Oct. 22, 1940. G. C. BURD 2,218,904

PROCESS OF AND MEANS FOR APPLYING ELASTIC SLEEVES ON CONDUITS AND THE LIKE

Filed Jan. 23, 1937 2 Sheets-Sheet 1

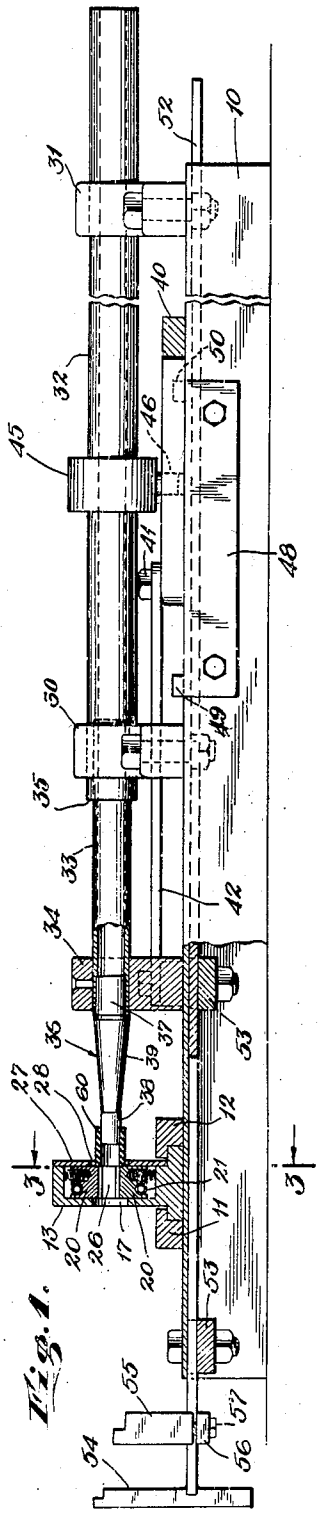


Fig. 1.

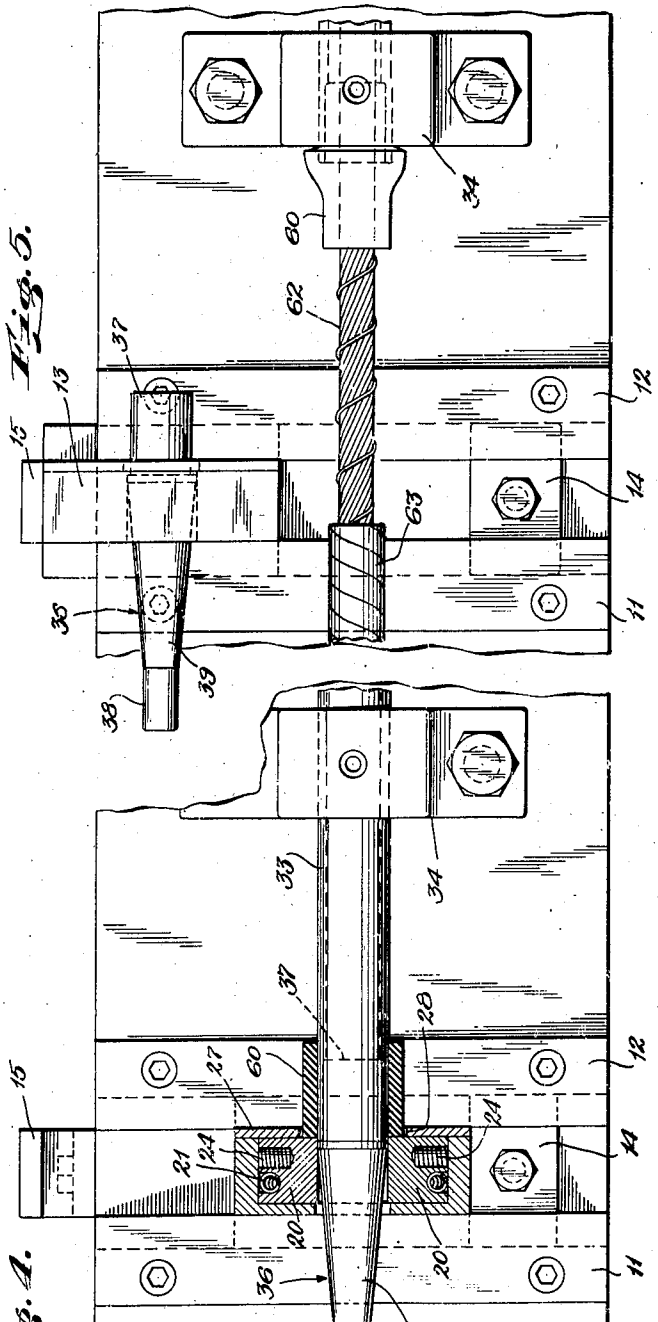


Fig. 5.

Fig. 4.

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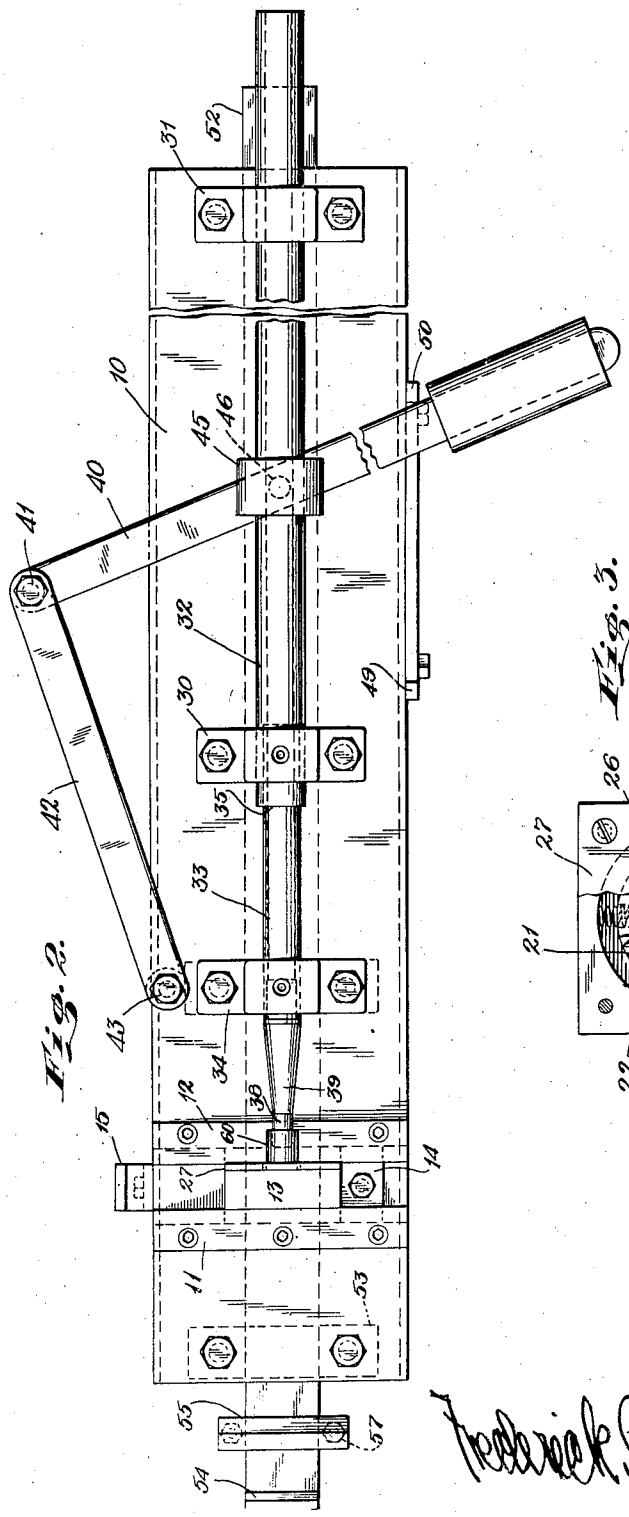


Fig. 2.

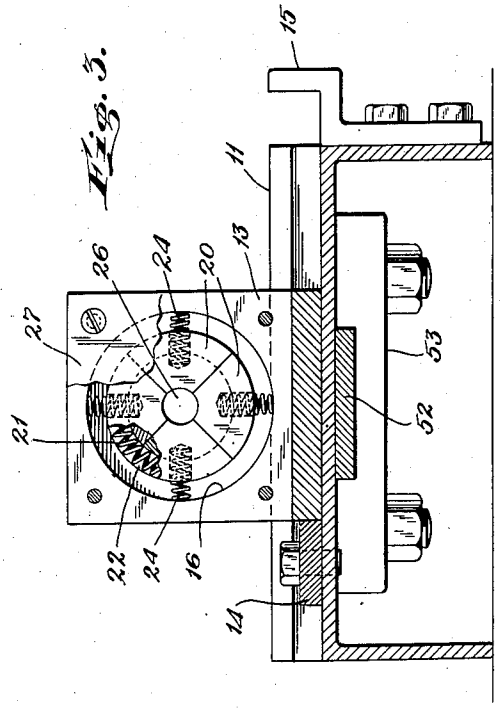


Fig. 3.

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UNITED STATES PATENT OFFICE

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PROCESS OF AND MEANS FOR APPLYING ELASTIC SLEEVES ON CONDUITS AND THE LIKE

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Application January 23, 1937, Serial No. 122,089

3 Claims. (Cl. 29—88.2)

The present invention relates to a novel process of applying sleeves of rubber or other elastic material at predetermined points on conduits and other elongated members and to a novel mechanism for carrying out said process.

The invention is particularly adapted for applying bumpers or flexible grommets on Bowden wire casings, such as flexible brake tubes of automobiles, so as to keep the casings from rattling or rubbing against frame members or other parts. Manifestly the invention will also be useful in applying sleeves of elastic material on other elongated members.

The sleeve or grommet must fit very snugly on the casing so as to maintain its position at a predetermined point thereon in service, and heretofore the task of applying the grommets quickly and at small cost has presented a serious problem, particularly where the grommets have to be passed over ferrules or binding sleeves at the ends of the casings.

My invention has for an object to overcome this difficulty by automatically expanding the grommet, passing it in expanded condition over the end of the casing to the point where it is to be located on the casing and thereafter depositing the grommet on the casing at such point.

A further object of the invention is to provide means for gauging the point on the conduit or other extended member at which the grommet is to be deposited.

Other objects and advantages of my invention will appear in the following description of my improved process and of a preferred apparatus for carrying out the process and thereafter the novelty and scope of the invention will be pointed out in the claims.

In the accompanying drawings;

Figure 1 is a view in side elevation of my preferred form of apparatus for applying grommets to extended members, the view showing the parts in a preliminary step of the process, a portion of the apparatus being shown in section to reveal interior details;

Fig. 2 is a plan view of the same;

Fig. 3 is a view in vertical section taken on the line 3—3 of Fig. 1 but showing the parts on a larger scale;

Fig. 4 is a fragmental plan view partly in section showing another step of my process; and

Fig. 5 is a fragmental plan view showing still another step of the process.

The mechanism shown in the drawings is mounted on an elongated bed 10 of inverted U-shape in cross section. Mounted on the bed and running transversely across the same near one end, are two spaced undercut rails 11 and 12 which form slideways for an inverted T-shaped slide block 13. The latter when in the normal operative position shown in Figs. 2, 3, and 4 is located midway of the width of the bed and bears against a stop 14 secured to the bed. The block 13 is slidable to an inoperative position shown in Fig. 5, in which position it bears against a bracket 15 bolted to one side of the bed.

The slide block 13 is formed with a circular recess 16 which opens inwardly or toward the right, as shown in Figs. 1, 2 and 4, and concentric with this recess there is an opening 17 which passes through the outer face of the block. Mounted within the recess is an expansible abutment and clutch which comprises four sector shaped jaws 20 resiliently bound together by a circumferentially disposed coil spring 21 seated in an outer peripheral slot 22 formed in the jaw members. Each jaw is also individually pressed inwardly by means of a coil spring 24 which is seated in a socket in the outer periphery of the jaw and bears against the peripheral wall of the circular recess 16. Thus, normally the jaws occupy the position shown in Fig. 3 and define between them a central opening 26 which is axially alined with the much larger opening 17. A cover plate 27 is secured to the block to close the mouth of the recess 16 and this cover plate is formed with a central opening 28 which is also coaxial with the openings 26 and 17.

A pair of brackets 30 and 31 are mounted on the bed 10 and provide bearings through which a tube 32 may slide. This tube has a reduced extension 33 secured therein, the outer end of the extension being normally supported in a bearing bracket 34 also secured to the bed 10. The bore of tube 32 is of the same diameter as that of the extension 33, and is in axial alinement with the hole 26 when the slide block is in operative position. A pilot member 36 is adapted to be detachably connected to the free end of the extension 33. This pilot member has a plug portion 37 which fits snugly into the bore of the extension 33, and at the outer end of the pilot there is a cylindrical stud 38 just large enough to pass freely through the opening 26 when the latter is at its smallest diameter. Connecting the plug 37 and the stud 38 is a conical body 39 which at its largest diameter adjacent the plug is of the same diameter as and in register with the exterior of extension 33. Thus, when the pilot is fitted to the end of the extension the tube 32 may be advanced toward the left, as viewed in Fig. 1, and

the pilot will then enter the hole 26 in the expansible abutment. As the conical portion 39 of the pilot is forced through the hole 26 the jaws 20 of the abutment will be moved radially outward to accommodate the increasing diameter of the tapered body 39. When the tube 32 is withdrawn the pilot will be separated from the extension 33, being retained by the jaws 20.

A convenient means for moving the tube 32 back and forth consists of a hand lever 40 which is fulcrumed at 41 to one end of a link 42, while the other end of the link is pivotally connected at 43 to the bed 10. The lever 40 passes under the tube 32 and a collar 45 fixed on the tube 38 is formed with a depending stud 46 which enters an aperture in the lever, so that as the lever is swung back and forth the tube 32 will be correspondingly moved. A plate 48 is secured to one side of the bed 10 and is formed with ears 49 and 50 respectively, which project into the path of the lever 40 and serve as stops to limit the stroke of the lever.

As will be explained more fully hereinafter, the conduit or other member on which the rubber grommet is to be applied is passed through the tube 32 and extension 33, and a gauge is provided to determine the position of the casing in the tube as desired. To this end a long narrow plate 52 is mounted on the under side of the bed 10, being clamped thereto by means of cleats 53 bolted to the frame. The plate 52 carries at its left hand end, as viewed in Fig. 1, a vertical stop member 54 and also mounted on the plate 52 is an adjustable stop member 55 which may be clamped thereon at any desired position by means of a clamping plate 56 and a pair of screws 57.

In operation, the slide block 13 is first moved against the stop 14 so that it occupies its operative position, as shown in Figs. 1, 2, 3 and 4. A grommet or sleeve 60 of rubber or other suitable elastic material is fitted upon the cylindrical end 38 of the pilot member 36 and the latter is inserted in the end of the extension 33. The lever 40 is now operated to advance the tube 32 and the pilot 36. While the pilot may pass freely through the opening 26 the sleeve 60 is prevented from doing so because it is of larger diameter than said opening. As the pilot advances through the opening 26 the jaws 20 spread apart but the grommet continues to bear against the adjacent side face of the jaws and is pushed up the tapered body 39 of the pilot until it clears the pilot and is supported on the extension 33, as shown in Fig. 4. It will be understood, of course, that the opening 28 in the cover plate 27 is large enough to clear the sleeve 60 when the latter is fully expanded and supported on the extension 33. The tube 32 is now withdrawn sufficiently to disengage the pilot which remains gripped between the jaws 20. The slide block 13 is then moved to idle position against the stop bracket 15, as shown in Fig. 5. The member 62 upon which the sleeve is to be applied is then inserted in the tube 32 and extension 33 and abutted against one or the other of the stops 54 and 55. Thereafter further movement of the handle 40 will withdraw the extension 33 and cause the bearing bracket 34 to strip the sleeve 60 off the extension 33 and deposit it upon the member 62. Fig. 5 shows the sleeve partly stripped off and deposited upon the member 62.

The member 62, fragmentally shown in the drawings, is a flexible brake tube provided with a wrapped end fitting or ferrule 63. The inner diameter of the extension 33 and tube 32 is sufficient to clear the outer diameter of this ferrule so that when the sleeve 60 is expanded and deposited upon the extension 33 it may easily be passed over the ferrule 63 and be deposited upon the main body of the casing 62 wherever desired. The location of the sleeve 60 on the brake tube will depend upon the position of the stop against which the ferrule bears with relation to the stripping bracket 34.

While I have described a preferred embodiment of apparatus for carrying out my improved process it will be understood that other means may also be employed for this purpose and the particular embodiment disclosed is not to be construed as limitative of my invention. I reserve the right to make various changes in form, construction and arrangement of parts without departing from the spirit and scope of my invention as set forth in the claims.

I claim:

1. In an apparatus for applying a closely fitting elastic sleeve upon an extended member, the combination of a frame, a sleeve supporting tubular member mounted for axial movement on said frame, a pilot detachably connected to one end of said tubular member, an expansible sleeve abutment provided with an aperture receiving the pilot and adapted to force a sleeve over the pilot upon the adjacent end of the tubular member when the tubular member and pilot are moved in one direction, means to contract the sleeve abutment with sufficient force upon the pilot to hold the same against movement when the tubular member is moved in the opposite direction to detach the pilot from the tubular member, means for supporting the abutment for subsequent movement laterally of the frame and tubular member whereby the extended member may be inserted into the tubular member, a gauge against which the end of the extended member may be abutted to determine the portion of the extended member upon which the sleeve is to be deposited, a stripper in the path of movement of the sleeve, operating to stop the sleeve upon further movement of the tubular member in said opposite direction to strip the sleeve off the tubular member and deposit the same upon the extended member and means for moving said tubular member in said two directions.

2. In an apparatus for applying a closely fitting elastic sleeve upon an extended member, the combination of a frame, a sleeve supporting tubular member mounted for axial movement on the frame, a pilot detachably connected to one end of the tubular member, an expansible sleeve abutment provided with an aperture receiving the pilot and adapted to force a sleeve over the pilot upon the adjacent end of the tubular member when the tubular member and pilot are moved in one direction, means to contract the sleeve abutment with sufficient force upon the pilot to hold the same against movement when the tubular member is moved in the opposite direction to detach the pilot from the tubular member, means for supporting the abutment and tubular member for subsequent relative movement laterally of the frame whereby the extended member may be inserted into the tubular member, and a stripper in the path of the sleeve located and operating to stop the sleeve upon further movement of the tubular member in said opposite direction to strip the sleeve off the tubu-

lar member and deposit the same upon the extended member.

3. In an apparatus for applying a closely fitting elastic sleeve upon an extended member, the combination of a frame, a sleeve supporting tubular member, an expansible sleeve abutment, means for supporting the tubular member and expansible sleeve abutment for relative movement in the direction of the axis of the tubular member and for relative movement at right angles to said axis, a tapered pilot detachably connected to one end of the tubular member, said abutment being provided with an aperture to receive the pilot and adapted to force a sleeve over the pilot upon the adjacent end of the tubular member when the tubular member and pilot and the abutment member are moved relatively toward each other in the direction of the axis of the tubular member, means to contract the abutment with sufficient force to cooperate with the pilot to hold the same against movement with respect to the abutment when the tubular member and abutment are moved away from each other in the direction of the axis of the tubular member to detach the pilot from the tubular member, means for moving the abutment and supporting member relatively laterally whereby the extended member may be inserted into the tubular member, a stripper, and means for supporting said stripper and tubular member for relative movement in the direction of the axis of the tubular member, said stripper operating to strip the sleeve off from the tubular member and deposit the same upon the extended member upon such relative movement.

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