

June 5, 1956

A. E. GRZENKOWSKI ET AL
APPARATUS FOR SECURING COVERS ON VISCOUS
VIBRATION DAMPER UNITS OR THE LIKE

2,748,736

Filed Nov. 14, 1950

5 Sheets-Sheet 1

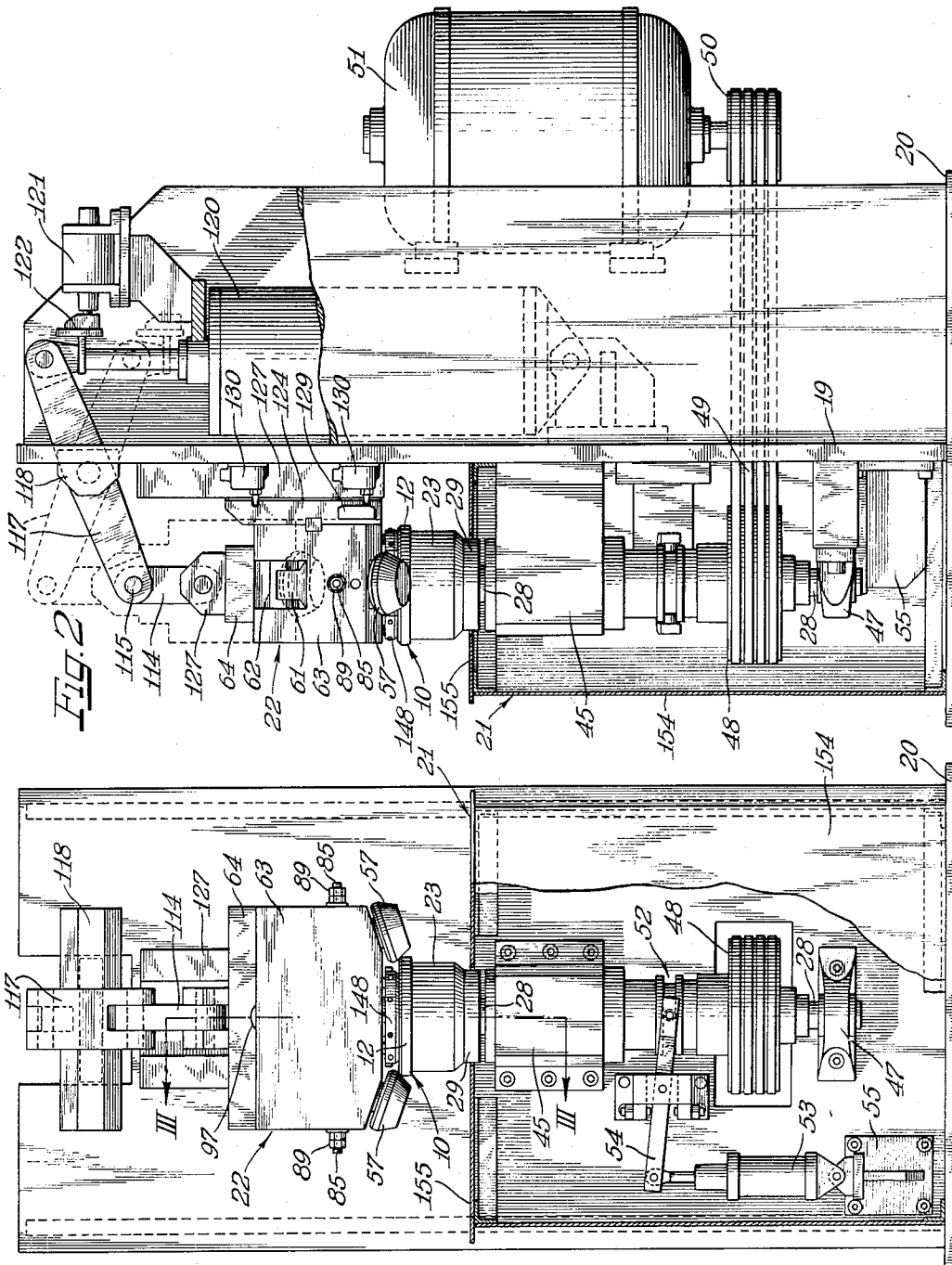


Fig. 1

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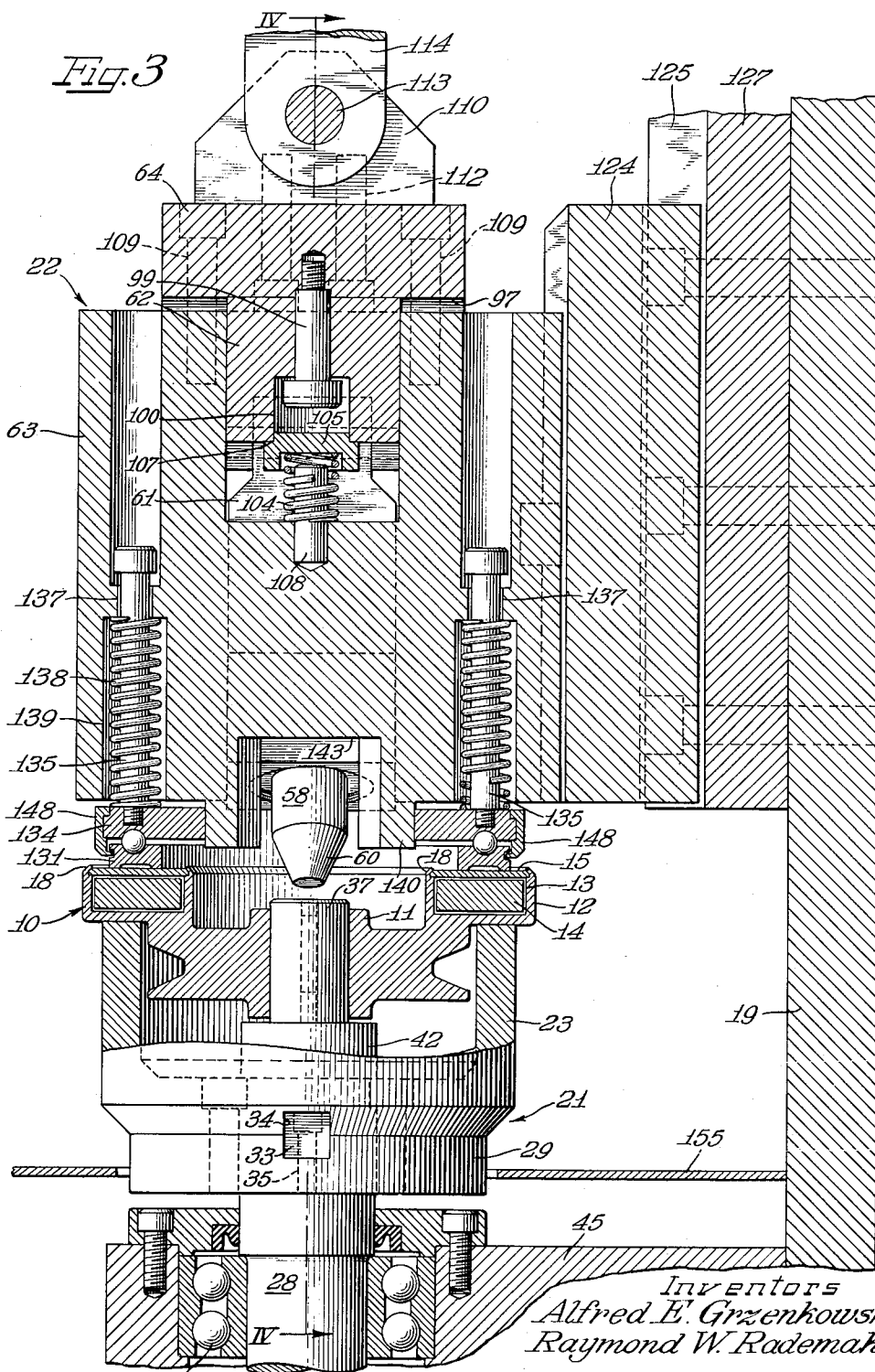
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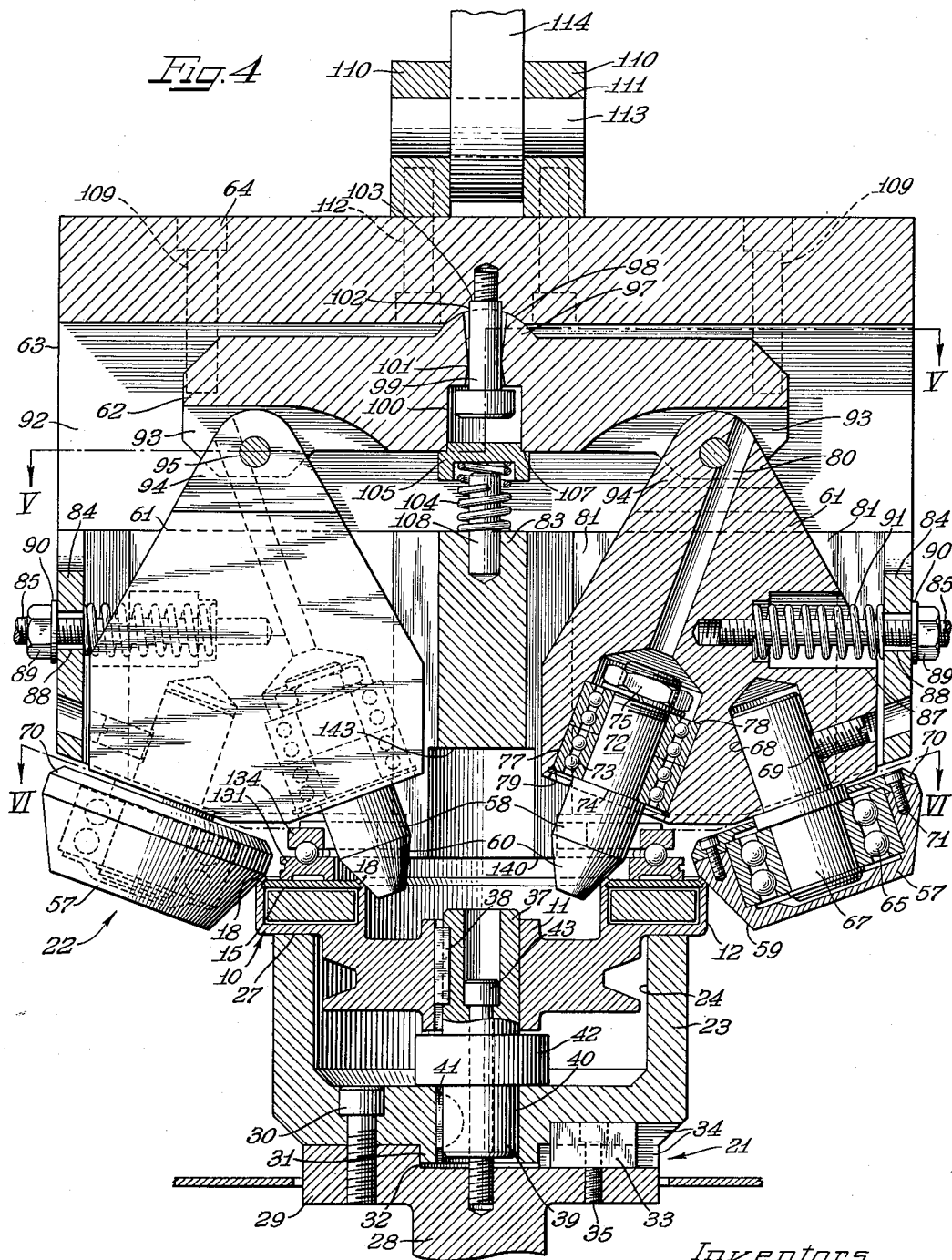
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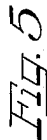
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5 Sheets-Sheet 4

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Fig. 6

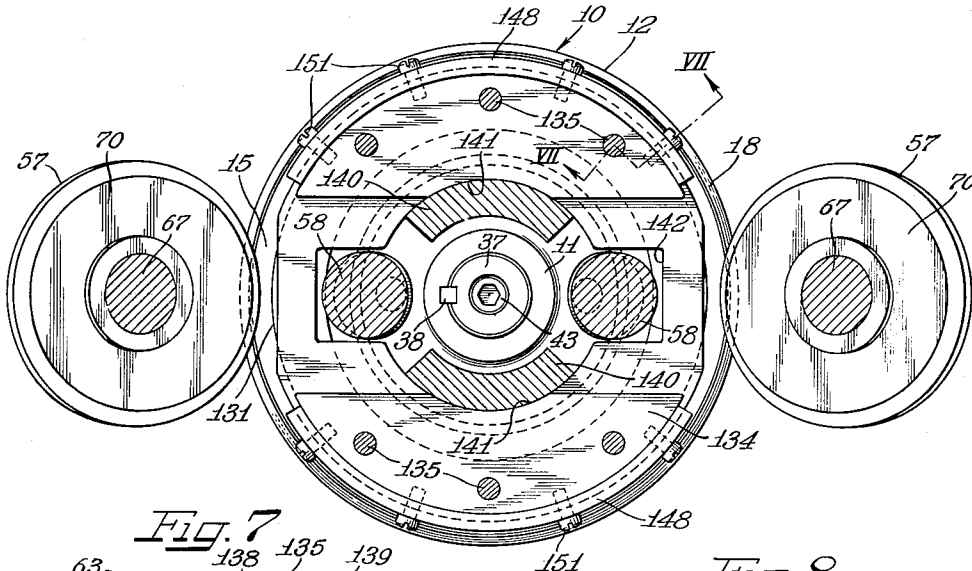


Fig. 7

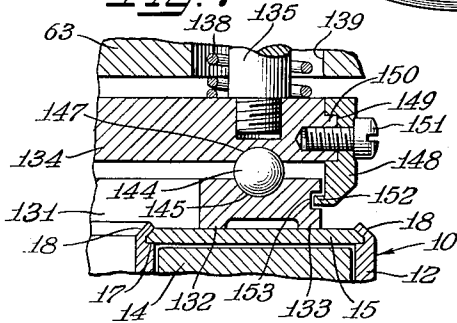


Fig. 8

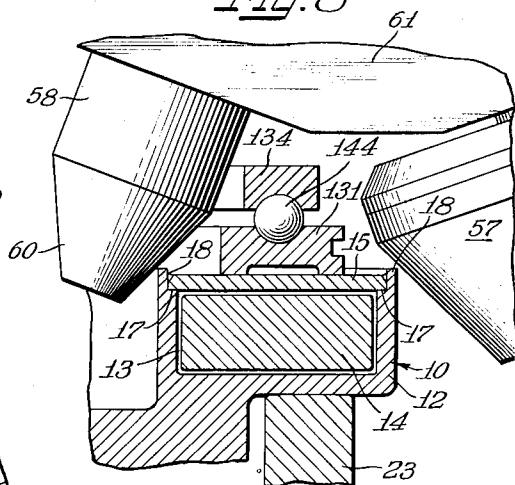
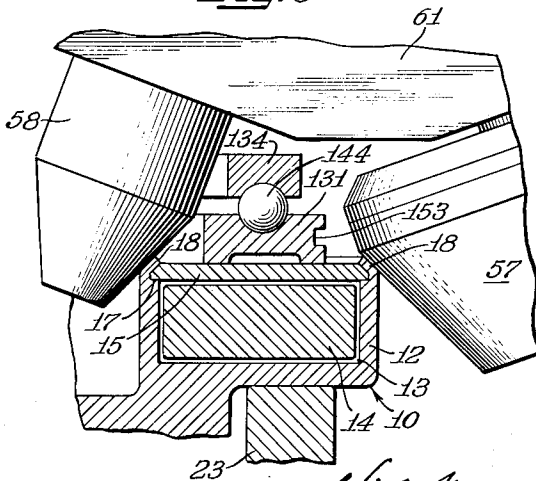


Fig. 9



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2,748,736

APPARATUS FOR SECURING COVERS ON VISCOUS VIBRATION DAMPER UNITS OR THE LIKE

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Application November 14, 1950, Serial No. 195,682

6 Claims. (Cl. 113—52)

The present invention relates to improvements in the securing of closures onto metal casings and more especially malleable iron casings such as may be used for enclosing the flywheels of viscous vibration damper units.

An important object of the present invention is to solve the problem of efficiently securing the covers or closure plates onto the sides of metal casings having malleable characteristics and which require that the cover plates be sealed in place to avoid leakage of fluid from the interior of the casings.

Another object of the invention is to provide improved apparatus especially adapted for production spinning of cover-retaining flanges of malleable iron articles.

A further object of the invention is to provide an improved machine for securing annular cover plates to annular malleable metal articles.

Still another object of the invention is to provide improved apparatus for spinning with a high degree of uniformity the cover-retaining flanges of malleable metal articles onto retained margins of the cover plates for the articles.

Yet another object of the invention is to provide a machine for spinning cover-retaining flanges of malleable metal articles with uniform, equalized pressure.

A still further object of the invention is to provide an improved self-equalizing spinning head for cover-securing machines.

Other objects, features and advantages of the present invention will be readily apparent from the following detailed description of a preferred embodiment thereof taken in conjunction with the accompanying drawings, in which:

Figure 1 is a front elevational view of a cover-securing spinning machine embodying the features of the invention and showing the same in the condition wherein a cover attachment spinning operation has just been completed;

Figure 2 is a side elevational view of the machine;

Figure 3 is an enlarged fragmentary vertical sectional view taken substantially on the line III—III of Fig. 1;

Figure 4 is a vertical sectional detail view taken substantially on the line IV—IV of Fig. 3;

Figure 5 is a horizontal sectional detail view taken substantially on the line V—V of Fig. 4;

Figure 6 is a transverse sectional detail view taken substantially on the line VI—VI of Fig. 4;

Figure 7 is an enlarged fragmentary vertical sectional detail view taken substantially on the line VII—VII of Fig. 6;

Figure 8 is an enlarged fragmentary sectional detail view, partially in section and partially in elevation and showing the relationship of the spinning rollers to the flanges of the article on which a cover is to be secured, just prior to engagement of the retaining flanges to be spun over by the spinning rollers; and

Figure 9 is a view like Fig. 8 but showing the spinning rollers in spinning relation to the cover-retaining flanges of the article.

In the production of viscous vibration dampers, for

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example an inertia member or flywheel is enclosed within a housing or casing in the presence of a viscous coupling or damping fluid. An exemplary form of such a damper 10 (Figs. 3 and 4) may be of the kind used on the end of the crankshaft of an internal combustion engine for damping torsional vibrations in the crankshaft. Such a damper includes a hub 11 and a casing portion 12 formed with an annular sidewardly opening channel-like chamber 13 within which is housed an inertia mass or flywheel 14. After the flywheel 14 is assembled within the chamber 13, a cover in the form of an annular closure plate or disk 15 is secured in closing relation to the open side of the casing 12. The flywheel 14 and the walls defining the chamber 13 have parallel opposed working surfaces in closely spaced relation so that a viscous fluid confined in the chamber 13 effects shear film coupling between the opposing working surfaces of the flywheel and the casing which resists sudden relative parallel movements of the working surfaces and thereby dampens vibrations in the use of the vibration damper.

In order to effect a fluid sealed joint between the edges of the closure plate 15 and the walls of the casing 12, the inner and outer walls are provided with rabbet seating grooves 17 (Fig. 8) within which the closure plate 15 seats marginally. Then an appropriate sealing compound is applied into the outer side of the joint, and thereafter the extremities of the casing walls which project outwardly beyond the outer face of the closure plate 15 are turned inwardly to provide clamping and sealing flanges 18 which permanently hold the closure plate 15 in closing relation to the casing and maintain a fluid sealed relationship. By preference, the cover securing flanges 18 are spun over into the securing relation and for this purpose the casing 12 is preferably made from a malleable material such as malleable iron.

For spinning the securing flanges 18 rapidly and economically on a production basis the improved machine exemplified in the drawings has been provided comprising a supporting frame 19 mounted on a base 20 and cooperatively supporting a rotary casing supporting assembly 21 and a flange spinning head assembly 22. In a convenient form, the supporting frame 19 may comprise a plurality of appropriately related steel plates, and the entire machine may be made up as a portable unit on the base 20.

The rotary casing-supporting assembly 21 comprises as a principal component a casing-supporting member 23 which is preferably of substantially cup shape so as to accommodate the hub portion 11 of the damper member within a cavity 24 of the supporting member while the casing 12 rests upon a rim 27 provided by the upper edge of the circular upstanding wall of the supporting member. By preference the outside diameter of the supporting member 23 is somewhat less than the outside diameter of the casing 12 so that there will be a substantial outward overhang of the casing enabling the same to be conveniently manually engaged for placing the same on the supporting member 23 and for removing the casing after the spinning operation has been completed.

In order to adapt the machine for operating upon viscous damper or like casings of various sizes, the supporting member 23 is preferably supported removably upon a vertical rotary spindle 28 so that the member 23 can be readily replaced by supporting members of various casing accommodating sizes. An attachment flange 29 (Figs. 1, 2, 3 and 4) at the upper extremity of the spindle 28 provides a seat for the supporting member 23 for attachment of the bottom of the latter to the spindle as by means of socket head screws 30. To assure a centered, coaxial relation of the member 23 to the spindle 28, a central downwardly projecting centering boss 31 on the member 23 is engaged within a complementary centering

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recess 32 in the upper side of the supporting head or flange 29. Torque imposed shearing stresses on the attachment screws 30 is relieved by means such as a key 33 which fits into appropriate matching keying grooves 34 in the opposing faces of the flange 29 and the bottom of the member 23. Centrifugal displacement of the key 33 is avoided by securing the same in place as by means of a screw 35 engaging therethrough and threaded into the flange 29.

Fixed retention of the damper 10 against rotation relative to the supporting member 23 is attained by keyed engagement of the hub 11 of the damper about a mandrel 37 carrying a key 38. Since the hub of different styles and sizes of damper may vary considerably, the mandrel 37 is replaceably carried within the recess 24 of the supporting member and for this purpose has a depending axial stem 39 which is engaged within an axial bore 40 in the base portion of the supporting member 23 and keyed against relative rotation by means of a key 41. An intermediate collar 42 of larger diameter on the spindle supports the same upon the bottom of the member 23, and a screw 43 secures the mandrel against axial displacement. Through this arrangement it will be apparent that convenient, rapid replacement of alternate supporting members 23 and mandrels 37, or combinations thereof, can be effected in minimum set-up time for accommodating various production runs of dampers. For any particular set-up, successive dampers can be operatively located on the supporting member 23 and removed as quickly as a workman can handle the same by slidably engaging the damper on the mandrel 37 and allowing the damper to come to rest on the rim 27; and reversing the movement for removing the damper.

Means are provided for rotatably driving the spindle 28. For this purpose the spindle is carried by appropriate bearings 44 (Fig. 3) carried by appropriate upper and lower journal brackets 45 and 47 respectively (Figs. 1, 2 and 3) supported by the machine frame 19. These bearing supports for the spindle are disposed in spaced vertical alignment to provide space therebetween for accommodating driving means, in the present instance including a sheave pulley 48 carried by the spindle and accommodating a plurality of drive belts 49 which are drivingly engaged by a drive sheave pulley 50 on the drive shaft of an electric driving motor 51 carried by the rear portion of the machine frame 19. The motor 51 may run continuously during an operating period so that the sheave pulley 48 is continuously rotated, and in such event means are provided for effecting selective driving connection between the sheave 48 and the spindle 28, herein comprising an appropriate clutch mechanism 52. Means under the control of the person operating the machine are provided for actuating the clutch 52, herein shown as comprising a fluid operated actuator 53 having an intermediately pivoted operating lever 54 for actuating the clutch mechanism. A supporting bracket 55 is carried by the machine frame 19 to support the operator 53. The controls for the operator 53 are not shown since these can take any convenient form, either mechanical or electrical. In Figs. 1 and 2 the clutch is shown as in the clutching condition, effecting a driving connection between the sheave 48 and the spindle 28.

Spinning of the cover-retaining flanges 18 is effected by the head assembly 22 of the machine through the medium of a pair of spinning rollers 57 disposed for spinningly-engaging the outermost of the flanges 18 at diametrically opposite sides of the casing 12, and a pair of inner spinning rollers 58 disposed for spinningly engaging the innermost of the flanges 18 at diametrically opposed points on the diametrical line of spinning engagement of the outer pair of spinning rollers 57. The outer spinning rolls 57 have their peripheries formed with appropriately angled spinning faces 59 of generally frusto-conical shape, while the inner spinning rolls have peripheral generally frusto-conical spinning faces 60. The respective angles of the spinning faces 59 and 60 are of such angularity and are

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so related that uniform, simultaneous spinning action is accomplished at each point engaged by the rolls operating in unison to spin the respective inner and outer flanges 18 over to the desired angle for clampingly and sealingly retaining the cover 15 on the damper unit.

During the spinning operation, it is highly desirable that the spinning rollers 57 and 58 apply spinning pressure to the respective flanges 18 uniformly and positively in spite of numerous variables and tolerances that are inevitably encountered in mass production of the damper casings 12. For this purpose, the spinning rollers are mounted in the spinning head assembly 22 in freely self-adjustable manner. Means are therefore provided herein comprising a roll mount or carrier 61 for a set comprising the outer roll 57 and the inner roll 58 at each side of the spinning head enabling the respective rolls of each set to find automatically optimum uniform spinning relation to the engaged casing flange 18 both by way of transverse and vertical position. At the same time, uniform, equalized spinning pressure by each set of spinning rolls is assured by means comprising a rockable yoke member or bar 62 to which the roll mounting members 61 are pivotally attached. The yoke 62 is rockably supported by a head carriage assembly comprising a head block 63 and a cap plate or block 64 mounted on top of the head block.

In a practical construction, each of the rollers 57 is bearingly mounted through the medium of a bearing assembly 65 upon a spindle 67 including a stem portion removably secured in a socket 68 in the associated mounting member 61 by means of a set screw 69. The roller 57 comprises a generally cup-shaped member within which the bearing assembly 65 is assembled and with which the roller body is maintained in assembly by a retaining cap plate 70 detachably secured to the body of the roller as by means of screws 71. Through this arrangement the rollers 57 can be readily detached and replaced for various size requirements in production, since all that need be done to replace one of these rollers is to loosen the set screw 69 and withdraw the roll spindle stem from its socket.

Each of the inner spinning rolls 58, in a preferred construction, has an integral stem 72 encircled by suitable bearing assembly means 73 secured on the reduced diameter stem 72 between a rear shoulder 74 of the roller and a lock washer and retaining nut assembly 75 threaded onto the extremity portion of the roll stem. Mounting of the roll 58 is effected in each instance within a bore socket 77 in the lower inner portion of the respective mounting member 61, the bearing assembly 73 being engaged against an inner thrust shoulder 78 adjacent the inner end of the socket and removably retained by a snap ring 79 secured in an appropriate groove in the wall of the socket adjacent the lower or mouth end thereof. A relatively small diameter lubricating passage 80 leads through the mounting member 61 from an accessible upper outer side portion to the inner end of the spinning roll socket 77.

By having the axes of the rolls 57 and 58 angled divergently as shown, spinning pressure on the rolls is imposed primarily laterally on the respective antifriction bearings, with a minimum axial thrust pressure on the bearings, whereby to improve and extend the useful life of the bearings.

Each of the mounting members 61 is so constructed and mounted that it is afforded a limited range of adjustment movement in a vertical plane diametrical to the axis of the workpiece-carrying rotary spindle 28 and the axes of the spinning rolls 57 and 58 and is held against movement normal to said plane. For this purpose, each of the mounting members 61 comprises a flattened vertically elongated plate or block affording substantial side bearing surfaces or faces opposing slidably flat bearing surfaces 81 (Figs. 4 and 5) within vertical guideways 82 provided in the spinning head block 63. The guideways

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are separated by a central partition 83 and are substantially enclosed at their outer sides by walls 84, the partition 83 and the walls 84 being sufficiently spaced apart to afford clearance for a limited range of generally horizontal movement of the mounting members 61 in the confined movement plane thereof.

Fixed incremental adjustment of the mounting members 61 toward the partition 83 and yieldable self-adjustment outwardly toward the outer walls 84 is provided for. For this purpose a stud 85 is carried by each of the mounting members 61 and projects from the bottom of an outwardly opening socket 87 in the respective mounting member, beyond the mounting member and through and beyond a clearance aperture 88 in the adjacent side wall 84. A set of lock nuts 89 threaded onto the exposed outer end portion of the stud 85 bears against a washer 90 resting against the adjacent outer side of the side wall 84 to define any preferred adjusted inward position of the respective mounting member 61 for any particular production requirement. This inward adjusted condition of the mounting member is normally maintained by a coiled compression spring 91 bearing between the inner end of the bore 87 and the opposing inner face of the adjacent side wall 84 about the stud 85. Through this arrangement, the respective mounting plate or block members 61 normally maintain an adjusted inward position as determined by incremental setting effected through the stud 85 and normally maintained by the spring 91. However, where the variables in a production run of articles being spun necessitate, automatic or self-adjustment outwardly of the respective mounting members 61 is enabled by resilient yielding of the respective biasing springs 91.

Relative vertical adjustments during operation are automatically provided for the mounting members 61 by having the yoke member 62 rockably mounted. For this purpose the upper portion of the spinning head block 63 is provided with an upwardly opening transverse slot 92 into the lower portion of which the mounting member guideways open and which is defined by opposing vertical parallel bearing walls with which the opposite longitudinal sides of the yoke member 62 are in sliding bearing relation. To this end the yoke member 62 is in the form of an elongated bar having flattened longitudinal bearing sides. Adjacent its opposite ends, the yoke member has downwardly opening longitudinal slots 93 within which are pivotally attached by means of respective pivot pins 95 upwardly projecting reduced thickness ear portions 94 on the respective mounting members 61.

Rocking support for the yoke member 62 is provided by means carried by the upper edge of the partition 83 and the overlying portion of the head plate or block 64 (Figs. 3 and 4). For this purpose, the inner or underside of the head block 64 is provided with a transverse downwardly opening groove 97 of semi-cylindrical cross section centered above the partition 83 and traversing the operating axis of the machine. The groove 97 provides a bearing for a complementary transverse semi-cylindrical upwardly projecting bearing or fulcrum rib 98 on the upper side of the yoke member 62. This provides a thrust fulcrum for the yoke member 62 maintaining the major upper face area of the yoke member in spaced relation to the underside of the head plate 64 to enable limited rocking movement of the yoke member as demanded by adjustment requirements during operation of the spinning head. At the same time upward thrust resulting from downward pressure of the spinning rollers against the work is absorbed by the head plate 64 through the fulcrum rib bearing.

During non-spinning intervals, when the spinning roller assembly is relieved from upthrust resulting from down pressure against work to be spun, support for the yoke 62 is afforded by a headed carrying member such as a bolt 99 having the head thereof accommodated in a

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downwardly opening recess 100 at the vertical center of the yoke member 62 and with the shank of the supporting bolt extending up through a bore 101 opening up through the rib 98. The supporting bolt 99 is terminally secured threadedly into the cap plate 64 and has an endwise limit shoulder 102 that engages against an opposing shoulder 103 recessed into the cap plate 64 whereby to limit the extent to which the bolt 99 may be driven into retained position. The length of the bolt shank from the shoulder 102 to the shoulder defined by the head of the bolt is slightly greater than the dimension between the shoulder 103 of the cap plate and the shoulder on the yoke member 62 that opposes the head of the supporting bolt when the yoke member fulcrum rib 98 is in full bearing relation within the bearing groove 97. This affords a narrow operating gap between the supporting head of the bolt 99 and the opposing shoulder of the yoke member 62 enabling rocking adjustment of the yoke member during a spinning operation. In practice a gap of approximately $\frac{1}{2}$ inch has been found adequate. On the other hand, during non-operating periods, the yoke 62 drops down onto the bolt head and is supported thereby, with only slight take-up clearance between the rib 98 and the bearing groove 97.

To afford clearance for rocking of the yoke member 62, the bolt shank passage bore 101 is enlarged toward its opposite ends from approximately the center thereof by substantially ovate enlargements at the sides of the bolt passage bore directed toward the ends of the yoke member 62 while the remaining transverse sides of the bore are dimensioned for slidable engagement with the bolt. This permits ample clearance for rocking of the yoke member but maintains a non-rocking bearing relationship of the bolt with the yoke member in the transverse direction.

Cushioning or counterbalancing support for the yoke member 62 is provided by a coiled compression spring 104 resting at its lower end upon the upper edge of the partition 23 and at its upper end engaging against an abutment member 105. To provide a socket for retaining the upper end of the spring 104 against lateral displacement, the abutment member 105 is preferably of inverted cup shape. For retaining the abutment member 105 against lateral displacement it is preferably provided with a reduced diameter upper end portion which fits into the mouth of the clearance bore 100 in the underside of the yoke member 62 and is defined by an annular upper corner rabbet groove 107 interengaging with the corner defining the mouth of the bore 100. Transverse displacement of the lower end of the spring 104 is avoided by means of a centering pin 108 which is fastened into the upper edge of the partition 83 and extends upwardly into the spring 104. The pin 108 is long enough so that when the yoke member 62 is lifted up from the spring 104, or prior to assembly of the yoke member 62 on top of the spring 104, the spring 104 will be held upright against falling off of the partition 83.

Assembly or disassembly of the spinning roll supporting assembly comprising the mounting members 61 and the yoke 62 with respect to the spinning head block 63 is readily effected through the upper bearing groove 92 through the medium of the cap block 64 which for this purpose is removably secured on top of the block 63 over the groove 92 by means of suitable screws 109. When removed from the block 63 or prior to attachment to the block 63, the cap plate or block 64 serves as a carriage for the spinning roll carrying assembly from which the outer larger diameter spinning rolls 57 will have been removed. Since the inner spinning rolls 58 are of smaller diameter than the guideways for the mounting members 61, and the inner spinning rolls do not project beyond the vertical confines of the respective mounting members 61, they can remain in assembly with the mounting members during assembly or disassembly of the roll-supporting assembly with respect to the spinning head block 63.

Since in the operative assembly, the cap plate or block 64 is secured functionally integral with the spinning head block 63, means attached to the cap block 64 may be provided for moving the spinning head 22 vertically into and out of spinning relation to a workpiece carried by the rotary work-supporting assembly 21 and more particularly the supporting member 23. To this end, the upper side of the cap block 64 has thereon a pair of upstanding spaced parallel connector ears 110 disposed in equally spaced relation on opposite sides of the transverse center of the block 64 and provided with coaxially aligned bearing bores 111. For assembly convenience the ears 110 are preferably formed separately from the block 64 and secured thereto as by means of screws 112. Journaled in the bearing bores 111 are respective trunnions 113 of a link 114 (Figs. 1, 2, 3 and 4) extending upwardly and pivotally connected by a pin or trunnions 115 to a bifurcated end of an actuating lever 117. The lever 117 is intermediately rockably pivotally mounted between the supporting bearing bosses 118 carried by the upper portion of the machine frame 19 and extending rearwardly beyond the bearing bosses. At its rear end the lever 117 is pivotally connected to the upper end of a piston rod 119 which is connected to an actuating piston (not shown) within a fluid operator cylinder 120 appropriately supported at the back of the machine frame 19 and which may comprise part of a pneumatic system including feed controlling means comprising a valve structure 121 operated through the medium of a cam 122 carried by the upper end portion of the piston rod 119. As shown in Figs. 1 and 2, the apparatus is in the spinning position. The return or non-spinning position of the spinning head to which it is moved by action of the pneumatic operator and the operating lever 117 is shown in dash position in Fig. 2.

For vertically reciprocally guiding the spinning head 22, the back of the spinning head block 63 is preferably secured as by means of screws 123 to a dovetail slide plate 124 vertically slidably guided in a dovetail way 125 afforded by a vertical guide plate 127 mounted on the upper portion of the machine frame 19. For ready detachment of the slide plate 124 a gib 128 may be provided (Fig. 5). Through this arrangement the spinning head is accurately guided for vertical reciprocation as actuated by the actuating lever 117 and the operator 120.

An operating cam 129 may be carried by one side of the slide plate 124 for operating vertically spaced respective control switches 130 utilized in the control system for the machine.

When the vibration damper 10 to be spun closed is first placed upon the supporting member 23, the cover 15 is, of course, loose on the seats provided by the respective inner and outer rabbet grooves 17. For best results, it is desirable to press the cover 15 firmly into seating relation and hold it there while the spinning of the securing flanges 18 proceeds. To this end the lower portion of the spinning head 22 is provided with a hold-down and pressure device including a cover-engaging pressure ring 131 (Figs. 3, 4 and 6). The ring 131 is of ample width to engage a substantial intermediate annular portion of the cover 15 and is preferably formed with spaced lower inner and outer engagement ribs 132 and 133 which limit the actual area of the upper surface of the cover 15 engaged by the ring 131 and thus minimize interference with adequate hold-down frictional engagement of the hold-down ring with the cover due to manufacturing inaccuracies or the presence of foreign material on the cover.

Means are provided for connecting the hold-down and pressure ring 131 rotatably to the spinning head block 63. To this end a carrying plate 134 is connected to the underside of the head block 63 above the pressure ring 131 by means such as a series of elongated stud bolts 135 which extend down through deeply countersunk respective bores 137 in the block 63 (Figs. 3 and 5) and have the lower ends thereof threadedly secured into the upper side

of the carrying plate. As shown, there may be six of the plate-carrying bolts 137 equally distributed on opposite sides of the block 63 where clear access can be had in to the upper ends of the bores 137 through the top of the block 63 at opposite sides of the cap block 64 which for this purpose is narrower than the top of the principal head block 63.

The supporting bolts 135 are of such length that in the inactive condition of the spinning head 22 the plate 134 hangs down a short distance under the head block 63 to which the plate 134 is biased by respective coiled compression biasing springs 138 disposed about the shanks of the carrying screws 135 within downwardly opening counterbores 139 and bearing at their lower ends against the upper surface of the plate 134 and at their upper ends against the shoulder provided at the upper ends of the respective counterbores 139. Thereby the springs 138 normally urge the plate 134 downwardly into a projected position.

In order to guide the carrying plate 134 for reciprocal non-tilting movement, the lower portion of the head block 63 is provided with respective depending semi-circular guide flanges 140 (Figs. 3 and 6) about which internal bearing edges 141 on an inner clearance aperture in the plate 134 engage slidably. Intermediate the bearing edges 141 the carrying plate is cut out as at 142 to clear the respective inner spinning rollers 58.

By preference the bearing flanges 140 are disposed about a central downwardly opening counterbore 143 in the lower portion of the head block 63 and more particularly the partition 83 for accommodating upwardly projecting hub structure of certain types of viscous damper 10 that may be accommodated for cover-securing spinning in the machine.

Since in the spinning operation, the damper being acted upon is spun at a substantial rate by rotation of the carrying member 23, a rotary connection is effected between the pressure ring 131 and the supporting plate 134, herein comprising ball bearings 144 running in concentric, complementary annular bearing race grooves 145 and 147 in the opposing surfaces of respectively the ring 133 and the plate 134. Through this anti-friction bearing connection pressure is uniformly applied from the springs 138 through the carrying plate 134 and the bearings 144 to the pressure and hold-down ring 131. At the same time the ring 131 can turn freely with the unit being spun and the carrying plate 134 remains stationary with the head block 63. By reason of the biasing springs 138 the hold-down ring 131 is yieldably disposed with respect to the block 63 to permit continued downward relative movement of the head block as spinning of the flanges 18 progresses.

Means for connecting the hold-down and pressure ring 131 to the carrying plate 134 for supporting the ring 131 when the spinning head is raised herein comprise a pair of connecting flange members 148 (Figs. 3, 6 and 7). Each of the flange members 148 is of substantial arcuate dimension for engaging against the periphery of the plate 134 intermediate the sets of spinning rollers. Each connecting flange member 148 has an inner peripheral longitudinal groove 149 which engages upon a complementary retaining rib 150 on the periphery of the carrying plate and to which the flange member is secured as by means of a series of attachment screws 151. A lower marginally depending portion of each of the connecting flanges 148 has an inwardly projecting annular narrow rib 152 effecting interconnection within an annular outer peripheral radially outwardly opening groove 153 in the pressure and hold-down ring 131. The groove 153 is slightly wider than the flange 152 and also slightly deeper and the relationship is such that when the carrying plate 134 is in thrust relationship to the ring 131, the interconnecting flange 152 is clear of all surfaces within the groove 153 so as to eliminate all frictional engagement between the connecting flanges

148 and the ring 131 while the ring 131 is turning relative to the carrying plate 134. When the spinning head is raised, the retaining flanges 152 act to lift the ring 131 with the spinning head unit through the medium of the carrying plate 134.

In brief summary of the operation of the machine, a damper assembly 10 having the cover 15 in closing relation to the flywheel chamber and with sealing compound applied at the edges of the cover, is placed by an attendant in position on the supporting member 23 of the rotary supporting assembly 21 while the machine is at rest and the spinning head 22 is raised to the dash line position shown in Fig. 2. The machine is then set into operation by throwing the clutch 52 to effect rotation of the spindle 28 and thereby the carrying member 23 and the supported damper unit to be spun. The spinning head 22 is then lowered until the pressure and hold-down ring 131 engages the cover 15 of the damper unit in advance of the action of the spinning rolls 57 and 58 and applies pressure to the cover to hold it firmly down on its marginal supporting seats. Lowering of the spinning head causes the outer and inner spinning rolls 57 and 58 to engage the respective flanges 18 of the damper casing 12 and spin the same over into cover-securing position. The spinning head 22 is then raised and the clutch 52 operated to disconnect the spindle 28 from the driving pulley 48 and the supporting member 23 comes to rest and the spun damper is removed and replaced by a succeeding damper to be closed.

When it becomes necessary to provide for servicing different sizes of damper in the spinning machine, various set ups can be quickly effected by changing any one or more of the rotary supporting member 23, the sets of spinning rolls, and the hold-down and pressure ring assembly including the pressure ring 131. Thereby a substantial number of different sizes of dampers to be spun can be accommodated in one machine with uniform results.

It may be noted that the work-supporting and rotating assembly 21 may be enclosed within a cabinet 154 having a tabletop 155 conveniently disposed adjacent the work-supporting member 23.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

We claim as our invention:

1. In combination in a machine for spinning inner and outer cover-retaining flanges of an annular metal casing onto the margins of an annular closure plate on the casing, means for supporting the casing rotatably about the axis of the annular closure plate, a spinning head assembly mounted for movement into and out of spinning relation to the casing on said supporting means, and at least two sets of spinning rollers, each set of rollers comprising an inner and an outer flange spinning roller mounted on a member which is in turn pivotally carried by a common equalizing yoke which is pivotally secured to and supports each of said members and which is in turn rockably secured to said head, means limiting said members to movement in respective planes extending substantially radially of said head whereby said members rotate with said head, all of said rollers being operable simultaneously to spin the inner and outer retaining flange of the casing onto the margin of the cover plate while the casing is rotated by said supporting means.

2. In combination in a machine for spinning inner and outer cover-retaining flanges of an annular metal casing onto the margins of an annular closure plate on the casing, means for supporting the casing rotatably about the axis of the closure plate, a spinning head assembly mounted for movement into and out of spinning relation to the casing on said supporting means, and a plurality of sets of spinning rollers, each set of rollers comprising an inner and an outer flange spinning roller mounted on a support member, said members all being pivotally connected to a

common yoke which is in turn rockably connected to said head, said connections permitting pivotal movement of said members in respective planes extending radially of said head only and operable simultaneously to spin the inner and outer retaining flange of the casing onto the margin of the cover plate while the casing is rotated by said supporting means, the rollers of each said set being mounted on diverging axes so that movement of the spinning head into engagement with the casing will cause the spinning thrust to be applied transversely to the axis of the rollers.

3. In combination in a spinning head structure of the character described, a roll-supporting block member pivotally carried eccentrically of the head structure for pivotal movement along a plane radiating from the axis of rotation of said spinning head structure, said member having socket bores on diverging axes at one end thereof, a spinning roller having a spindle rotatably secured in one of said socket bores, and a spinning roll rotatably carried by a spindle detachably but non-rotatably secured in the other of said socket bores whereby said rolls describe concentric paths for spinning concentric flanges.

4. In combination in a spinning machine of the character described for spinning inner and outer closure retaining flanges of a malleable metal casing onto the margins of an annular closure, means for supporting the casing in position for spinning of the flanges, a spinning head movable toward and away from said supporting means, said spinning head having a plurality of spaced sets of spinning rollers, each set comprising an inner and an outer roll spaced apart for respectively engaging the inner and outer flanges of the casing to spin the flanges into retaining relation to the closure, and a ring-shaped hold-down and pressure member carried by the spinning head and disposed intermediate the rolls of the respective sets of rolls for engaging against the closure to apply pressure thereto while the rolls spin said flanges.

5. In combination in a machine for spinning inner and outer concentric cover-retaining flanges of a malleable article, means for supporting said article, a spinning head movable toward and away from said supporting means, a plurality of pairs of spinning rolls carried by said head, the rolls of each said pair engaging and spinning the respective concentric flanges of said article, means on said head supporting said pairs of spinning rolls for movement relative to one another and to said supporting means, said roll-supporting means including a plurality of roll mounting members each rotatably carrying one of said pairs of rolls and each pivotally secured to a yoke member which is in turn rockably connected to the head and means limiting said mounting member to movement in respective planes radiating from the axis of rotation of said head.

6. In combination in a machine for simultaneously spinning inner and outer concentric annular walls of an article in opposite directions into contact with an annular cover member comprising, a support for holding said article, a rotary spinning head rotating on the axis of said article, a plurality of roller carrying members, means pivotally connecting each of said members to a common yoke for pivotal movement substantially radially of said axis, means rockably mounting said yoke to said head, and a pair of rollers rotatably mounted on each of said members for respective contact with the inner and outer walls of said article whereby said pairs of rolls are self-aligning with respect to said annular walls.

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