

[54] CAULKING GUN ADAPTER FOR ELECTRIC
HAND DRILL

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[*] Notice: The portion of the term of this
patent subsequent to Jan. 21, 1992,
has been disclaimed.

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Assistant Examiner—Charles A. Marmor

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[57] ABSTRACT

[21] Appl. No.: 446,961

This invention relates generally to caulking guns and particularly to such a device specifically adapted for being power driven by a conventional electric hand drill upon which the device is equipped for being mounted and drivably coupled therewith by a portion of the driving train of the device being clamped within the chuck of the drill.

[52] U.S. Cl. 222/326; 222/333; 222/390

[51] Int. Cl.² B67D 5/46

[58] Field of Search 222/333, 325-327;
64/30 R, 30 A, 30 C; 74/424.8 A

[56] References Cited
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9 Claims, 8 Drawing Figures

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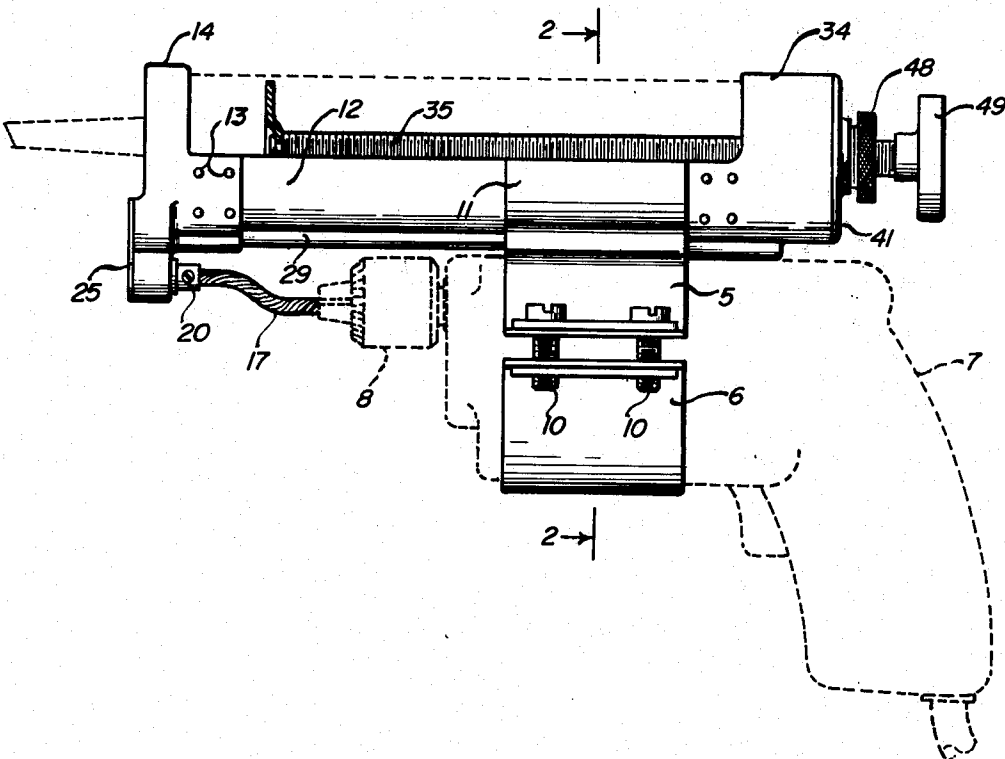


FIG. 1

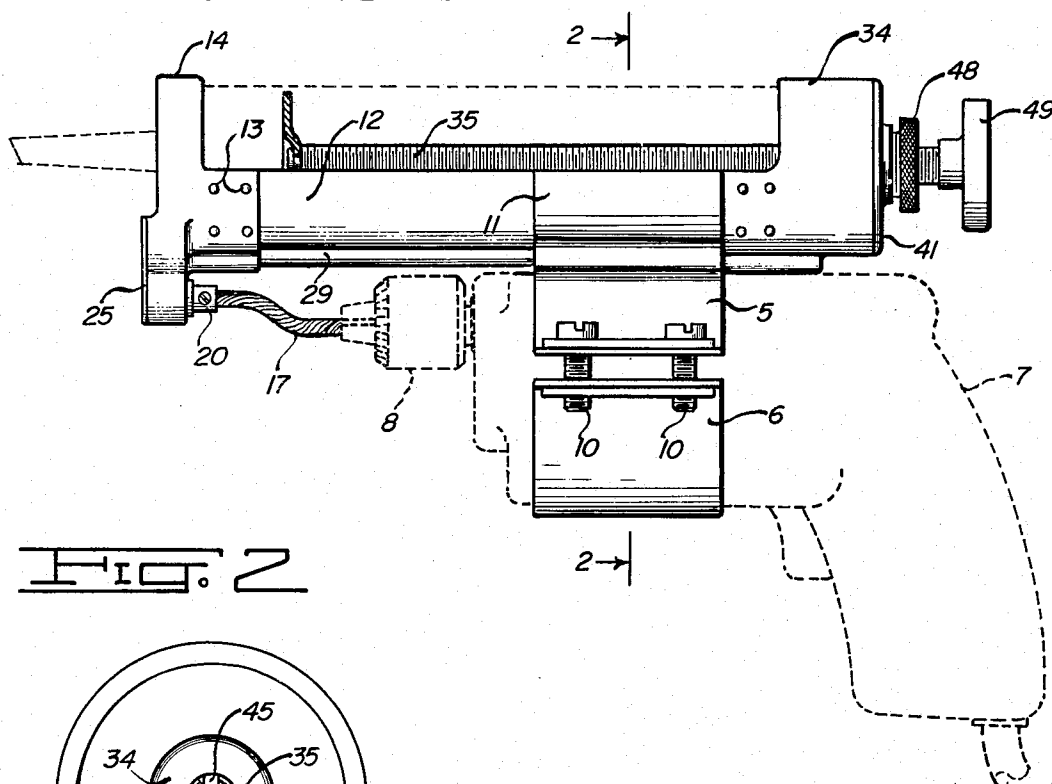


FIG. 2

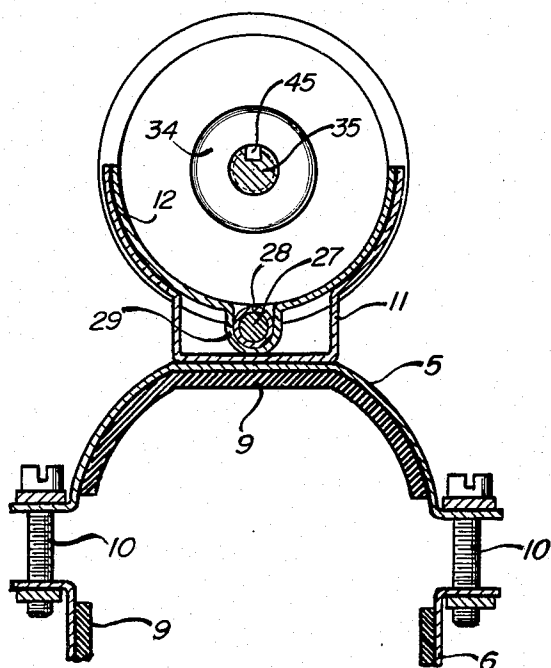
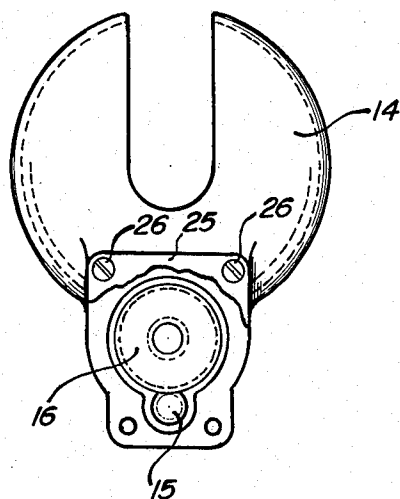
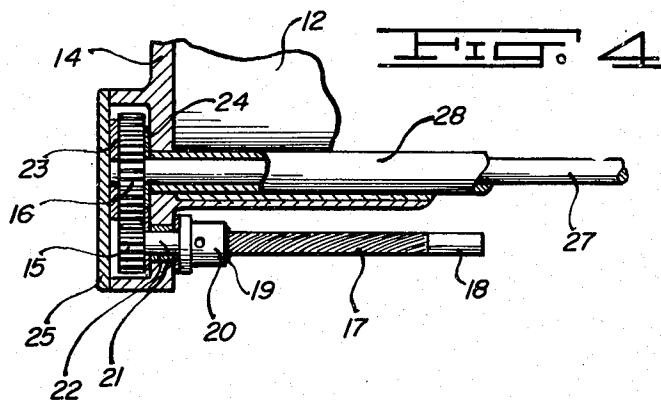
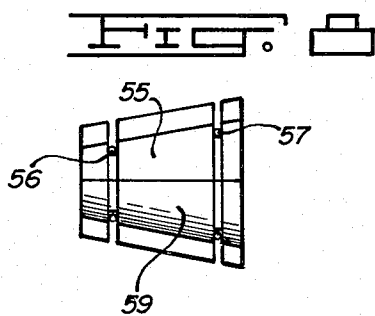
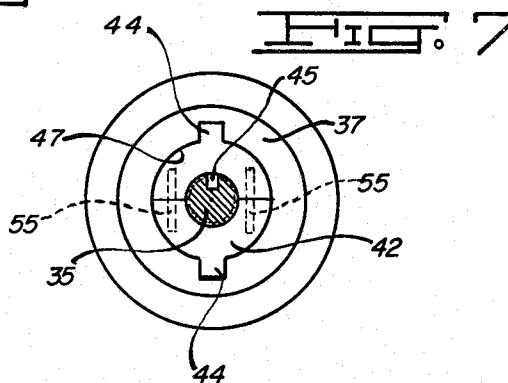
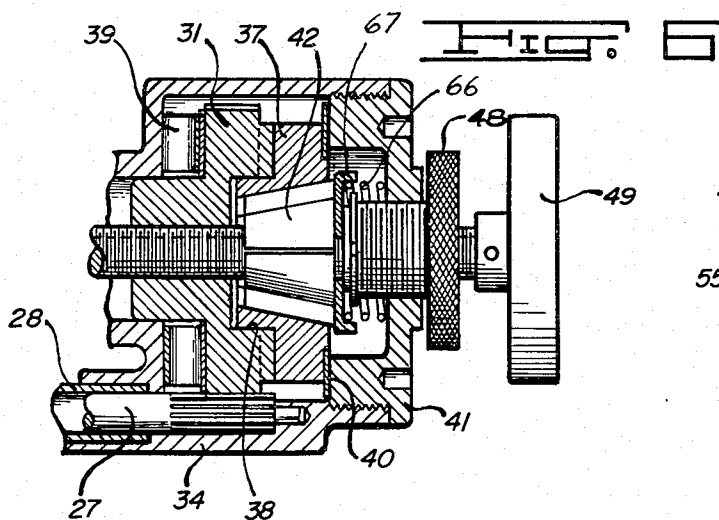
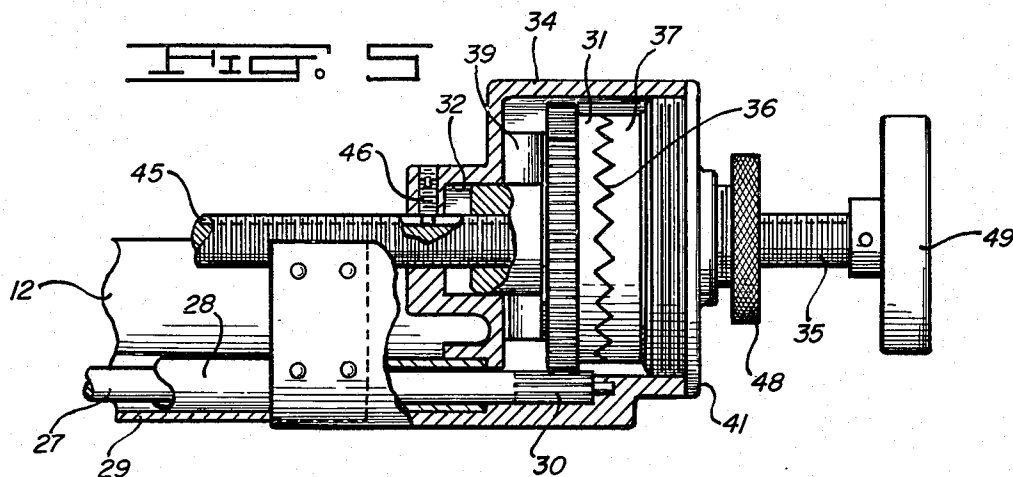


FIG. 3





CAULKING GUN ADAPTER FOR ELECTRIC HAND DRILL

Caulking guns of this general type are well known in the art and are designed primarily for dispensing caulking that comes prepackaged within a cylindrical-like container or cartridge having projecting therefrom a dispensing nozzle through which the caulking is forced during the caulking operation. The gun includes a receptacle wherein is received the cartridge with means being provided for driving a piston-like member through the cartridge thusly forcing the caulking from the nozzle.

Generally the piston of such apparatus is driven by variously constructed hand operated leverage mechanisms which serve to multiply the force applied to more easily urge the piston through the cartridge. It is well known, however, that even with the mechanical advantage offered by such force multiplying mechanisms, the effort required to drive the piston through the cartridge is considerable and frequently beyond the gripping capability of many, particularly the aged or those crippled as by arthritis or the like. Yet in many instances the very livelihood of such individuals with trades such as painters, boatmen and general home repair men depend upon operating such caulking guns.

It is the primary object of the present invention to provide a caulking gun wherein the power required to drive the piston of the gun is applied by means of a conventional electric hand drill of the kind commonly owned and which will enable even a child to dispense caulking of the most viscous composition and in a continuous, easy to control flow, a factor totally unobtainable by conventional hand operated apparatus of this type.

It is a further object to provide a caulking gun of the type described wherein upon emptying of the caulking cartridge or upon any other form of interrupted forward movement of the driven piston, a clutching mechanism disengages the driving train from the piston thereby preventing damage to the driving train mechanism of the device. A still further object is to provide a quick disengagement of the driving linkage from the piston after emptying of the cartridge thereby allowing the piston to be quickly retracted for insertion of another caulking cartridge within the gun.

Another object is to provide a caulking gun attachment for an electric hand drill which operates to dispense the caulking from the gun with considerable force and in a manner to more positively penetrate such cracks and crevices into which the caulking is intended to flow.

Other objects and advantages will become more apparent when referring to the accompanying description and drawings wherein:

FIG. 1 is a plan view in elevation of the device as it would appear when mounted upon a conventional electric hand drill.

FIG. 2 is a cross-sectional view of the clamping brackets as taken along 2—2.

FIG. 3 is an end view in elevation of the device, partly cut-away and showing the arrangement therein of two of the gears of the driving train.

FIG. 4 is a fragmentary view partly in cross section and partly cutaway and showing the arrangement of the piston driving mechanism of the caulking gun.

FIG. 6 is a cross-sectional view partly in elevation and showing in more detail the internal structure and

arrangement of the piston driving elements of the device.

FIG. 7 is a plan view in elevation of the split nut as arranged within one of the clutching elements of the mechanism.

FIG. 8 is a side view in elevation of an alternate form of the piston driving segmented nut of the device.

In FIG. 1 the device of the present invention is shown as secured by the clamping members 5 and 6 about the body of an electric hand drill 7 in the manner in which it is intended for use and with the flexible shaft portion 17 of the driving train of the device secured within the clamping jaws of the drill chuck 8.

In FIG. 2 the crescent-like clamping members 5 and 6 are shown as lined with any form of suitable resilient material 9 such as rubber or plastic which serves to yieldably bear upon the drill surface to provide a more positive frictional bond between the drill and clamps as the sections of the clamps are drawn together about the drill by the tightening of screws 10.

Secured to and extending upwardly from the clamp member 5 is a gun supporting bracket 11 to which the saddle or cartridge receiving receptacle 12 of the caulking gun is attached. Sleeved over and fastened to the receptacle 12 as at 13 is a die-cast housing 14 wherein is shown, as in FIGS. 2 and 3, the arrangement of gears 15 and 16 forming parts of the driving train of the device. The flexible cable 17, extending from gear 15, provides easy coupling with any of the various sizes and shapes of electric drills upon which the device may be mounted for use. The cable 17 is suitably fused at its end 18 for readily clamping within the jaws of a drill chuck 8 with the other end secured as by brazing at 19 within the member 20 for sleeving over and securing to the gear shaft 21. A suitable oil-impregnated or graphite bearing 22 and washers support and positions the shaft 21 and gear 15 within the housing with the shaft 21 being the only relatively high speed component of the device. Spacing washers 23 and 24 serve to position gear 16 against end play within the housing. The gear housing 14 is closed by the removable plate 25 secured in place as by screws 26.

The shaft 27 that extends from the gear 16 passes through a tubular guide 28 that lies within a protective recess 29 formed within the base of the receptacle 12 and shown to advantage in FIGS. 2 and 4. The gear 30 formed upon the end of shaft 27 is so positioned as to engage in driving relation a plastic molded gear member 31 mounted for journaling within the bearing surface 32 formed within housing 34 and closely rotatable about the piston shaft member 35, FIGS. 5 & 6.

Molded within the face of gear 31 are teeth-like projections 36 that engage in meshing relation with similarly formed teeth molded within a preferably plastic drive member 37 that journals within the gear 31 at 38 to form what will hereinafter be referred to as the clutching mechanism of the device. The teeth 36 upon these drive members are yieldably maintained in meshing relation by means of an annular corrugated spring washer 39 that serves to force the assembly against a washer and shoulder 40 provided upon the inner surface of the threaded housing cover 41. Upon an overload of the drive member 37, as by the forceful stopping of the piston 45 during operation of the drill, the teeth on gear 31 are cammed from those on the drive member 37 by compressing spring 39 sufficiently to allow slippage between the teeth of the clutch until

such time as current to the drill is interrupted or the piston freed. The degree of tightening of the clamp screw 48 varies the initial compression of spring 39 and thusly the slipping point of the clutch.

Centrally disposed within the drive member 37 is a tapered split or segmented nut assembly 42 having thereon extending flanges 44 that move within similarly formed tapered grooves provided therefor within the drive member 37. Rotation of the member 37 drives nut 42 by way of the flanges 44, FIG. 7.

The nut 42 is internally threaded in a manner to mesh with the threads upon the piston 35. As the nut 42 is rotated by means of the driving train and member 37, the piston 35, prevented from rotation by means of groove and screw 45 and 46 respectively, is driven through the receptacle 12 of the gun to force caulking from the nozzle of a caulking cartridge secured within the receptacle.

The conical configuration of the nut 42 is such that as this tapered nut is forced into a similarly tapered recess 47, FIG. 7, within the member 37 as by the tightening of a clamp screw 48, the internal threads of the segmented nut 42 are caused to be clamped tightly about the mating threads of the piston 35 in a manner to drive the piston as gear 31 is rotated. A backing off of the clamp screw 48 frees the nut 42 allowing it to be withdrawn from its clamped position within the drive member 37 and to move backward with the piston as the latter is drawn from the cartridge by handle 49. Sufficient backward movement of the nut from the confines of the tapered recess 47, allows the nut section to separate in a manner to permit slippage of the threads of the piston by the threads of the nut thusly enabling the piston to be quickly withdrawn for insertion of removal of a caulking cartridge. Tightening of the clamp screw again places the piston in operative relation with respect to the drive train. The spring 66 maintains the bearing washer 67 in position against the nut 42 as the clamp screw 48 is loosened and the piston 45 manually retracted.

The power multiplying force developed by the speed reducing drive train places very little torque upon the flexible shaft 17. It is understood that here any form of universal joint system will suffice for the cable 17 at a relatively slight increase in cost. Further, it is anticipated that the clutching mechanism, as provided between the gear 31 and drive member 37, may be located anywhere within the drive train, for example in combination with gear 16.

While the sections of the split nut 42 are shown in FIG. 7 as loosely pinned together as at 55, an alternate arrangement is shown in FIG. 8 wherein ring springs 56 and 57 yieldably maintain a three sectioned nut 58 together while preventing independent axial movement which could result in misalignment of the internal threaded surfaces of the nut sections.

While herein is shown one embodiment of the invention, it is understood that various modifications and arrangements of the parts may be resorted to without departing from the spirit and scope of the invention as disclosed.

What I therefore claim and desire to cover by letters patent is:

1. A caulking gun attachment for an electric hand drill including in combination securing means for fastening said gun to the body of said drill, a receptacle fastened to said securing means for receiving therein a

caulking cartridge having a caulking dispensing nozzle thereon, a threaded piston movable when driven through said cartridge to force the caulking within said cartridge from said nozzle, driving means for said piston including a threaded nut disposed about the threaded surface of said piston and operative when rotated to drive said piston through said cartridge, a speed reducing drive train disposed for connecting said drill with said nut and operative when activated by operation of said drill to effect rotation of said nut, fixed means engaging said piston and operative upon rotation of said nut by said drill to prevent rotation of said piston with said nut and clutch means interposed in said speed reducing drive train between said drill and said nut and operative to interrupt rotation of said nut upon a predetermined arrested movement of said piston during operation of said drill.

2. A caulking gun attachment for an electric hand drill including in combination securing means for fastening said gun to the body of said drill, a receptacle fastened to said securing means for receiving therein a caulking cartridge having a caulking dispensing nozzle thereon, a threaded piston movable when driven through said cartridge to force the caulking from said cartridge by way of said nozzle, driving means for said piston including a threaded segmented nut, clamping means for releasably clamping the segments of said nut about the threaded surface of said piston with said nut being operative when clamped about the threaded surface of said piston and rotated, to effect movement of said piston through said cartridge, a speed reducing drive train disposed for connecting said drill with said nut and operative when activated by operation of said drill to effect rotation of said nut, fixed means engaging said piston and operative upon rotation of said nut by said drill to prevent rotation of said piston with said nut and clutch means interposed in said speed reducing drive train between said drill and nut and operative upon a predetermined arrested pressure upon said piston during operation of said drill to drivably disengage said drill from said nut.

3. A caulking gun as claimed in claim 2 wherein said clutching means include manual adjustment means for varying selectively the drill disengaging point of said driving train clutch.

4. A caulking gun as claimed in claim 2 wherein said segmented nut is conical-like in configuration and clamped about said piston by being driven by said clamping means into a similarly conical-like configured recess included as a part of said driving train.

5. A caulking gun as claimed in claim 4 wherein the reduced end of said conical-like configured nut is pointed in the direction the piston is driven by said driving train when forcing caulking from said receptacle.

6. A caulking gun as claimed in claim 4 wherein upon release of said clamping means for said conical-like configured nut, the nut is free to be manually withdrawn by said piston from its clamped position within the said conical-like configured recess.

7. A caulking gun as claimed in claim 4 wherein between said conical-like configured nut and said conical-like configured recess are disposed interlocking drive communicating surfaces.

8. A caulking gun as claimed in claim 2 wherein said segmented nut is comprised of at least three segments.

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9. A caulking gun attachment for an electric hand drill including in combination, fastening means for securing said gun to the body of the drill, a receptacle secured to said fastening means for receiving therein a caulking cartridge having a caulking dispensing nozzle thereon, a threaded piston movable when driven through said cartridge to force caulking within said cartridge from said nozzle, drive means for said piston including a drive train to be driven by said drill, a tapered segmented nut threadedly engaging the threads of said piston with the decreasing tapered end of said nut directed toward the caulk driving end of said piston, a conical recess forming a part of said driving train and disposed about said tapered nut, drive communicating surfaces disposed between said tapered nut and said

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conical recess, clamping means for forcing said tapered nut in the driven direction of said piston and into said conical recess to effect driving communication between said nut and said driving train by means of said drive communicating surfaces, means for separating said clamping means from said nut to permit manual withdrawal of said nut from said conical recess and separation of said nut segments from the threads of said piston for manual withdrawal of said piston from said receptacle and clutch means interposed in said driving train and operable upon a predetermined arrested movement of said piston during operation of said drill to drivably disengage said drill from said nut.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,913,799 Dated February 26, 1976

Inventor(s) George B. Davis, Jr.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 2, column 4, line 40, "arrested" should read -- arresting --.

Signed and Sealed this

fourth Day of *May* 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks