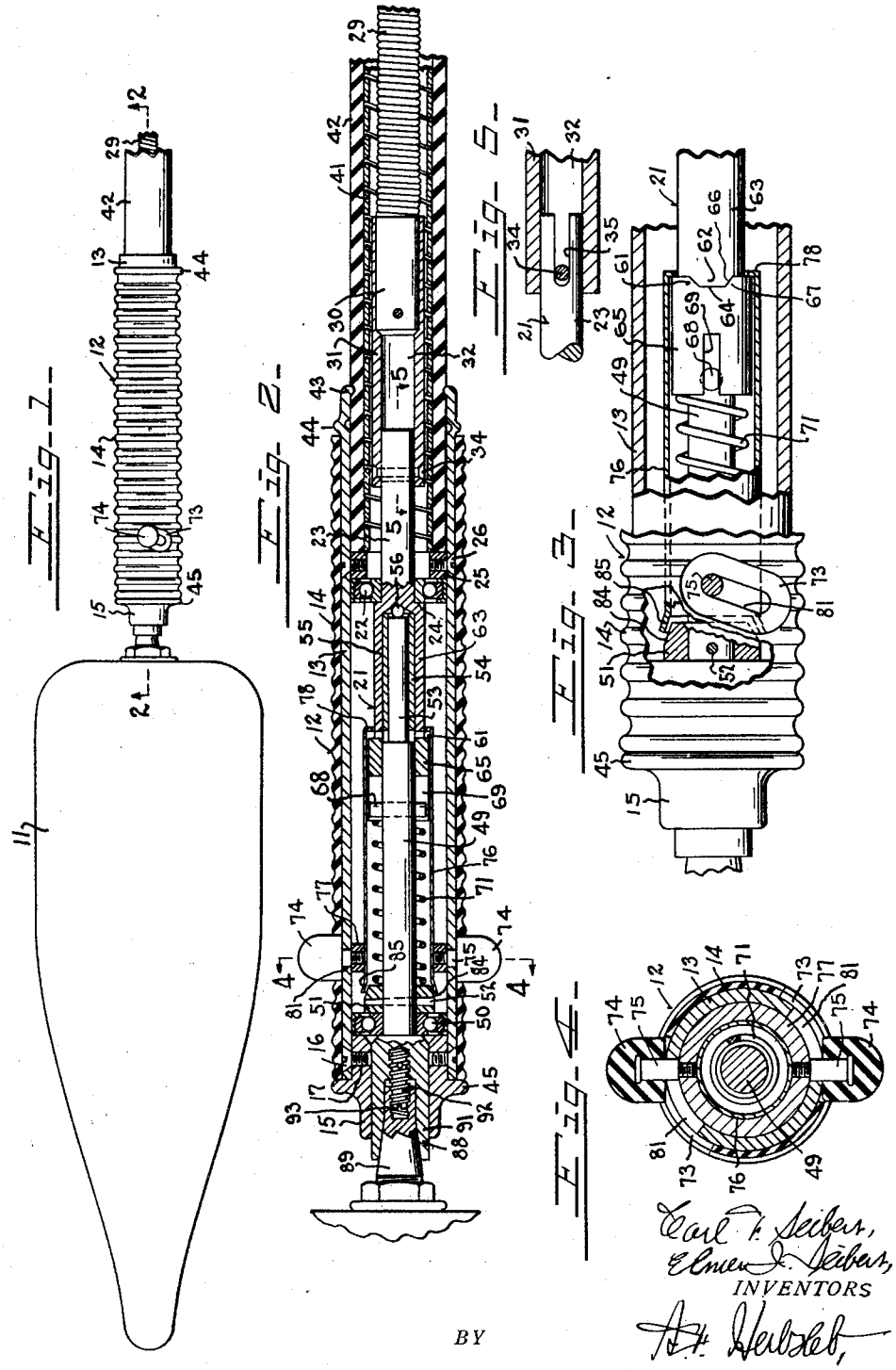
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DRIVING MEANS FOR APPLICATORS

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DRIVING MEANS FOR APPLICATORS

Application filed June 24, 1929. Serial No. 373,302.

Our invention relates to driving means for applicators intended for use for instance in treating surfaces, for example, of vehicles such as automobiles, in cleaning, waxing or polishing the same.

Our improved device is intended for use in connection with the vehicle treating device shown, described and claimed in our application for patent on vehicle treating device, filed in the United States Patent Office January 17, 1929, as Serial No. 333,189, and in connection with applicators such as shown, described and claimed in our applications for patents on improvement in applicators for treating surfaces, respectively filed in the United States Patent Office June 12th, 1929, as Serial No. 370,192, and June 24th, 1929, as Serial No. 373,301.

Applicators of this character are rotatable and are manually manipulated for proper contact between the applicator and the surface being treated. It is desirable that rotation of the applicator shall be under instant control of the operator for starting and stopping rotation of the same.

It is the object of our invention to provide novel means for driving an applicator of this character; further, to provide novel means for causing cessation of rotation of the applicator; and, further, to provide novel means whereby undue resistance to rotation of the applicator, for instance, by undue pressure between the applicator and the surface being treated, causes slippage between the driving means and the applicator to prevent injury to the surface being treated.

The invention will be further readily understood from the following description and claims, and from the drawing, in which latter:

Fig. 1 is a side elevation of our improved device, the flexible shaft and casing therefor being partly broken away.

Fig. 2 is an axial section of our improved device, taken on the line 2—2 of Fig. 1, with the applicator-head and the flexible shaft and casing therefor partly broken away.

Fig. 3 is a side elevation of a detail of our improved device, partly broken away.

Fig. 4 is a cross-section of our improved device, taken in the plane of the line 4—4 of Fig. 2; and,

Fig. 5 is an axial section of a detail of our improved device, taken in the plane of the line 5—5 of Fig. 2.

The applicator head is represented at 11. This head is rotatable and is also manually manipulated. A manipulating handle 12 is provided. The applicator head and its form and its driving connection are not herein claimed, having been shown, described and claimed in our aforesaid applications copending herewith.

The manipulating handle comprises a tube 13, shown as a cylindrical tube, having a cover 14. This cover is preferably a ribbed rubber cover, so that the handle may be firmly gripped by the operator. A thimble 15 is fixed in one end of the tube, as by means of screws 16, received through holes in the tube and threaded in threaded holes in the hub 17 of the thimble.

A drive-shaft 21 is journaled in the tube, as in a ball-bearing 22 in said tube. The inner raceway of the ball-bearing is received about the reduced shank 23 of the drive-shaft and against an annular shoulder 24 formed thereby. The outer raceway of the ball-bearing is received against a collar 25, held in the tube by screws 26, received through holes in the tube and threaded in threaded holes in the collar.

A flexible drive-shaft 29 is operatively connected with the drive-shaft 21. This is shown accomplished by providing the end of the flexible drive-shaft with a ferrule 30 fixed thereto. The ferrule is received in one end of a sleeve 31, being fixed therein so as to rotatively connect the flexible shaft and the sleeve. The sleeve has a bore 32 for receiving the reduced end 23 of the drive-shaft. A pin 34 in the sleeve extends crosswise of said bore and is received in a slot 35 in said reduced end of the drive-shaft.

A flexible casing 41 is located about the flexible drive-shaft, and is provided with a flexible cover 42. The end of the flexible casing and the end of the flexible cover are received in the tube 13, and are fixed therein, as by being clamped in the clamp end

43 of the sleeve. The cover 14 of the tube 13 is received between an annular bead 44 formed by said clamp and an annular flange 45 formed on the thimble 15.

A driving member 49 has releasable drive connection with the drive-shaft 21. This driving member is preferably releasable from the drive-shaft so as to interrupt the operative connection between the drive-shaft and the driving member when it is desired that the applicator-head shall be non-rotative, and the drive connection is preferably such also that it will yield upon undue or excessive frictional resistance between the applicator-head and the surface being treated, so as to avoid scratching, marring or burning of said surface. It is also desirable that the cessation of rotation of the applicator shall be instantaneous, for which reason braking means are provided between the driving member and the handle.

The driving member or shaft 49 is journaled in a ball-bearing 50 in the tube. The outer raceway of the ball-bearing contacts the inner end of the hub 17. The inner raceway of this ball-bearing is resisted inwardly by a collar 51 fixed to the drive-shaft 49 by a pin 52.

The shaft 49 is provided with an inner reduced extension 53 which is journaled in a bushing 54 located in an axial bore 55 of the drive-shaft 21. A step-bearing, shown as a ball 56, is located between the inner end of the drive-shaft 49 and the bottom wall of said bore. A telescoping connection is thus formed between the drive-shafts.

A releasable driving clutch 61 is located between the drive-shaft 21 and the drive-shaft 49. This clutch is shown as a tooth clutch, comprising clutch teeth 62 on the end of the sleeve portion 63 of the drive-shaft 21, and coacting clutch recesses 64 in the proximate end of a yieldable clutch-sleeve 65 received about the drive-shaft 49.

The side walls of these clutch teeth and clutch recesses are tapered as shown at 66, 67, respectively. A pin 68 in the driving member 49 is received in slots 69 in the sleeve 65.

A spring 71, shown as a helical spring, is received about the shaft 49 between the collar 51 and the sleeve 65 for urging engagement between the coacting faces of the clutch 61.

The power transmission of the clutch 61 is controlled by the resistance of this spring and the inclination of coacting taper faces 66, 67, of the clutch members. The spring acts to normally engage this clutch for transmission of rotation between the drive shaft 21 and the applicator-head.

Control means are on the handle 12 for controlling the engagement or disengagement of the clutch 61. These control means are exemplified as knobs 74 at the outside of the tube 13. Pins 75 connect these knobs with a sleeve 76. The inner ends of these pins are threaded and received in threaded holes in a collar 77 fixed to the sleeve 76. This collar is rotatable in the inside of the tube 13 and centers the sleeve 76 in said tube.

The sleeve 76 is provided with a flange 78 at its inner end received about the inner end of the clutch-sleeve 65, the flange being turned inwardly so as to engage the outer annular portion of said sleeve, which is shown of greater diameter than the proximate outer periphery of the sleeve-portion 63 of the drive-shaft 21.

The pins 75 are slidable in slanting slots 81 formed in the tube 13. When the knobs 74 are moved about the tube 13 in one direction, the pins climb in said slots toward one end of the tube 13 for moving the clutch sleeve 65 away from the drive-shaft 21, the spring 71 yielding to said movement. The knobs 74 are guided in slots 73 in the cover 14.

When the knobs 74 are moved about the tube 13 in the opposite direction, the pins 75 move along the inclined slots 81 in the opposite direction and toward the drive-shaft 21 for axial movement of the clutch-sleeve 65, urged by the spring 71, for engagement of the clutch 61, thereby placing the shaft 49 in rotative drive relation with the drive-shaft 21.

This rotative drive relation is, however, a slip drive relation, as excess resistance to rotation of the applicator-head and shaft 49 causes the inclined faces 67 on the clutch sleeve 65 to climb upon the incline faces 66 of the clutch-teeth 62. Recurrent engagement and release of these clutch-members takes place throughout such excessive resistance to rotation of the applicator-head and shaft 49. Combined rotation of the clutch-members again takes place as soon as such excessive resistance is removed.

The collar 51 fixed to the drive-member 49 is provided with a conical face 84 with which a cup-end 85 of the sleeve 76 engages for providing a braking means for the applicator-head for causing quick cessation of rotation of the same.

When the knobs 74 are moved for disengaging the clutch 61 and the pins 75 are caused to move axially of the tube outwardly in the inclined slots 81, braking engagement is also caused in the brake. The direction of inclination of the slots 81 is such with relation to the direction of rotation of the drive-shaft, that engagement in the brake tends to move the knobs 74 and the sleeve 76 into clutch engaging position.

The applicator-head and the drive-shaft 49 are provided with complemental members of a chuck 88, exemplified as a tapered plug 89 fixed to the applicator-head received in a tapered socket of a cup 91, which is part of the drive-shaft 49. A threaded shank 92 is

secured in said socket. The outer end of the plug is provided with a complemental threaded socket 93. The threads are in such direction that resistance to rotation of the applictor-head causes said chuck-members to be drawn together, so that the rotative driving of the applicator-head by the drive-shaft 49 tends to draw said chuck-faces toward each other.

The cup-member 91 of the chuck is shown rotatable in the thimble 15 of the handle.

Applicator-heads are readily released from the handle by manually unscrewing the same, and other applicator-heads substituted on the handle. Applicator-heads may be automatically removed from the handle while rotating, by quick and firm application of the brake, which causes the chuck-member on the drive-shaft 49 to suddenly stop rotating, the applicator-head continuing to rotate by reason of its inertia of rotation and being thereby unscrewed from the handle, and, if held above its storage receptacle, dropping into said receptacle.

Our improved device provides simple, compact and convenient means for manipulating and rotating the applicator-head. It also provides convenient means for controlling the driving connection between the driving means and the applicator-head which are in convenient position for ready manipulation by the fingers of the operator when grasping the manipulating handle.

It further provides compact and ready yieldable means for permitting cessation of rotation of the applicator-head upon excess frictional resistance to rotation of said head, and provides convenient and compact means for quick cessation of rotation of the applicator-head upon release of the driving clutch.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is:

1. In a device of the character described, the combination of a rotatable head, a manipulating handle therefor, said handle comprising a tube, a drive-shaft in said tube, a flexible drive-shaft having operative connection therewith, a driving member in said tube for said head, releasable connecting means in said tube between said first-named drive-shaft and said driving member, a brake in said tube, said releasable connecting means and said brake each including a movable member and manual control means having operative connection with each of said movable members, said manual control means extending to outside said handle where it is provided with a manipulating part, said manipulating part located at one end of said handle, and said releasable connecting means located in said handle between said manipulating part and said flexible drive-shaft.

2. In a device of the character described, the combination of a rotatable head, a manipulating handle therefor, said handle comprising a tube, a drive-shaft in said tube, a flexible drive-shaft having operative connection therewith, a driving member in said tube for said head, releasable connecting means in said tube between said first-named drive-shaft and said driving member, a brake in said tube for said driving member, and manual control means including connecting means in said tube with said releasable connecting means and said brake, said manual control means extending to outside said handle.

3. In a device of the character described, the combination of a rotatable head, a manipulating handle therefor, said handle comprising a tube, a drive-shaft and a driving member in said tube for rotating said head, said drive-shaft and said driving member having telescoping connection with each other, bearings in said tube between said tube and said drive-shaft and said driving member respectively, a yieldable clutch between said drive-shaft and said driving member comprising a releasable member, said clutch provided with complemental clutch-faces arranged to relatively yield to excess load, a spring urging clutch engagement, said clutch-faces and said spring controlling the yield in said clutch, and manual control means having automatically shiftable connection with said releasable clutch-member and extending to outside said tube.

4. In a device of the character described, the combination of a rotatable head, a manipulating handle therefor, said handle comprising a tube, a drive-shaft and a driving member in said tube for rotating said head, said drive-shaft and said driving member having telescoping connection with each other, bearings in said tube between said tube and said drive-shaft and said driving member respectively, a yieldable clutch between said drive-shaft and said driving member comprising a releasable member, said clutch provided with complemental clutch-faces arranged to relatively yield to excess load, a spring urging clutch engagement, said clutch-faces and said spring controlling the yield in said clutch, and manual control means having automatically shiftable connection with said releasable clutch-member and extending to outside said tube, said manual control means and said tube provided with complemental cam-faces controlling positional relation between the clutch-members.

5. In a device of the character described, the combination of a rotatable head, a manipulating handle therefor, said handle comprising a tube, a drive-shaft and a driving member in said tube for rotating said head, said drive-shaft and said driving member having telescoping connection with each other, bearings in said tube between said tube and said

drive-shaft and said driving member respectively, a yieldable clutch between said drive-shaft and said driving member comprising a releasable member, said clutch provided with complemental clutch-faces arranged to relatively yield to excess load, a spring urging engagement, said clutch-faces and said spring controlling the yield in said clutch, manual control means having operative connection with said releasable clutch-member and extending to outside said tube, and a brake comprising a member having operative connection with said driving means and a co-acting releasable member, control means, said control means and said tube provided with complemental faces controlling positional relations of said releasable members.

6. In a device of the character described, the combination of a rotatable head, a manipulating handle therefor, said handle comprising a tube, a pair of telescoping drive-shafts in said tube for rotating said head, bearings in said tube therefor, a clutch between said drive-shafts comprising a clutch-member on one of said drive-shafts and a complemental clutch-sleeve on the other of said drive-shafts, said clutch-sleeve axially movable for engagement and disengagement of said clutch, said drive-shafts having journal connection one within the other at one side of said clutch, a spring about one of said drive-shafts at the other side of said clutch urging engaging movement of said sleeve with said clutch-member, and manual control means extending to outside said tube having operative connection with said sleeve for positionally controlling said sleeve.

7. In a device of the character described, the combination of a rotatable head, a manipulating handle therefor, said handle comprising a tube, a pair of telescoping drive-shafts in said tube for rotating said head, bearings in said tube therefor, a clutch between said drive-shafts comprising a clutch-member on one of said drive-shafts and a complemental clutch-sleeve on the other of said drive-shafts, said clutch-sleeve axially movable for engagement and disengagement of said clutch, a spring about one of said drive-shafts urging engaging movement of said sleeve with said clutch-member, a brake comprising complemental brake-members, one of said brake-members secured to one of said drive-shafts, and manual control means extending to outside of said handle having operative connections with the other of said brake-members and with said clutch-sleeve.

8. In a device of the character described, the combination of a rotatable head, a manipulating handle therefor, said handle comprising a tube, a pair of driving members in said tube for rotating said head, a releasable clutch between said driving members, said releasable clutch comprising an axially movable sleeve, rotative drive connection between said sleeve and one of said driving members, a spring about said last-named driving member urging engaging movement of said clutch-sleeve, a sleeve about said spring and said clutch-sleeve having operative connection with said clutch-sleeve for positionally controlling said clutch-sleeve, a brake between said other of said driving members and said last-named sleeve, and manual control means for said last-named sleeve extending to outside said handle for moving said last-named sleeve in opposite axial directions for clutch release and brake engagement, and for clutch engagement and brake release.

9. In a device of the character described, the combination of a rotatable head, a manipulating handle therefor comprising a tube, a pair of axially alined drive-shafts in said tube, a clutch between said drive-shafts comprising a clutch-member on one of said drive-shafts and a clutch-sleeve about the other of said drive-shafts, a brake comprising a brake-member on said last-named drive-shaft, a brake-sleeve about said last-named drive-shaft, a spring in said brake-sleeve about said last-named drive-shaft between said brake-member and said clutch-sleeve, said brake-sleeve having operative connection with said clutch-sleeve, and a manual control-part outside said tube having operative connection with said brake-sleeve.

In testimony whereof, we have hereunto signed our names.

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