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CRANK FOR LOADING HYPODERMIC JET INJECTOR

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FIG. 1.

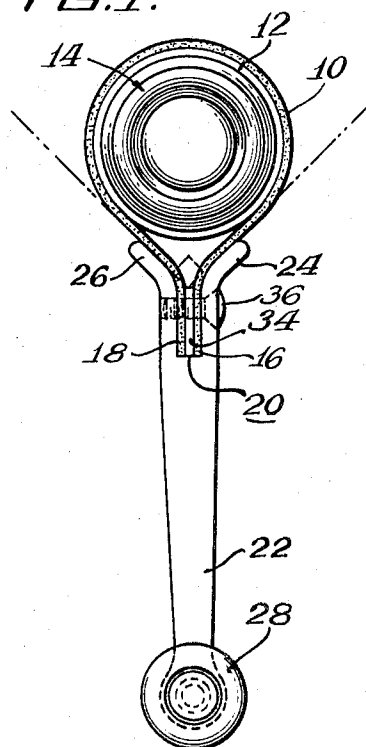


FIG. 2

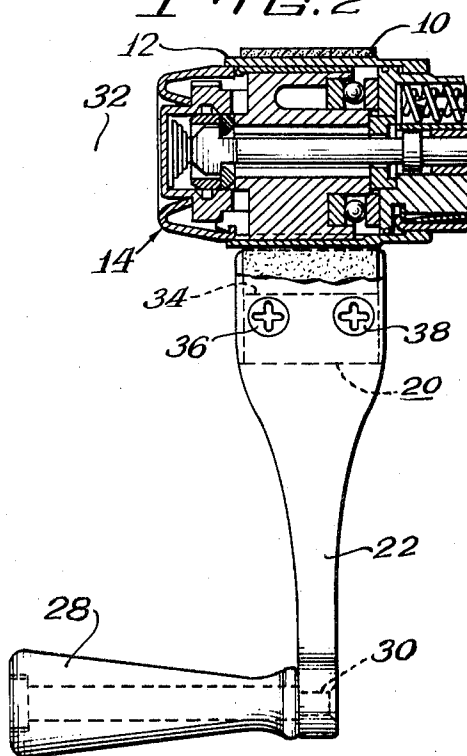
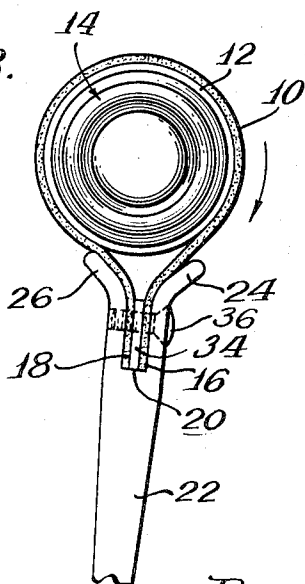


FIG. 3.



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CRANK FOR LOADING HYPODERMIC JET INJECTOR

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U.S. Cl. 128—173 3 Claims

ABSTRACT OF THE DISCLOSURE

A crank for attachment to a hypodermic jet injector which may be rotated to compress the dosage driving means of the injector. The crank includes a flexible belt which wraps around a rotatable sleeve on the jet injector. The ends of the belt are inserted in a slot at the end of a rigid arm. A handle at the end of the arm opposite the slot is manually gripped for simultaneous rotation of the crank and the jet injector sleeve.

BACKGROUND OF THE INVENTION

This invention relates to an improved crank for a hypodermic jet injector which is charged by rotation of dosage driving means.

Hypodermic jet injectors have found wide spread acceptance especially for mass inoculation programs. A typical hypodermic jet injector construction is illustrated by U.S. Patent No. 3,330,276 issued to Gordon on July 11, 1967.

The power to drive the medicament from a jet injector and into a patient may be provided by a piston or ram driven by a compressed spring. Normally the driving spring of a jet injector is compressed by rotating a cylindrical compression sleeve at one end of the injector. The sleeve is normally rotated to compress the spring by means of a crank which can be clamped to the sleeve during the rotation operation.

Available cranks have provided some dissatisfactory results. For example, it is quite time consuming to attach a crank to the sleeve, rotate the sleeve and then detach the crank each time more power is required for administering the medicament. Another disadvantage is structural failure of some available cranks. This has resulted in the expense and irritation of replacement.

SUMMARY OF THE INVENTION

In a principal aspect the present invention of an improved crank for a hypodermic jet injector includes a belt which may be slipped around the rotatable compression sleeve of the jet injector. The ends of the belt are held in a slot at one end of an arm. The arm extends outwardly from the rotatable sleeve. A handle is attached to the outward extending arm and may be grasped to rotate the crank and activate the hypodermic jet injector.

It is thus an object of the present invention to provide an improved crank for a hypodermic jet injector.

It is still a further object of the present invention to provide an improved crank for a hypodermic jet injector which may be easily attached to or removed from the injector.

Another object of the present invention is to provide an improved crank of rugged, economical, and simple construction which will provide long and unailing service.

These and other objects, advantages and features of the present invention will be more fully set forth in the detailed description which follows.

BRIEF DESCRIPTION OF THE DRAWING

In the detailed description which follows reference

will be made to the drawing comprised of the following figures:

FIGURE 1 is an end, plan view of the improved crank as attached to a hypodermic jet injector;

FIGURE 2 is a side view of the improved crank showing in cross section a portion of the hypodermic jet injector; and

FIGURE 3 is a partial plan view of the improved crank as it is being rotated in a clockwise direction.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIGS. 1 and 2 illustrate the construction of a preferred embodiment of the improved crank. The crank is comprised of a flexible belt or strap 10 which is strapped around a rotatable sleeve 12 of a hypodermic jet injector generally shown at 14. The belt 10 has a first end 16 and a second end 18. The ends 16 and 18 terminate in a slot 20 at one end of an arm 22. The slot 20 is defined by a first projection 24 and a second projection 26. The end portions of the projections 24 and 26 are curved away from each other with the result that the slot 20 becomes increasingly wider toward the end of the arm 22 most nearly adjacent the sleeve 12. Tangents shown to the projections 24 and 26 intersect to form, approximately, a right angle as illustrated in FIG. 1.

Attached to the end of the arm 22 opposite the end adjacent the injector 14 is a handle 28. The handle 28 is rotatably mounted on a handle pin 30 which is rigidly connected to the arm 22. The handle 28 and handle pin 30 are attached to the arm 22 and extend therefrom in a direction generally parallel to an axis of rotation 32 of the sleeve 12.

As is illustrated in FIG. 1 a wedge 34 is inserted between the first and second ends 16 and 18 of the strap 10. The wedge 34 provides proper alignment of the strap 10 and also provides a better and more secure fastening arrangement of the strap to the arm 22. The first and second end 16 and 18 of the belt 10 are held in slot 20 by Phillips head screws 36 and 38 which pass through appropriate openings defined in the projections 24 and 26 respectively.

A typical compression spring mechanism for driving medicament in measured doses from the jet injector 14 is more fully described in Gordon, referred to above. The feature most pertinent to this discussion is illustrated in FIG. 2, the rotatable sleeve 12. This sleeve 12 rotates in both directions about the axis of rotation 32. When the proper sequence of rotational operations is carried out, the jet injector becomes operative or "cocked."

In operation the belt portion 10 of the crank is slipped over the sleeve 12 as illustrated in FIGS. 1 through 3 and rotated in a clockwise direction as illustrated in FIG. 3 and in a counterclockwise direction. As can be seen from FIG. 3 when the crank is rotated in the clockwise direction the second end projection 26 presses against the sleeve 12 through the strap 10 and the first projection 24 is lifted away from the strap 10. At the same time the portion of the strap 10 adjacent the projection 24 stretches tightly. The strap 10 thereby frictionally engages the sleeve 12 for easy rotation and at the same time is compressed about the sleeve 12 to prevent slippage. In addition, a mechanical advantage is achieved by the use of a combination of the flexible belt 10 and the specially constructed projections 24 and 26 since the arm 22 is slightly off center from the sleeve 12 during rotation of the sleeve. Thus a more efficient coupling force is transferred to the sleeve 12 through the arm 22.

This construction besides providing a non-slipping and easily turning crank arrangement for the jet injector also provides a crank which can be easily removed from the jet injector by merely slipping the belt 10 off of the sleeve

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12 and away from the jet injector. By having the projections 24 and 26 just slightly extend or overlap the sleeve 12, the strap or belt 10 remains flexible enough for easy removal but taut enough for easy gripping and rotation of the sleeve 12.

While in the foregoing there has been set forth a preferred embodiment of the present invention it is to be understood that all those embodiments obvious to persons skilled in the art and all those embodiments which are equivalent to the claimed invention are to be included within the scope of the claims.

What is claimed is:

1. In a hypodermic jet injector, said injector including manually activated drive means to drive medicament in measured doses from said jet injector, said drive means being activated by rotation of a cylindrical sleeve of said jet injector, said sleeve having an axis of rotation, the improvement comprising, a slidably removable, manual crank for engaging and rotating said sleeve, said crank including:

a flexible strap having two ends, said strap extending around said sleeve and being slidably removable therefrom;

an arm positioned substantially perpendicular to said sleeve, said arm including an end adjacent said sleeve, said adjacent end including a slot there-through to define two end projections, said projections being curved away from each other such that

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said slot becomes progressively wider toward said sleeve, said strap ends being attached in said slot in said arm such that upon rotation of said crank one of said projections compresses said belt against said sleeve to hold said belt in a fixed position on said sleeve, said belt being tightened thereby to provide frictional and compressive turning forces on said sleeve; and

a handle extending from said arm substantially in the direction of said axis of rotation, said handle being connected with said arm opposite said end adjacent said sleeve.

2. The improvement of claim 1 including a wedge inserted between said ends of said strap in said slot to aid in securing said strap in position in said slot.

3. The improvement of claim 1 wherein tangents drawn to said first and second end projections and intersecting within said slot define substantially a right angle.

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