GUN FOR TWO COMPONENT ADHESIVES
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This invention relates to guns or dispensing devices for
two component adhesives wherein two components of an
adhesive substance set up comparatively quickly when
mixed together and so cannot be stored in a single con-
tainer, or in use, are said to have a pot-life of the order of
hours rather than weeks or months necessary for a
reasonable shelf-life.

One example of such adhesives is epoxy resin which is
mixed for curing with an amine such as triethylene tetra-
mine. Such a system is well known to the art. Another
is the polyurethane system. Often powdered aluminum
or silica flour is added to one of the components or mix-
ture to give greater adhesion.

An object of the invention is to provide a device of this
kind by which the two components may be mixed
substantially at the point of application in proper propor-
tions.

Another object is to provide a device of this kind
which is small and light enough in weight to be held in
the hand for easy manipulation and yet will contain com-
pletely therein some of each component.

Another object is to provide a device of this kind
in which there is a mixing chamber of very small size.

Yet another object of the invention is to provide a de-
vice of this type in which the danger of clogging is re-
duced to practical limits.

And still another object of the invention is to provide
a dispenser in which comparatively small quantities of
each of the two components may be loaded, as for ex-
ample, from a collapsible tube, so that small quantities of
the components may be purchased and used in small
amounts.

The attainment of these objects is reached, in a gun-
type applicator or dispenser which, briefly described, com-
pises two storage cylinders for the two separate com-
ponents of the adhesive having a common dispensing head
thereon and provided with an expelling and mixing
plunger rod. Means are provided to reciprocate the
rod and at the same time meter increments of the com-
ponents from the cylinders to the head.

In the accompanying drawing showing, by way of ex-
ample one of many possible embodiments of the inven-
tion,

FIG. 1 is a plan of the dispenser;
FIG. 2 is a side view of the dispenser with parts in
one position;
FIG. 3 is a side view of the dispenser with parts in
another operational position, and
FIG. 4 is a schematic representation of elements of the
metering means.

The applicator comprises a body generally designated
10 having a pistol grip handle 11 and a forward or cylin-
der-carrying portion 12 generally symmetrical about the
vertical mid-plane having left and right spaced socket
members 14a and 14b provided with parallel cylindrical
recesses 15a and 15b.

Axially parallel storage cylinders 16a and 16b for the
two components are mounted fast in the recesses and proj-
ject forwardly generally as does the barrel of a revolver,
and may be substantially closed at their rear as at 18.

These cylinders are provided with rather tightly fitting
pistons 19a and 19b having threaded rods 20a and 20b
fast thereto and extending rearwardly through holes 21
in the body 10 and above the handle.

The forward portions 22 of cylinders 16a and 16b are
provided with a symmetrical head 24 with recesses 25a
and 25b having a medial longitudinal bore or small mix-
ing chamber 26 between the recesses 25a and 25b which
have each an annular end wall 28 and a further recess of
reduced diameter 29a and 29b respectively.

The head is provided with laterally opening ports 30a
and 36b internally threaded as at 31 and for communication
from the exterior to the interior of the respective
storage cylinders ahead of the pistons. Collapsible tubes
containing the separate components may be used to load
the cylinders through the ports, particularly tubes having
necks threaded to fit the port threads 31 so as to reduce
the chance of spillage, which ports are sealed as by
screw plugs 32.

The recesses 29a and 29b terminate somewhat conically
as at 35 and straight duct bores 34a and 34b connect the
mixing chamber 26 as at 36 in the conical zones with the
interiors of the cylinders 16a and 16b. It is to be noted
that these duct bores extend outwardly to the ports 30a
and 36b at such an angle that, say, a wire may be inserted
into the duct from the port in the event the duct bore
becomes clogged. For ease of use, the forward end of the
head at the chamber bore 26 is formed somewhat
as a nozzle 38.

A plunger rod 39, preferably of nylon plastic or fluo-
rinated plastic material such as "Teflon," both of which
have low adhesion to epoxy and urethane resins, is dis-
posed in the mixing chamber, projecting rearwardly be-
 tween the two cylinders, for reciprocation and rotation in
the chamber bore. Preferably the head 24 is of steel,
stainless steel, or aluminum and the chamber bore 26
about 0.001 inch larger in diameter than the plunger rod
39. With this clearance and choice of materials just
mentioned, there is substantially no danger of fouling in
normal use.

The limits of reciprocation by the plunger rod are such
that the outer end 40 of the rod projects from the head
slightly in extreme forward position and is retracted be-
hind the dust bore junction 36 upon withdrawal.

The plunger rod 39 is rotated by a somewhat ring sec-
tor or U-shaped gear member 41 having laterally pro-
jecting teeth 42 engaging with teeth 44 on the plunger
rod and extending thereon for a sufficient distance so that
the two sets of teeth may be engaged during the reciprocatory
motion of the plunger while the teeth 42 move in a some-
what circular path in a vertical plane.

The gear member is pivoted at one end 45 of an arm
46 thereof to the body 10 between and under recesses
15a and 15b at 48 and is held sufficiently close to the
teeth of the rod by, as shown, the right cylinder 16b.
The arm 46 occupies the normal trigger position of a
revolver and oscillation of the gear member causes the
plunger rod to spin back and forth.

Reciprocation of the plunger is accomplished by a lon-
gitudinal movement of a bearing 49 carrying the rear end
portion 50 of the plunger at a part 51 of reduced di-
meter. The bearing is pivotally mounted, as at 52,
about midway on the lower arm 54 of an inverted
L-shaped lever rocker 55 pivoted at 50 on and between
upwardly projecting arms 59 on the body 10. The lower
portion 59 of the rocker arm 54 is provided with a lon-
gitudinal slot 68 receiving a pivot pin 61 fast on the gear
member arm 46 below its pivot 45. This combination
provides a loose linkage between the arms 46 and 54
permitting the arm 54 to be drawn rearwardly in trigger
fashion. The rocker and gear member arms 54 and 46
are biased to forward position by a spring 62 mounted on
the handle 11 so that at the end 49 of the plunger is nor-
manly in projecting position from the nozzle 35.

Feed to the mixing chamber bore 26 through ducts
34a and 34b is obtained by metered forward movement

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of the pistons 12a and 12b in predetermined increments. To this end, gears 64a and 64b having threaded central holes are threaded on the respective piston rods 20a and 20b and disposed in a transverse slot 65 in the body 15 to be turned in increments. This turning is carried out by ratchet wheel means 68, well known to the art, on at least one of the gears, and actuated by a vertically reciprocatory resilient strip 68 having a hook 67 to engage the wheel and pivoted to the upper arm 69 of the rocker, as at 70, where it overhangs rearwardly the slot 65. A friction washer may be provided between the ratchet wheel and the wall to the slot if necessary.

In order to avoid the need for left handed threads on a gear and piston rod set and to use only one ratchet, though these avo</p>
ders and pivotally mounted on the arms, the rocker member having a pending trigger-like lower portion; a bearing pivotally mounted on said lower portion for forward and rearward movement with the lower portion and receiving the portion of the rod of reduced diameter for reciprocating the rod, the latter being rotatable in the bearing; the rod being provided with pinion teeth between the bearing and the head; a generally U-shaped sector gear pivoted at one end thereof to the body and having lateral teeth on the other end portion to engage the pinion teeth; pin-and-slot means for pivoting the lower end portion of the rocker member to the sector gear remote from said one end for constraining the sector gear to turn when the lower end portion is pulled in trigger fashion; bias means for urging the lower end portion forward, and feeding means for forcing the components from the cylinders into the chamber when lower end is pulled, whereby repeated pulling of said lower end portion in trigger fashion will rotate and reciprocate the rod to mix the components and expel the mixture from the head.

5. An applicator as claimed in claim 4, said feeding means including pistons in the respective cylinders, and ratcheted means for advancing the pistons when the lower end portion of the rocker member is pulled.

6. An applicator as claimed in claim 4, the chamber having a diameter about 0.001 inch greater than that of the plunger rod and the latter being of nylon plastic to minimize fouling and freezing of the rod in the chamber by the adhesive.

7. An applicator as claimed in claim 4, the rod being long enough and the bias means having sufficient acting range for the rod to normally project from the extreme forward end of the head to reduce the chance of sufficient mixed adhesive being left in the bore of the chamber to set up.

References Cited in the file of this patent

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Patent No.</th>
<th>Date</th>
<th>Inventor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,663,338</td>
<td>Mar. 20, 1928</td>
<td>Gagne</td>
</tr>
<tr>
<td>2,814,827</td>
<td>Dec. 3, 1957</td>
<td>Snow et al.</td>
</tr>
<tr>
<td>2,913,151</td>
<td>Nov. 17, 1959</td>
<td>Wiseman et al.</td>
</tr>
</tbody>
</table>