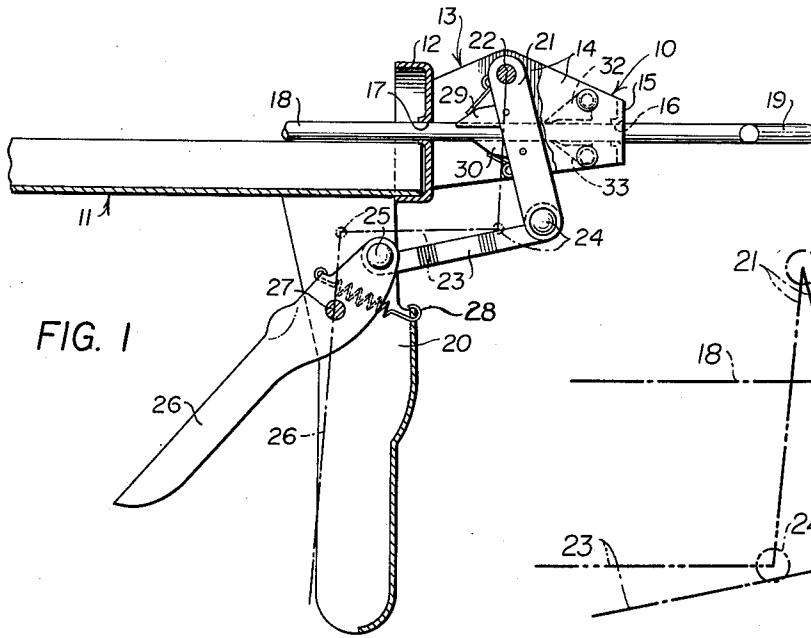


FIG. 1

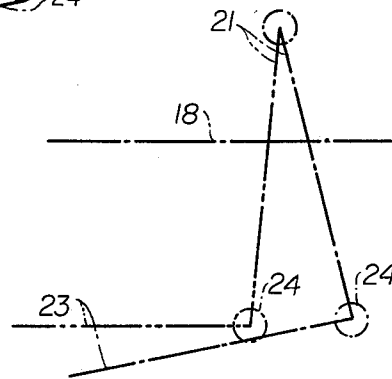


FIG. 4

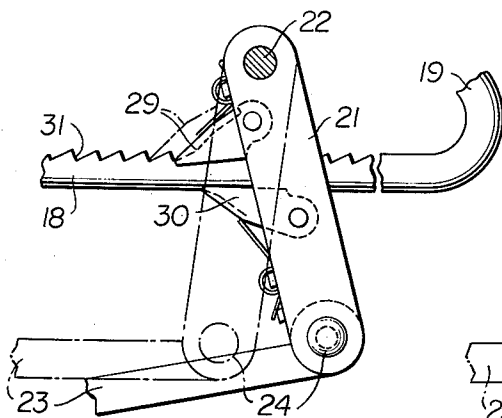


FIG. 2

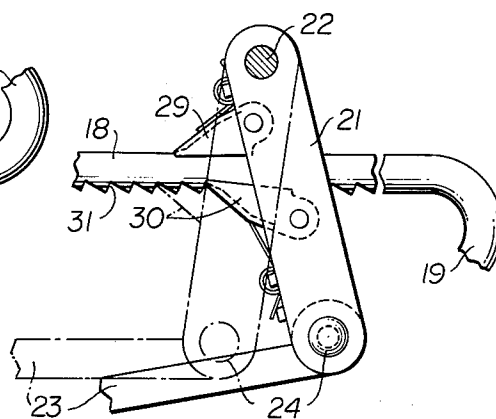


FIG. 3

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DUAL DRIVE MEANS FOR A CAULKING DEVICE

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9 Claims. (Cl. 74-169)

This invention relates to means for actuating a piston rod, and more particularly, to actuating means adapted to move a piston rod within the barrel of a caulking gun in such manner that each stroke of the lever operating the piston rod selectively advances the rod the width of one or more of the ratchet teeth disposed on the rod.

In conventional practice, caulking guns for dispensing plastic caulking materials include a piston rod having a piston disposed at the forward end thereof which is advanced in the barrel of the caulking gun by means of a hand operated trigger. In using caulking guns of this type, when it is desirable to increase the rate of the flow of the caulking material to meet the requirements of a specific job, it is necessary to operate the hand actuated trigger at a faster rate in order to increase such flow. I have discovered that by positioning and arranging the driving or actuating means in the manner herein set forth, the rate of extrusion of the caulking material may be substantially increased without increasing the speed of operation of the hand trigger. I have also discovered that by changing the angle or direction of the driving means actuating the piston rod, more efficient driving means are produced, thereby requiring less energy in operating the device.

Therefore, an object of this invention is to provide means for selectively increasing the rate of caulking material flow, said means being quickly and easily operated.

Another object of the invention is to improve the mechanical working efficiency of the drive means for actuating the piston rod in order that less energy will be required in operating the device.

Another object of the invention is to dispose the handle of the caulking gun in a more advantageous position providing better balance and improved operating efficiency.

Another object of the invention is to provide an improved caulking gun which can be produced at a relatively low cost, is simple and effective in operation, and is durable and efficient in service.

These and other objects of the invention will be apparent during the course of the following specification.

In the drawing forming a part of this specification:

FIG. 1 is a broken sectional view through the rearward end of a caulking gun illustrating an embodiment of my invention and illustrating in broken lines the direction of the driving force;

FIG. 2 is a broken view of the rearward portion of the piston rod and associated driving means illustrating the position of the parts when the piston rod is being driven from above, the lever operating the dogs being illustrated in two different positions;

FIG. 3 is a broken view of the rearward portion of the piston rod and associated driving means illustrating the position of the parts when the piston rod is being driven from below, the lever operating the dogs being illustrated in two different positions; and

FIG. 4 is a diagrammatic view illustrating the direction of the driving forces.

The inventive thought underlying the invention herein disclosed relates to the use of the invention in actuating the piston rod of a caulking gun. The invention, however, is adapted to be used in devices other than caulking guns, as will be readily apparent.

Briefly, the invention relates to providing a driving lever for actuating the dogs disposed along the piston rod. The driving lever supports two driving dogs for

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actuating the piston rod, one being disposed along the top surface of the rod while the other is disposed against the lower surface thereof, both dogs being held in contact with the rod at all times. The lower end of the actuating lever is connected to a link member driven by a conventional hand operated trigger. The piston rod is mounted so that it is rotatable on its longitudinal axis so that the ratchet teeth thereon may be disposed along the top thereof at which time the rod is driven by the upper dog, causing the rod to be advanced the width of one ratchet tooth upon each actuation of the trigger. When, however, the piston rod is rotated so that ratchet teeth are disposed along the lower surface, the rod is actuated by the lower dog which, being disposed at a great distance from the upper pivot point of said lever, advances the rod the width of two ratchet teeth upon each actuation of the trigger.

The handle support of the device, as well as the associated trigger, are disposed forwardly of the rearward end of the device, which enables the connecting link between the trigger and the operating lever to be disposed substantially parallel to the axis of the piston rod, thereby providing improved operating mechanical efficiency.

In the drawing illustrating this embodiment of my invention, the numeral 10 refers generally to a portion of a caulking gun including a half barrel or support means 11 adapted to contain caulking compound and provided with an end cap 12 secured to the rearward end of the barrel by welding. A bracket or support member 13, extending rearwardly from the rear wall of the end cap 12 to which it is welded, is provided with spaced side walls 14 and a rear wall 15 having a centrally disposed aperture therethrough aligned with an aperture 17 in the end cap 12.

A piston rod 18 extending through the apertures 16 and 17 of the rear wall 15 and the end cap 12 respectively, provides means for forcing caulking material out of the forward end of the barrel or support means 11 in a well known manner. The piston rod 18 is mounted in the rear wall 15 and the cap 12 in such manner that it may be readily rotated on its longitudinal axis, and the rod 18 is provided with a handle 19 at its rearward end to facilitate the operation of the same. A downwardly extending handle 20 disposed forwardly of the end cap 12 a short distance is secured to the barrel or support means 11 by suitable means, such as welding, and provides means for supporting the caulking gun. An operating lever 21 pivotally mounted on a pivot pin 22 disposed in the upper part of the support member 13 includes two side walls extending downwardly therefrom along the sides of the piston rod 18 to a forked link member 23 to which it is pivotally connected by a pivot pin 24, the forward end of the link member 23 also having a forked construction receiving a pivot pin 25 pivotally connecting it to the top end of a trigger 26 pivotally mounted on the handle 20 on a pivot pin 27. A coil spring 28 extending between the upper end of the trigger 26 and the handle 20 provides means for returning the trigger after it is advanced towards the handle.

As illustrated in FIG. 1, a spring-pressed downwardly extending dog 29 pivotally connected to the lever 21 above the piston rod 18 engages such rod at all times while a similar dog 30 is similarly disposed on the lever below the rod 18 and engages the rod at all times. The piston rod 18 is provided with ratchet teeth 31 disposed along one side thereof. The rod 18 may be positioned with its ratchet teeth 31 disposed along the upper surface thereof, as illustrated in FIG. 2, or it may be positioned with the ratchet teeth disposed along its lower surface, as illustrated in FIG. 3. When the ratchet teeth 31 are disposed along the upper surface of the rod 18, the upper dog 29 engages such ratchet teeth and upon actuation of

the trigger 26 toward the handle 20, the link member 23 actuates the lever 21, causing the dog 29 to advance the rod 18 the width of one ratchet tooth. When, however, the ratchet teeth 31 of the piston rod 18 are disposed along its lower surface, the bottom dog 30 engages the ratchet teeth and one actuation of the trigger 26 will cause the piston 18 to be advanced the width of two or more of the ratchet teeth, due to the increased distance of the dog 30 from the pivot pin 22 at the top of the lever 21.

As illustrated in FIG. 1, a spring-pressed holdback dog 32 is pivotally mounted in the support member 13 above the piston rod 18 while a similar holdback dog 33 is mounted in the support member 13 below the piston rod 18. Said holdback dogs are positioned and arranged in such manner that they are in contact with the piston rod 18 at all times and prevent the rod from being retracted as it is being advanced during a caulking operation. After the piston rod 18 has been advanced in the barrel or support means 11 to the desired point it may be retracted, or moved rearwardly, by grasping the handle 19 at the rear end of the rod 18 and turning the same so that the ratchet teeth 31 of the rod 18 are disposed along one side of the rod and the rod may be then moved rearwardly as it is not restrained in this position by either the driving dogs 29 and 30 or the holdback dogs 32 and 33. Thus it will be understood that the piston rod 18 may be readily rotated on its longitudinal axis to dispose it in a driving position whereby it is advanced a distance equal to the width of one ratchet tooth or a distance equal to the width of two or more ratchet teeth by disposing the same in selective relation to either the top driving dog 29 or the lower driving dog 30, the rod being readily moved to a neutral or non-driving position as above described.

It will be noted that the operating lever 21, having the driving dogs 29 and 30 mounted thereon, and the link member 23 are positioned and arranged in such manner that the link member 23 is disposed in substantially parallel relation with the piston rod 18 so that the driving force exerted on said parts by the trigger 26 provides an effective vector of force. The foregoing is accomplished by positioning the handle and trigger 26 forwardly of the rear wall of the barrel or support means 11. In conventional types of caulking guns, the handle and trigger are disposed rearwardly of the rear end of the barrel. In such constructions, it is not possible to provide the power pull action developed by this invention, which provides a pivot for the lever above the rod, thereby providing driving means above and beneath the plunger rod, and provides pulling means past the pivot center.

It therefore will be understood that the driving mechanism for actuating the piston rod in this invention is positioned and arranged in such manner that most effective results are obtained due to the direct line pull of the trigger. It therefore follows that substantially less force is required to operate a caulking gun of this type than would be required in operating the conventional type of caulking gun of comparable capacity. This feature is particularly important when it is considered that the trigger is manually operated.

Attention is directed to FIG. 4, illustrating in diagrammatic form the angular relation of the driving means for actuating this invention wherein the link member 23 at the end of the driving stroke is disposed substantially parallel to the piston rod 18, thereby providing direct line pulling action for actuating the operating lever 21, which could not be provided if the trigger were disposed rearwardly of the barrel. Another advantage of disposing the handle 20 inwardly of the rear end of the barrel is that it positions the handle nearer the center of gravity of the caulking gun, thereby making it easier to hold the gun while it is being operated. By providing the double driving dog means the operator of the caulking gun is

enabled to gauge the rate of advancement of the piston rod to suit the requirements of a specific job.

The caulking gun disclosed herein is illustrated for use in dispensing caulking material in cartridge form, although the invention is equally applicable to caulking guns using bulk material. The invention, as disclosed, refers to the piston being advanced the width of one ratchet tooth when it is driven by the upper driving means and being advanced the width of two or more teeth, when driven by the lower driving means. Obviously, the length of the advancement of the rod is not necessarily gauged by the width of the ratchet teeth, as the distances of advancement are not limited in terms of such teeth.

Having thus described this invention in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains to make and use the same, and having set forth the best mode contemplated of carrying out this invention, I state that the subject matter which I regard as being my invention is particularly pointed out and distinctly claimed in what is claimed, it being understood that the equivalents or modifications of, or substitutions for, parts of the above specifically described embodiment of the invention may be made without departing from the scope of the invention as set forth in what is claimed.

I claim:

1. In a caulking gun, support means for caulking material, a piston rod reciprocally mounted in said support means, an operating lever extending transverse the axis of the piston rod and having an upper end portion located above the piston rod and a lower end portion located below the piston rod, the upper end portion of the operating lever being mounted on a horizontal pivot fixed against lateral displacement and located rearwardly of said support means and disposed above said piston rod, driving means mounted on said lever and disposed along the upper and lower surfaces of said piston rod for engaging said rod and reciprocating said rod in said support means, actuating means for advancing said rod, said actuating means being disposed below said support means forwardly of the rearward end thereof, and a link member and pivot means connecting said actuating means to the lower end portion of said operating lever, said link member and pivot means being disposed below said support means, and said link member being disposed during operation thereof substantially parallel to the axis of said piston rod, whereby operation of said actuation means pulls said link member, thereby actuating said lever and advancing said rod.

2. The structure described in claim 1, in which the actuating means is operatively connected to a handle operatively connected to the lower surface of said support means.

3. The structure described in claim 1, in which the driving means are dogs disposed in continuous contact with said piston rod.

4. The structure described in claim 1, in which the piston rod is mounted in said structure in swivel fashion such that it can be rotated about its longitudinal axis and is provided with ratchet teeth along one surface thereof whereby such rotation of the rod may selectively dispose such ratchet-teeth surface against either the driving means disposed along the upper surface of the rod or the driving means disposed along the lower surface of the rod.

5. In a caulking gun, support means for caulking material, a bracket member disposed rearwardly of the rear end of said support means, a piston rod provided with ratchet teeth reciprocally mounted in said support means and bracket member, an operating lever extending transverse the axis of the piston rod, and having an upper end portion above the piston rod and a lower end portion below the piston rod, the upper end portion of the operating lever being mounted in said bracket member above said piston rod on a pivot fixed against lateral

displacement, means mounted on said lever for engaging the ratchet teeth of said piston rod for advancing said rod in said support means, a handle disposed on the lower surface of said support means forwardly of the rearward end thereof, actuating means pivotally associated with said handle below said support means for advancing said rod, and a link member and pivot means disposed below said support means connecting said actuating means to the lower end portion of said operating lever, said link member during operation thereof being disposed substantially parallel to the axis of said piston rod.

6. In a caulking gun, support means for caulking material, a bracket member disposed rearwardly of the rear end of said support means, a piston rod provided with ratchet teeth along one longitudinal side thereof reciprocally mounted in said support means and bracket member, an operating lever extending generally transverse the axis of the piston rod and having an upper end portion located above the rod and a lower end portion located below the rod, the upper end portion of the operating lever being mounted on said bracket member above said piston rod by means of a fixed pivot, an upper and a lower driving dog mounted on said lever and disposed along the upper and lower surfaces of said piston rod respectively for advancing said rod in said support means, a handle disposed on the lower surface of said support means forwardly of the rearward end thereof, actuating means for operating said rod pivotally associated with said handle, and a link member extending generally parallel to the axis of the piston rod connecting said actuating means to the lower end portion of said operating lever, said actuating means pulling said link member forwardly relative to the support means in a direction substantially parallel to the axis of said piston rod upon each actuation of said actuating means for advancing said piston rod a first predetermined distance when it is actuated by said upper dog and for advancing said piston rod a second predetermined distance greater than said first predetermined distance when actuated by said lower dog.

7. In dispensing apparatus for viscous material, elongated support means for said material having a forward portion and a rearward portion, a piston rod for dispensing said material along the forward portion of said support means, a bracket mounted on the rearward portion of the support means, an operating lever extending transverse the axis of the piston rod and having an upper end portion disposed above the piston rod and a lower end portion disposed below the piston rod, the upper end portion of the operating lever being mounted on a horizontal pivot disposed rearwardly of said support means and positioned above said piston rod, said pivot being fixed upon said bracket against lateral displacement, the lower end piston of said lever being disposed below said rod, double driving means mounted on said lever for reciprocating said rod, one of said driving means being in contact with the upper surface of said rod and the other driving means being in contact with the lower surface of said rod, a generally horizontally disposed elongated link member having one end thereof pivotally connected to the lower end of said lever, the opposite end of said link member being operatively connected to actuating means, said actuating means and said link member moving the lower end of said lever forwardly towards said support member by a substantially straight line pulling action upon each stroke of said actuating means, thereby advancing said piston rod forwardly in said support means a first distance when said rod is driven by said upper driving means, a similar stroke of said actuating means advancing said rod a second or greater distance than said first distance when said rod is driven by said lower driving means.

8. Selective driving means for a caulking gun including support means for plastic material, a bracket member

secured to the rearward end of said support means, a piston rod adapted to have a piston mounted at its forward end, said piston rod being mounted in said bracket member and adapted to be advanced forwardly in said support means for dispensing caulking material, said piston rod having ratchet teeth disposed along one surface thereof and being mounted in swivel fashion such that it may be rotated about its longitudinal axis, and an operating lever extending transverse the axis of the piston rod and having one end portion disposed adjacent one lateral surface of the piston rod and the other end portion disposed adjacent the opposite lateral surface of the piston rod, said one end portion of the operating lever being pivotally mounted to said bracket member on a pivot fixed against lateral displacement and located adjacent said one lateral surface of said piston rod, an elongated link member pivotally connected at one end portion to the end portion of said lever adjacent the opposite lateral surface of said piston rod, and mounted thereto, said trigger being pivoted intermediate its ends on a pivot located forwardly of the rearward end of said support means, said elongated link members being pivotally connected at the other end portion thereof to a portion of said trigger located forwardly of the rearward end of the support means, actuating means disposed below said support means and co-operating driving dogs mounted on said operating lever and one of said dogs being disposed along said one lateral surface of the rod and another being disposed along the opposite lateral surface of said piston rod for advancing said rod in said support means, said piston rod, when positioned so that said one driving dog actuates said rod, being advanced a first predetermined distance upon each actuation of said actuating means and when said another driving dog actuates said rod, said rod being advanced a second predetermined distance which is greater than said first distance upon each actuation of said actuating means.

9. Selective driving means for a caulking gun including support means for plastic material, a bracket member secured to the rearward end of said support means, a piston rod adapted to have a piston mounted at its forward end mounted in said bracket member and adapted to be advanced forwardly in said support means for dispensing caulking material, said piston rod having ratchet teeth disposed along one surface thereof, and an operating lever extending transverse the axis of the piston rod pivotally mounted to said bracket member adjacent one lateral surface of said piston rod on a pivot fixed against lateral displacement, a link member pivotally connecting the end of said lever adjacent the opposite lateral surface of said rod to a trigger pivoted forwardly of the rearward end of said support means for advancing said piston rod, and co-operating driving dogs mounted on said operating lever, one of said dogs being disposed along said one lateral surface of the piston rod, said piston rod, when positioned so that the upper driving dog actuates said rod, being advanced the width of one ratchet tooth upon each actuation of said actuating means and when said lower driving dog actuates said rod, said rod being advanced a distance equal to the width of a plurality of ratchet teeth upon each actuation of said actuating means, due to the disposition and arrangement of said lower driving dog at a greater distance from the horizontal pivot mounting of said lever than said upper dog.

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