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DUPLEX RATCHET MECHANISM FOR CALK GUNS

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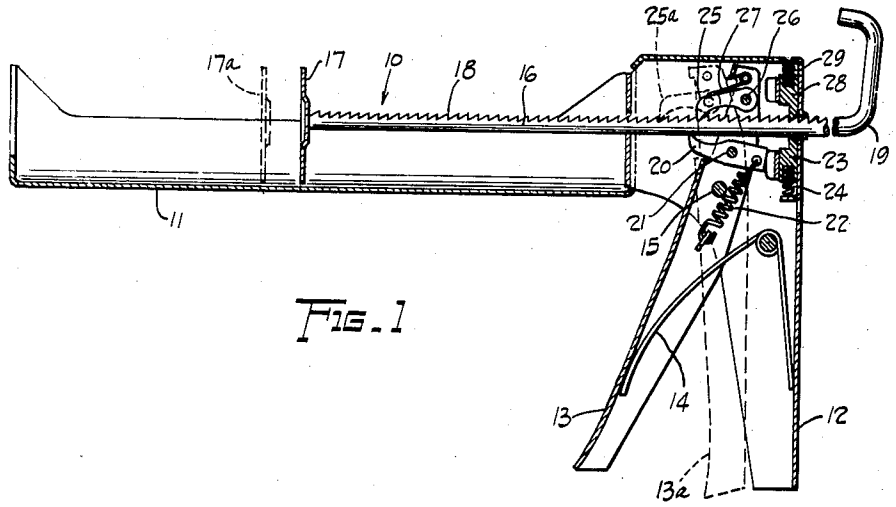

FIG. 1

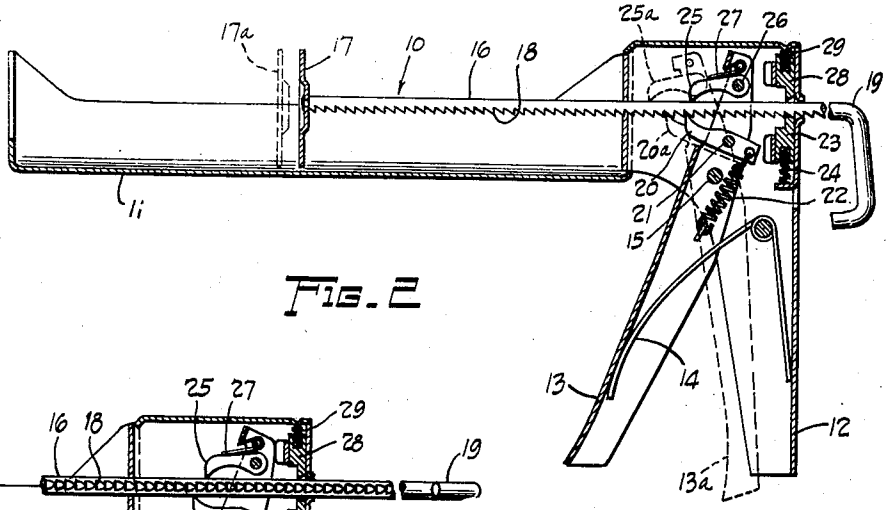

FIG. 2

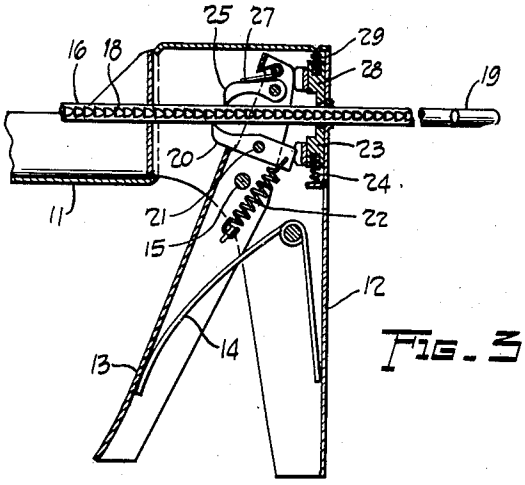

FIG. 3

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DUPLEX RATCHET MECHANISM FOR CALK GUNS

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4 Claims. (Cl. 74—169)

The present invention generally relates to dispensing devices and more particularly, to hand operated pressure guns especially intended to dispense calking or similar material of varied viscosity, and primarily aims to provide a simplified, yet rugged duplex ratchet mechanism for such devices.

Conducive to a better understanding of the invention it may be well to point out that plastic sealing material such as the so-called calking compounds are made in varied viscosities. The ordinary calk gun is intended for use with compounds of medium viscosity. If very stiff calk is used in such guns the operator must exert increased finger pressure on the gun's operating lever in order to move the calk out of the gun. This is very tiring and reduces the rate of application.

Furthermore most calk compounds become more viscous with age, and if stored for some time before use, may become very difficult to apply with the ordinary gun.

The primary object of this invention, therefore, is to provide a duplex ratchet mechanism for calk guns that will require no more operative pressure for heavy than for light viscosity calk material.

Another object is to provide a ratchet mechanism of the type stated that can be converted instantly for use requiring either light or heavy pressures.

Another object is to provide such a duplex mechanism that require no action on the part of the operator other than a half turn of the piston rod to convert from light to heavy pressure or vice-versa.

Still another object is to provide a device of stated type that will not change or interfere with the regular or customary operation of the gun.

A further object is to provide a duplex ratchet mechanism that is economical to construct and efficient in its operation.

These and other objects of the invention will become apparent from a study of the following description and claims together with the accompanying drawing in which like parts are designated by like reference characters and wherein:

Figure 1 is a side elevation, partly in section, of a cradle type cartridge calk gun embodying the duplex ratchet mechanism that is the subject of this invention, showing the parts arranged for light pressures;

Figure 2 is a similar view showing the ratchet mechanism parts arranged for heavy pressures; and

Figure 3 shows the parts in an intermediate condition wherein the piston rod is released for the manual retraction thereof.

Referring more particularly to the drawing there is seen the calk gun mechanism that is the subject of this invention, broadly indicated by reference numeral **10**.

The gun illustrated is adapted for use with prefilled cartridges. The cartridge, not illustrated, is nested in the semi-circular cradle **11** which is attached at its rear end to the frame handle **12**. It is of course to be understood that the so-called bulk loading type gun could

also be used with this duplex ratchet mechanism. In such case the cradle **11** would be replaced by a tube or cylinder into which the calk compound would have to be manually packed.

A piston rod **16** is mounted in the frame **12** and is free to reciprocate therein. The rod **16** has a piston **17** mounted on the forward end thereof adapted to press against the calk held in the gun and force it out the cartridge or bulk cylinder, as the case may be.

The other end **19** of the piston rod **16** is curved laterally thereof to form a handle by means of which the rod **16** may be rotated on its axis, for purposes to be hereinafter disclosed.

Reference numeral **18** indicates a row of ratchet teeth cut the length of the upper surface of the piston rod **16**, which, incidentally, is circular in cross-section.

An operating lever or trigger **13** is pivotally mounted in handle **12** on a fulcrum pin **15**. The trigger **13** is normally held in a forward position by spring **14**. Upon compression the trigger **13** pivots on its fulcrum pin **15** against the handle **12** to take the position **13*a***, indicated in dotted outline in Figures 1 and 2.

The ratchet rod **16** can be rotated by its handle **19** between a first position, illustrated in Figure 2 wherein the ratchet teeth **18** are faced downward, and a second position, illustrated in Figure 1, wherein the ratchet teeth **18** are faced upward.

Reference numeral **20** indicates a first pawl that is mounted, at pivot pin **21**, on the operating lever **13**, below the ratchet rod **16**. A spring **22** urges the detent end of the pawl **20** into contact with the rod **16**. As seen in Figure 1, the pawl **20** rides on the smooth back face of the ratchet rod **16** when the rod is in its second position, and is engaged with the ratchet rod teeth **18** when the ratchet rod **16** is in its first position, illustrated in Figure 2.

Reference numeral **25** indicates a second pawl that is mounted at pivot pin **26**, on the operating lever **13**, above the ratchet rod **16**. A spring **27** urges the detent end of pawl **25** into contact with the rod **16**. As seen in Figure 1, the pawl **25** is engaged with the ratchet teeth **18** when the ratchet rod is in its second position, and rides on the smooth back face of the ratchet rod **16** when the rod **16** is in its first position, illustrated in Figure 2.

When the ratchet rod **16** is in its first position, illustrated in Figure 2, retrogression of the piston rod **16** is prevented by a dog **23** which is urged into engagement with the ratchet teeth **18** by spring **24**.

When the ratchet rod **16** is in its second position, illustrated in Figure 1, retrogression of the piston rod **16** is prevented by a dog **28** which is urged into engagement with the ratchet teeth **18** by spring **29**.

At the end of the forward travel of the piston rod **16**, the rod may be withdrawn from the empty cartridge by rotating the rod to an intermediate position, illustrated in Figure 3, wherein all the pawls and dogs ride on the smooth sides of the piston rod **16**, out of engagement with the ratchet teeth **18**.

Referring once more to Figure 2 wherein the ratchet rod **16** is in its first position, with the teeth **18** facing downward, it will be seen that retraction of trigger **13** to position **13*a*** will cause the pawl **20** to engage the teeth **18** and move the piston **17** forward the distance of two teeth to the position indicated by reference numerals **20*a*** and **17*a***. It will also be evident that the mechanical advantage of the lever **13** will be relatively great since the distance from fulcrum **15** to the end of the lever **13** is substantially greater than the distance from the fulcrum **15** to the pivot pin **21** upon which the first pawl **20** is mounted. Under these circumstances a full stroke of

the lever **13** will deliver the maximum pressure the gun is capable of producing.

When the ratchet bar **16** is in its second position, illustrated in Figure 1, the teeth **18** will be facing upward, or diametrically opposite to that of Figure 2.

Retraction of trigger **13** to position **13***a* will now cause the pawl **25** to engage teeth **18** and move the piston **17** forward the distance of four teeth to the position indicated by reference numerals **25***a* and **17***a*.

It will also be evident that the mechanical advantage of the lever **13** will now be approximately ½ of that obtained in the first position of the ratchet bar **16** illustrated in Figure 2, since the distance of the pivot pin **26**, of the pawl **25**, from the leverfulcrum **15** is approximately twice that of the pivot pin **21** of the first pawl **20**. A full stroke of lever **13** will therefor deliver ½ the maximum pressure the gun is capable of producing.

While the gun illustrated has a power stroke of two or four teeth, any desired differential could be employed, always keeping in mind the fact that the force delivered will be proportional to the distances of the two pawls **20** and **25** from the fulcrum **15**.

In using the gun with calk compound of average viscosity the ratchet rod **16** is normally set in its second position, illustrated in Figure 1.

If the contained calk becomes stiff, due to a long time interval between usage of the gun, or if a very stiff calk is intentionally used, it is only necessary to rotate the piston rod **16**, one-half turn, to its first position, illustrated in Figure 2, to double the calk gun pressure without requiring any increase of finger pressure on the trigger lever **13**.

It will now be clear that there is provided a device which accomplishes the objectives heretofore set forth. While the invention has been disclosed in its preferred form; it is to be understood that the specific embodiment thereof as described and illustrated herein is not to be considered in a limited sense as there may be other forms or modifications of the invention which should also be construed to come within the scope of the appended claims.

I claim:

1. A duplex ratchet mechanism for calk guns of the character described, comprising in combination, a supporting grame, including a handle; a piston rod mounted in the frame to reciprocate therein, said rod having a row of ratchet teeth extending the length thereof, the said rod being rotatable between first and second positions wherein the teeth are faced in diametrically opposite directions; an operating lever pivoted to the handle; first and second elements mounted on the operating lever at different distances from the fulcrum thereof and adapted to alternately engage the piston rod teeth when said rod is in its first or second position, respectively, to move the piston for creating pressure within the gun when the operating lever is pivoted against the handle, the pressure created per lever stroke being proportional to the distance of the engaged element from the lever fulcrum; and means engageable with the ratchet teeth, when the piston rod is in either its first or second position to hold same against retrogressive movement.

2. A duplex ratchet mechanism for calk guns of the character described, comprising in combination, a supporting frame, including a handle; a piston rod mounted in the frame to reciprocate therein, said rod having a row of ratchet teeth extending the length thereof, the said rod being rotatable between first and second positions wherein the teeth are faced in diametrically opposite directions; an operating lever pivoted to the handle; first and second pawl members pivotally mounted on the operating lever at different distances from the fulcrum thereof and adapted to alternately engage the piston rod teeth when said rod is in its first or second position, respectively, to move the piston for creating pressure within the gun when the operating lever is pivoted against the handle, the pressure created per lever stroke being proportional to the distance of the engaged element from the lever fulcrum; and means engageable with the ratchet teeth, when the piston rod is in either its first or second position to hold same against retrogressive movement.

3. A duplex ratchet mechanism for calk guns of the character described, comprising in combination, a supporting frame, including a handle; a piston rod mounted in the frame to reciprocate therein, said rod having a row of ratchet teeth extending the length thereof, the said rod being rotatable between a first position wherein the teeth are faced downward and a second position wherein the teeth are faced upward; an operating lever pivoted to the handle; a first element mounted on the operating lever below the piston rod and adapted to engage the ratchet teeth thereof when the rod is in its first position; a second element mounted on the operating lever above the piston rod and adapted to engage the ratchet teeth thereof when the rod is in its second position, the said first and second elements, so alternately engaged, acting to move the piston for creating pressure within the gun when the operating lever is pivoted against the handle; and means engageable with the ratchet teeth when the piston rod is in either its first or second position to hold the same against retrogressive movement.

4. A duplex ratchet mechanism for calk guns of the character described, comprising in combination, a supporting frame, including a handle; a piston rod mounted in the frame to reciprocate therein, said rod having a row of ratchet teeth extending the length thereof, the said rod being rotatable between a first position wherein the teeth are faced downward and a second position wherein the teeth are faced upward; an operating lever pivoted to the handle; a first pawl member mounted on the operating lever below the piston rod and adapted to engage the ratchet teeth thereof when the rod is in its first position; a second pawl member mounted on the operating lever above the piston rod and adapted to engage the ratchet teeth thereof when the rod is in its second position, the several pawls, so alternately engaged acting to move the piston rod for creating pressure within the gun when the operating lever is pivoted against the handle; the pressure so created, per stroke of the operating lever, being greater when the piston rod is in its first position than when it is in its second position; and means engageable with the ratchet teeth when the piston rod is in either its first or second position to hold same against retrogressive movement.

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