June 24, 1947. B. SPANIER 2,422,990

WAX INJECTOR

Filed Oct. 10, 1945

Fig. 1.

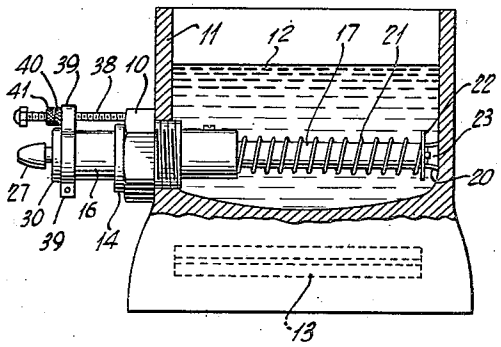


Fig. 2.

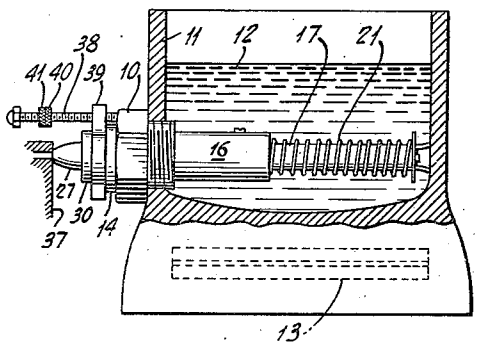


Fig. 3.

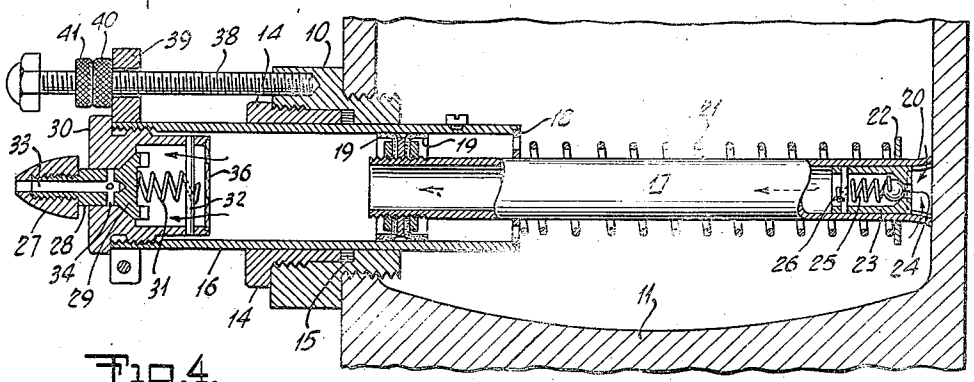


Fig. 4.

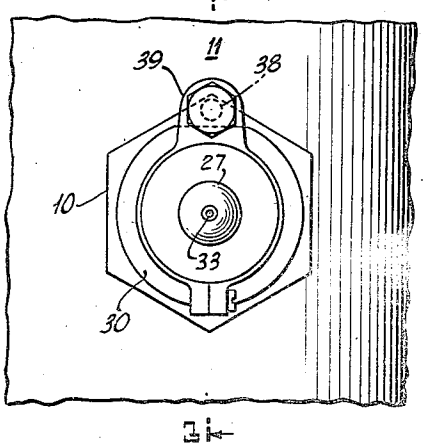
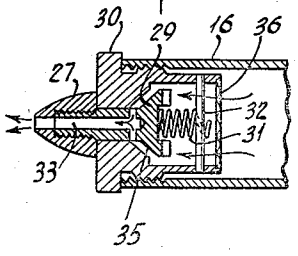


Fig. 5.



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WAX INJECTOR

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3 Claims. (Cl. 222—125)

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This invention relates to a wax injector intended primarily for use by jewelry manufacturers, although it may be used by others and for other purposes than that herein described.

In the manufacture of jewelry of precious or non-precious metal, such as rings and other articles, it is now the ordinary practise to make models that are used in forming the molds in which the definitive articles are cast.

One method commonly employed is first to make models by injecting wax into a model mold. A plurality of wax models are then enveloped in or covered with a heat resisting substance, such as a ceramic forming material, or plaster and asbestos fiber. The investment so formed is heated to a high temperature to disintegrate the wax, leaving cavities into which the metal is cast or poured through the usual sprues or gates.

The wax used in making the models is held in a pot or receptacle provided with a nozzle or injector, which pot is generally heated, or has a heating unit embodied therein, to keep the wax in a molten condition. The molten wax is injected into the model mold either by manual operation of the injector or by air pressure. My invention relates particularly to improvements in an injector for such use.

One object of the invention is to provide a simple, efficient, safe, and readily controllable device for injecting hot molten wax into a model mold.

Another object is to provide an injector that can be adjusted to regulate the amount of wax discharged from or received in the barrel of the injector on each stroke.

A further object is to provide means for locking the barrel of the injector in fixed position when injection of the wax is to be effected by air pressure.

A still further object is to provide an injector on which all required adjustments may be easily made from the exterior so as to protect the operator from injury by contact with the hot molten wax.

Other objects and advantages of the invention will be apparent from the following description, reference being had to the accompanying drawings in which:

Figure 1 is a side view of the injector attached to a wax pot, the latter being shown partly in section, and the barrel and nozzle of the injector being in protracted position;

Fig. 2 is a similar view showing the barrel and nozzle in retracted position;

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Fig. 3 is a cross sectional view of the injector taken on the line 3—3 of Fig. 4;

Fig. 4 is an end view of the injector; and

Fig. 5 is a detailed view, in cross section, of the injector nozzle in retracted position.

The injector is supported by a main supporting nut 10 threaded in a wall of a pot or receptacle 11 near the bottom thereof. The pot holds a supply of wax 12 that is maintained in molten condition by any suitable heating means, such for example, as the electric heating element indicated at 13.

Detachably secured in the nut 10 is a locking nut 14 having a packing ring 15 at its rear end. The barrel member 16 of the injector is slidably mounted in the nuts 10 and 14 to move to and fro. A hollow plunger or piston 17 extends concentrically into the barrel through a central opening in a disc or washer 18 fixed to the rear end of the barrel. The plunger has flexible washers 19 mounted on its head end and rearwardly protruding, circumferentially spaced, fingers 20 at its foot. The fingers butt against and are free from attachment to the inner face of the rear wall of the pot. The spaces between the fingers permit the molten wax to be drawn into the bore of the plunger on the suction stroke or forward movement of the barrel, as indicated by the arrows in Fig. 3. A helical expanding spring 21 surrounds the plunger with its ends bearing respectively against washer 18 fixed to the barrel and washer or radial member 22 fixed to the plunger, thus normally urging the barrel into its protracted position shown in Figs. 1 and 3 and pressing the fingers at the foot of the plunger tightly against rear wall of the pot. It is to be understood that in operation the plunger remains stationary and the barrel is reciprocated in relation thereto.

A check valve 23 is set into the foot or rear end of the hollow plunger. The valve comprises a ball 24 that is normally pressed closed against its seat by a coil spring 25 held by a pin 26. The valve opens automatically on the suction stroke of the barrel to allow the wax to enter. The valve is disposed in axial alignment with the plunger and thus affords a straight line draw.

The nozzle 27 of the injector is threaded onto a valve stem 28 having a conical head 29 that seats over a corresponding opening in a sleeve 30 threaded into the front end of barrel 16. The valve is normally urged closed by a coil spring 31 held by a pin 32. A duct 33, extending axially through the nozzle and the valve stem, connects with the transverse ducts 34 in the stem. When

the nozzle is in retracted position, as seen in Fig. 5, a passage 35 is opened between the valve head and its seat to permit the wax to be discharged from the barrel and out of the nozzle through ducts 33, 34. A filter 36 may be secured to the rear end of sleeve 30 to strain any impurities from the wax before it enters the ducts. The nozzle has the safety feature that it remains shut until it is intentionally opened by pressing the mold 37 against the nozzle, as indicated in Fig. 2. This prevents accidental discharge of the hot wax with possible injury to the operator.

A screw 38 projects outwardly from the nut 10 or pot 11 parallel to the barrel 16. Slidably mounted on the screw is a band 39 which is firmly clamped to the barrel adjacent the sleeve 30. By means of the nut 40 and lock-nut 41 the barrel 16 may be moved into adjusted positions so as to regulate the extent of the stroke of the barrel and the amount of wax that the barrel can hold. If desired the barrel may be calibrated and marked with graduations to indicate the amount of wax held therein in its various adjusted positions. Where the wax is to be discharged by air pressure, as distinguished from manual operation of the injector, the barrel must be moved to its innermost position shown in Fig. 2 and locked in that position.

From the foregoing description it will be apparent that the injector, as a unit, may be readily attached to or detached from the wax pot, and that its parts may be easily disassembled to permit of cleaning, repair, and replacement.

In operation, the nozzle 27 is pressed against the mold 37 to cause the molten wax to be injected into the mold.

Various modifications in the details of construction herein illustrated and described may be made within the scope of the invention defined in the claims.

What I claim is:

1. A device of the character described comprising a receptacle having an opening in the front wall thereof, a threaded main supporting nut removably secured therein adapted to support an injector unit, said unit comprising a cylindrical relatively movable barrel passing through said nut and directly supported thereby in horizontal position, a perforated disc secured to the inner end of said barrel, said disc having a central opening, a tubular relatively stationary plunger having its innermost end in contact with the rear wall of the receptacle, said plunger passing through the central opening in the disc and supported thereby, a piston packing disposed in said barrel and fixed to the plunger near the outermost end thereof, a radially extending member secured to the plunger near its inner end, a helical expansion spring mounted around said plunger, the ends of said spring bearing respectively against said radial member and disc so as to keep the inner end of the plunger in engagement with the rear wall of said receptacle and normally to keep the barrel in projected position, a sleeve in threaded engagement with the outer end of the barrel, a conical stem valve slidably supported by the sleeve, a nozzle mounted on the outer end of the stem valve, a spring within the sleeve acting on the stem valve to hold it normally closed, said stem valve having a longitudinal duct and transverse ducts formed therein to afford a communicating passage from the sleeve through the stem valve and nozzle when the stem valve is pushed inwardly, and a check valve located within said plunger near the inner end thereof, whereby when the nozzle and barrel are pushed inwardly fluid within the receptacle is ejected through the plunger, barrel and nozzle.

2. A device in accordance with claim 1 wherein there is a locking nut in threaded engagement with the main supporting nut and a packing member interposed between the locking nut and the main supporting nut to provide a fluid-tight joint.

3. A device in accordance with claim 1 wherein the main supporting nut carries a screw in parallel alignment with the barrel and nozzle, and the barrel carries a plate having a hole therein through which passes the screw carried by the said main supporting nut, and a pair of nuts in threaded engagement with said screw for adjusting the extent of outward projection of said barrel.

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