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Hirsch et al.

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[54] **FLUID PRESSURE MOTOR WITH EXTENSIBLE AND RETRACTABLE PART**

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[52] **U.S. Cl.** ..... **198/24**, 214/1 BC

[51] **Int. Cl.** **B65g 47/24**

[58] **Field of Search** ..... 198/24, 212; 214/82, 214/1 BC, 8.5 F

[56] **References Cited**

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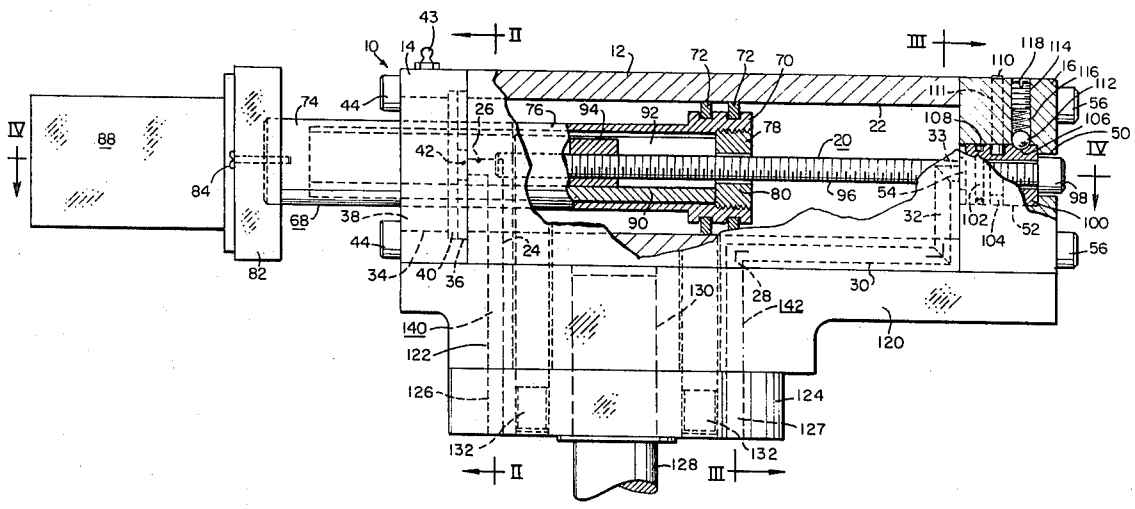
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[57] **ABSTRACT**

A fluid pressure motor is mounted at the head of a vertically extending shaft for being oscillated or turned forth and back thereby about the axis of the shaft. The motor is provided with a part extensible and retractable laterally of the shaft. The axis of the shaft is coincident with the line of intersection of a plane extending longitudinally of the fluid pressure motor and a plane extending transversely thereof. The weight of the fluid pressure motor on one side of either of said planes substantially balances the weight of the fluid pressure motor on the other side of the plane.

4 Claims, 7 Drawing Figures



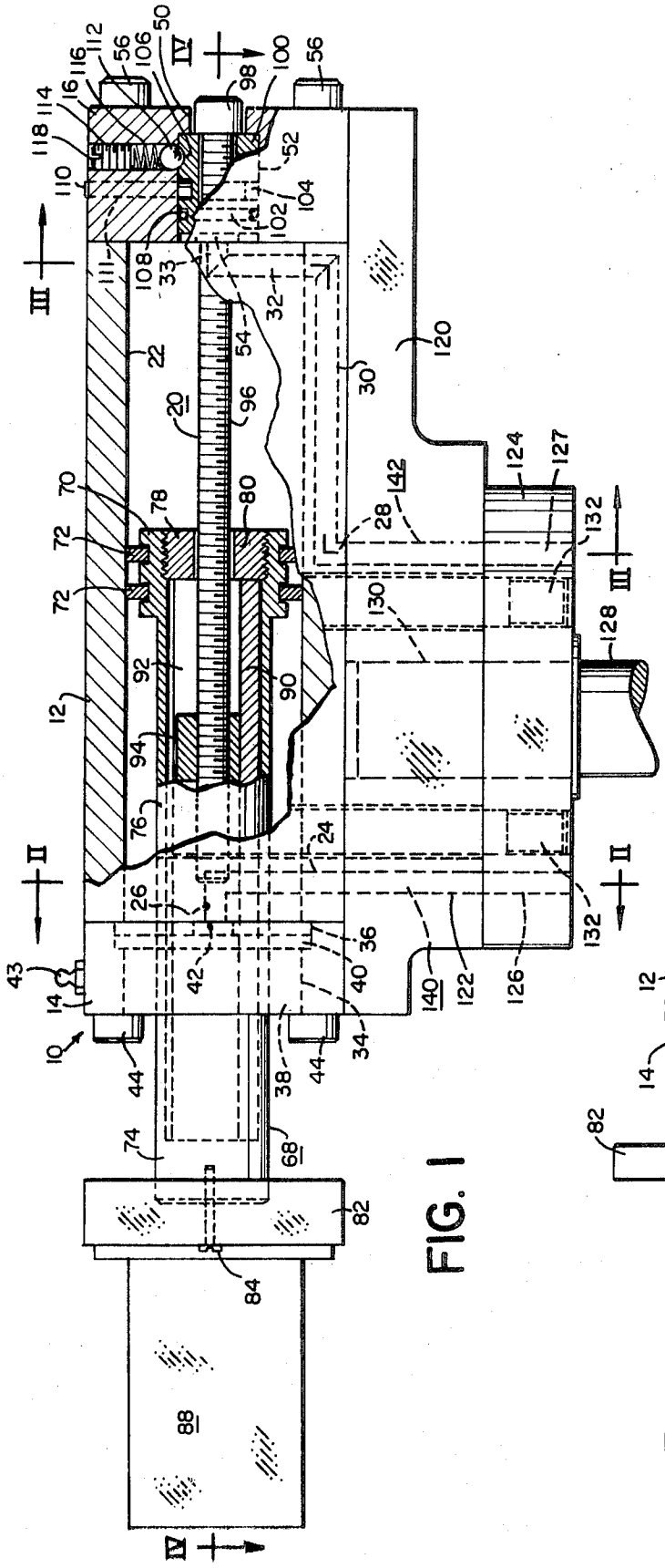


FIG. 1

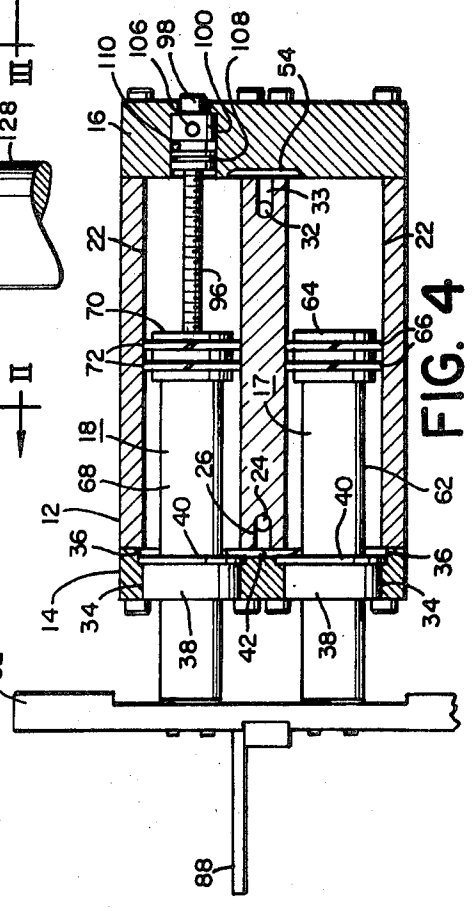


FIG. 4

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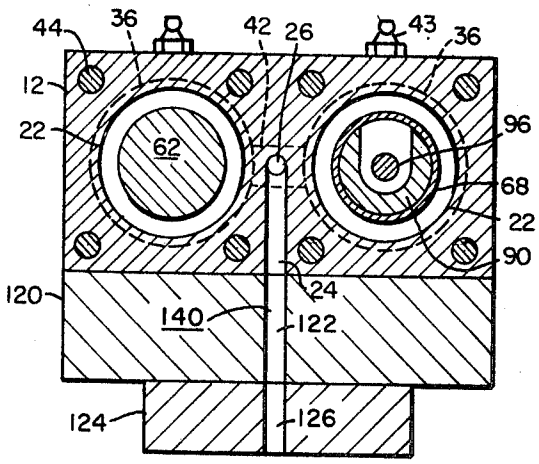


FIG. 2

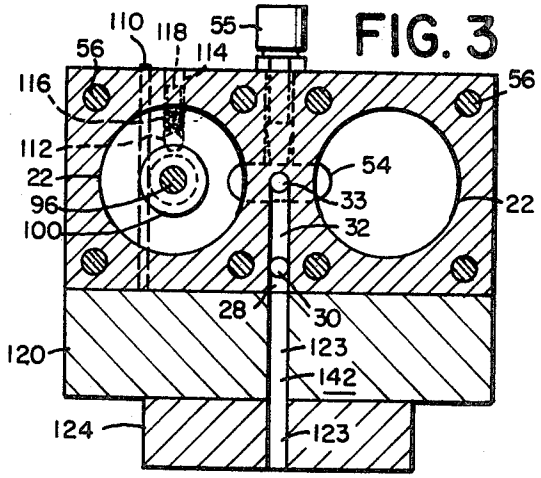


FIG. 3

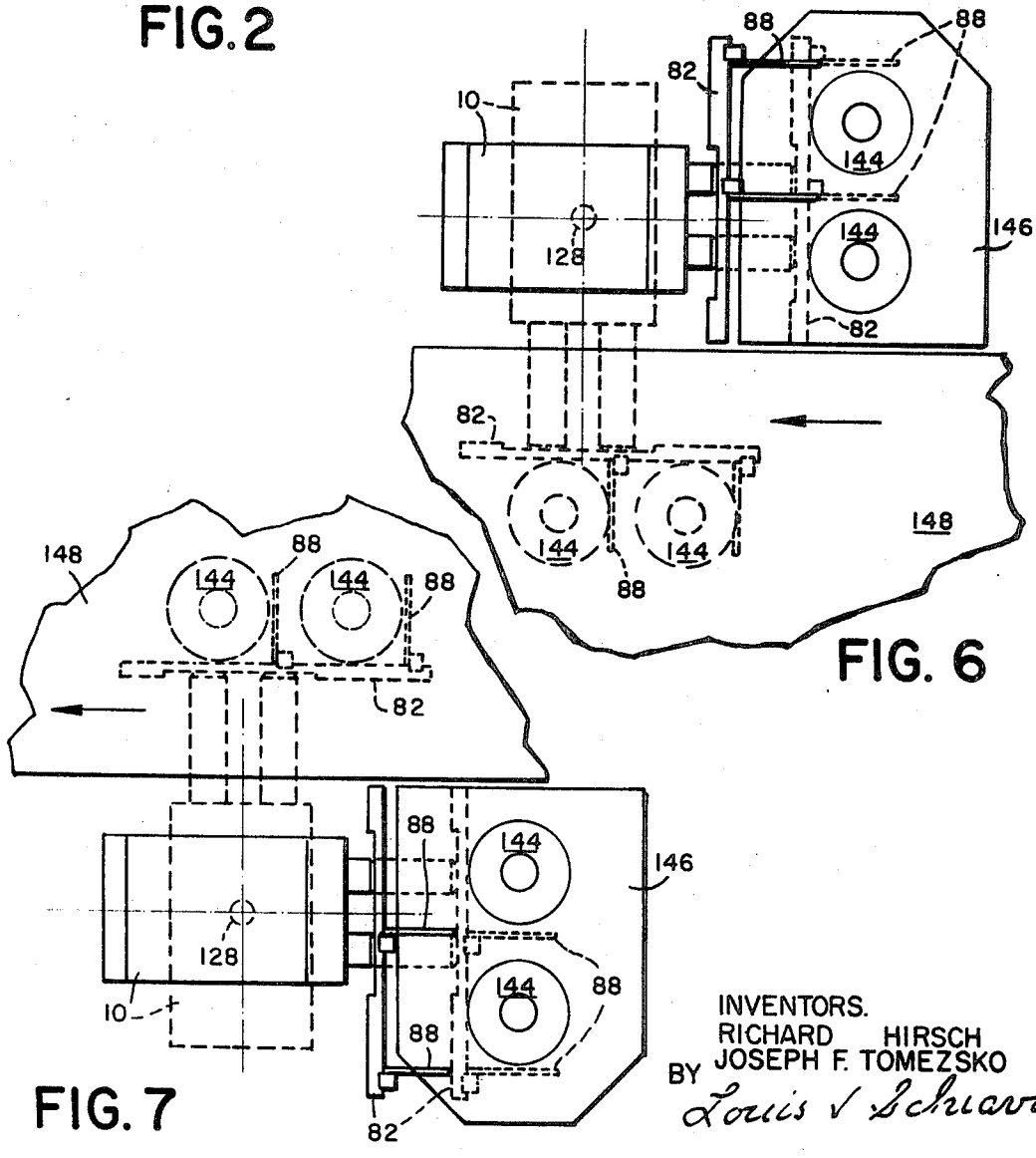


FIG. 6

FIG. 7

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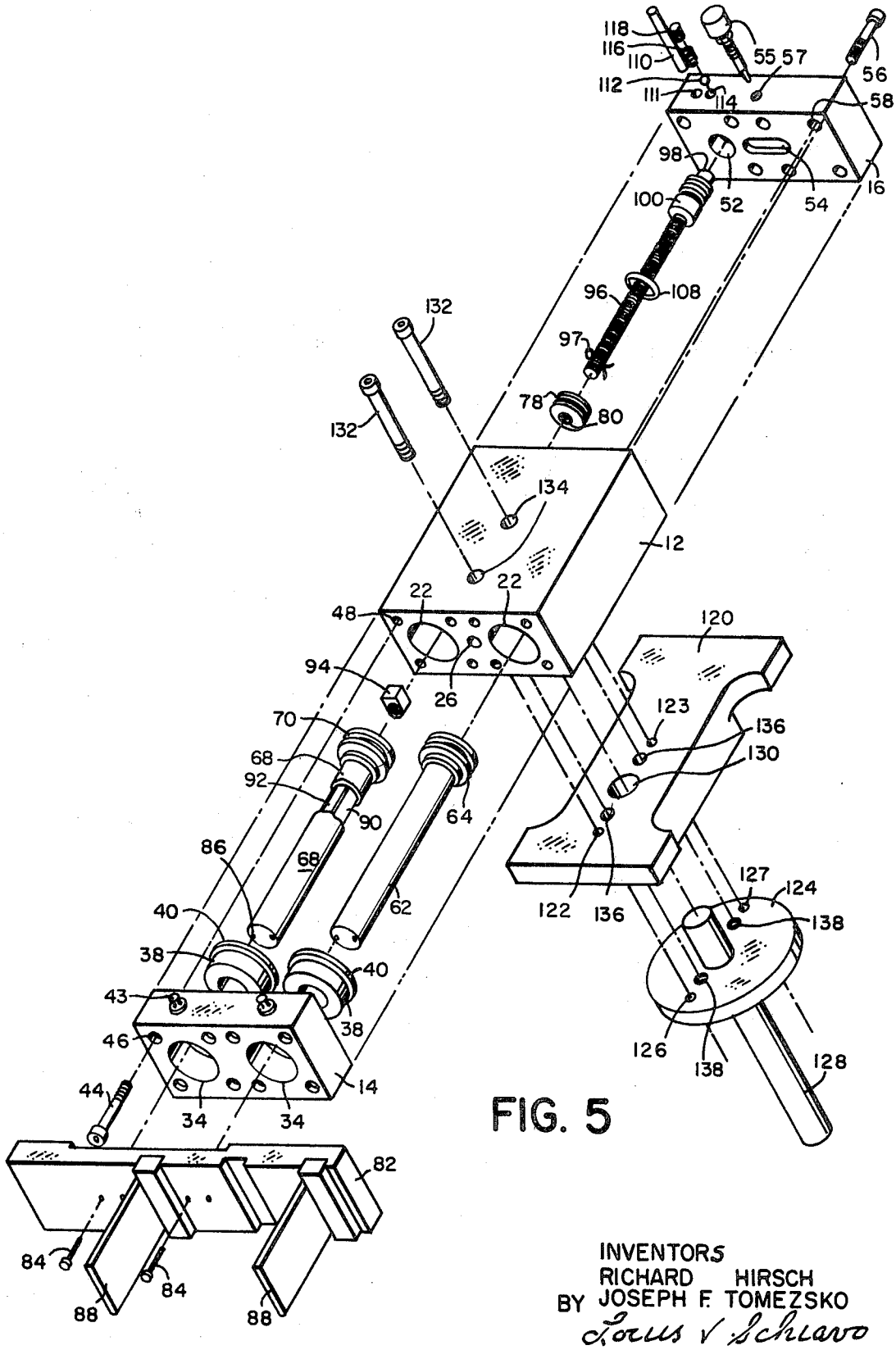


FIG. 5

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FLUID PRESSURE MOTOR WITH EXTENSIBLE AND RETRACTABLE PART

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to glassware forming machines, and particularly to a fluid pressure motor with an extensible and retracted part operable for transferring newly formed glassware from a stationary platform or deadplate onto a continuously moving conveyor.

2. Description of the Prior Art

A glassware forming machine, such as the well-known Hartford I. S. machine, may comprise a plurality of sections each including a stationary deadplate at a first station for receiving newly formed glassware, a continuously moving conveyor and means for transferring the glassware from the deadplate onto the conveyor for being advanced thereby to a second station. The deadplate and conveyor of one section of the machine may be assembled to the right hand, while the deadplate and conveyor of another section of the machine may be assembled to the left hand. Otherwise the sections may be alike. The conventional transfer means with which such right and left hand sections are furnished are not interchangeable because they themselves are constructed to the right and left hand. In addition, the conventional transfer means is in the form of a fluid pressure motor mounted upon the head and wholly to one side of a vertically extending shaft which oscillates the motor about the axis of the shaft. The eccentric load on the shaft causes undue wear on certain parts of the motor and on the mechanism for oscillating the same. Furthermore, the fluid pressure motor is provided with an extensible and retractable part, but lacks any means for selectively adjusting the length of the stroke. Still further, the extensible and retractable part of the fluid pressure motor includes only one piston, as a consequence of which means, such as guide rods, have been employed to secure the piston against turning about its own axis.

SUMMARY OF THE INVENTION

The principal object of the present invention is to removably mount a fluid pressure motor having an extensible and retractable part at the head of a vertically extending shaft in such a way that the fluid pressure motor may be used with a section of a glassware forming machine whether the dead plate and conveyor thereof are assembled to the right hand or the left hand.

Another object is to mount the fluid pressure motor centrally so that the weight thereof is substantially balanced on the shaft, and so that eccentric loading of the shaft is kept to a minimum.

Another object is to provide such a fluid pressure motor with built-in means operable for adjusting the stroke of the extensible and retractable part.

Still another object is to provide such a fluid pressure motor wherein the extensible and retractable part comprises a pair of parallel, laterally spaced pistons interconnected to secure them against turning about their axes.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of a fluid pressure motor constructed in accordance with the invention showing the extensible and retractable part partially extended, parts being broken away and others being shown in section;

FIGS. 2 through 4 are reduced sections respectively on lines II—II, III—III and IV—IV in FIG. 1;

FIG. 5 is an exploded perspective view of the fluid pressure motor, part being broken away and others omitted altogether for the sake of clarity; and

FIGS. 6 and 7 are diagrammatic views showing the fluid pressure motor associated with sections of a glassware forming machine, the sections being assembled to the right and left hands, respectively.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The following description is directed to the specific embodiment of the invention disclosed in the drawings. It is not addressed to the scope of the invention since the invention may be practiced in a variety of forms.

Referring particularly to FIGS. 1 through 5, a fluid pressure motor constructed in accordance with the present invention, generally designated **10**, comprises a main body part or block **12**, plates **14** and **16** extending respectively across the fore and aft ends of the block **12**, a pair of extensible and retractable members, generally designated **17** and **18**, extending through the front plate **14** and into the block **12**, and an adjustable stroke mechanism, generally designated **20**, extending through the back plate **16** and into the block **12**.

The block **12** is rectangular in transverse section, and in both vertical and horizontal longitudinal section, as shown. Extending longitudinally through the block **12** are a pair of parallel, laterally spaced cylindrical bores or cylinders **22**. At the fore end of the block **12**, between the cylinders **22**, are a pair of communicating bores **24** and **26**, these bores opening respectively on the bottom and the fore end of the block. At the aft end of the block **12**, between the cylinders **22**, are a series of communicating bores **28**, **30**, **32** and **33**, the bores **28** and **33** opening respectively on the bottom and the aft end of the block.

Axially aligned respectively with the cylinders **22** in the block **12** and extending from front to back through front plate **14** are a pair of bores **34** terminating in counterbores **36**. Pressed into each bore **34** is a bushing **38** provided with a radially outwardly extending flange **40** nested in the associated counter-bore **36**. It will be noted that the thickness of the flange **40** is less than the depth of the counterbore **36**, as shown. The inner face of the front plate **14** is provided with a groove **42** extending horizontally between and interconnecting the counterbores **36**. Threaded into the top of the front plate are a pair of fittings **43**, respectively directly over the bushings **38**. The inner surface of each bushing **38** may be lubricated through the associated fitting **43** and an oil passage (not shown) placing the fitting in communication therewith. The front plate **14** is secured to the fore end of the block **12** by means of eight studs **44** which extend freely through holes **46** in the plate and thread into holes **48** in the fore end of the block **12**. When the front plate **14** is secured in place, the groove **42** communicates with the bore **26**.

Axially aligned with one of the cylinders **22** in the block **12** and extending from back to front through the back plate **16** is a bore **50** terminating in a counterbore **52**. The inner face of the back plate **16** is provided with a groove **54** extending radially outwardly from the counterbore **52** and across the longitudinally extending vertically disposed median plane of the block **12**.

Threaded into the top of the back plate **16** is a needle valve **55** communicating with the groove **54** through a suitable passage (not shown). The back plate **16** is secured to the aft end of the block **12** by means of eight studs **56** which extend freely through holes **58** in the plate and thread into holes (not shown) in the aft end of the block **12.** When the back plate is secured in place, the groove **54** communicates with the bore **33.**

The extensible and retractable member **17** comprises a solid piston rod **62** slidably passing through one of the bushings **38** and extending into the associated cylinder **22** in the block **12.** The inner end portion of the rod **62** mounts a piston **64** fitted with a pair of axially spaced piston rings **66.** The extensible and retractable member **18** comprises a piston rod **68** slidably passing through the other bushing **38** and extending into the associated cylinder **22** in the block **12.** The inner end portion of the rod **68** mounts a piston **70** fitted with a pair of axially spaced piston rings **72.** The fore end portion of the rod **68,** designated **74,** is solid, while the remainder of the rod **68,** designated **76,** is hollow. Threaded into the inner end portion of the hollow section **76** is a lock collar **78** provided with a central opening **80.**

The piston rods **62** and **68** mount a pusher plate **82** extending horizontally across the fore ends thereof and secured to each rod by a pair of studs **84** extending freely through the pusher plate and threaded into holes **86** in the fore ends of the rods. The pusher plate in turn mounts a pair of laterally spaced pusher arms **88** extending horizontally forwardly from the pusher plate. It will be understood that the pusher plate and pusher arm assembly may take various forms, depending upon the mode of operation and the work to be accomplished, e.g., preferably, the pusher arms are adjustably secured in position along the pusher plate and vertically relative to the pusher plate to accommodate glassware of different size.

The adjustable stroke mechanism **20** comprises a guide bar **90** pressed into the hollow section **76** of the piston rod **68** and extending from the solid fore end portion **74** of the piston rod **68** to the lock collar **78.** The bar **90** is provided with a groove **92** extending the full length thereof and accommodating a correspondingly shaped slide **94.** Extending freely through the opening **80** in the lock collar **78** and threaded through the slide **94** is the fore end of a rod **96,** which carries a cotter pin **97.** The aft end portion of the rod **96** is provided with a head **98** nested in the bore **50.** Under the head **98** is a lock member **100** affixed to the rod **96** and nested in the counterbore **52.** The lock member is provided with axially spaced circumferentially extending grooves **102** and **104** and a dimple **106.** The groove **102** accommodates an O-ring **108.** The lower end portion of a pin **110** which is pressed into an opening **111** projects into the groove **104.** The dimple **106** accommodates a spherical detent **112** at the inner end of a hole **114.** Threaded into the outer end of the hole **114** is a set screw **116,** and interposed between the detent and the set screw is a compression spring **118.**

The fluid pressure motor **10** is seated upon a base or swival plate **120** provided with parallel, laterally spaced bores **122** and **123** communicating respectively with the bores **24** and **28** in the block **12.**

The base plate **120** in turn is seated upon a plate **124** which is provided with parallel, laterally spaced bores **126** and **127** communicating respectively with bores **122** and **123** in the plate **120.** The plate **124** is in the form of a collar affixed to an upper end portion of a vertically extending shaft **128.** The upper end portion of the shaft is detachably projected into an opening **130** in the base plate **120.** A pair of studs **132** extend downwardly freely through openings **134** in the block **12** and openings **136** in the plate **120** and are threaded into openings **138** in the plate **124.**

It will be observed that the bore **126** in the plate **124,** bore **122** in the plate **120,** bores **24** and **26** in the block **12** and the groove **42** in the front plate **14** conjointly provide an air passage **140** communicating with the fore ends of the cylinders **22,** and that the bore **127** in the plate **124,** bore **123** in the plate **120,** bores **28, 30, 32** and **33** in the block **12,** and the groove **54** in the back plate **16** conjointly provide an air passage **142** communicating with the aft ends of the cylinders **22.** It will also be observed that the fluid pressure motor **10** is centrally mounted upon the shaft **128,** i.e., the axis of the shaft **128** is disposed in a longitudinally extending vertically disposed plane midway between the extensible and retractable members **17** and **18.**

Fluid motor **10** is operated pneumatically. Suitable conduits (not shown) from a source of pressurized air are connected to the underside of the plate **124** for supply of air respectively to cylinders **22** through the passages **140** and **142.** Referring particularly to FIG. **1,** the piston rods **62** and **68** are shown partially extended. Air under pressure is introduced through the passage **142** to the aft ends of the cylinders **22.** If desired, the pressure may be reduced by bleeding air through the needle valve **55.** At the same time the fore ends of the cylinders **22** are vented to atmosphere through the passage **140.** As a consequence, the pusher plate **82** and piston rods **62** and **68** are extended. The limit of traverse is reached when the lock collar **78** engages the stop **94.** After a predetermined period of time, air under pressure is introduced through the passage **140** into the fore ends of the cylinders **22,** and at the same time, the aft ends of the cylinders **22** are vented to atmosphere through the passage **142.** As a consequence, the pusher plate **82** and piston rods **62** and **68** are retracted. The limit of traverse is reached when the pusher plate **82** engages the front plate **14** or the heads of the studs **44.**

The length of the stroke may be adjusted to suit the work to be done. A tool is applied to the head **98** of the rod **96** and the rod is turned to position the stop **94** in a selected position longitudinally of the rod **96.** The cotter pin **97** guards against threading the stop **94** off the rod **96.** Lock member **100** is secured against axial movement by the lower end portion of the pin **110** engaged in the groove **104.** The O-ring **108** prevents escape of air past the lock member **100.** When the head **98** of the rod **96** is turned, the rod **96** and the lock member **100** are also turned and the spherical detent **102** is forced out of the dimple **106** against the influence of the compression spring **118.** As the rod is turned, the slide moves axially of the rod **96** to the selected position which affords the stroke desired.

The fluid pressure motor **10** of this invention is intended for replacing the corresponding fluid pressure motor of U.S. Pat. No. 3,249,200, issued May 3, 1966, to G. E. Rowe. Reference may be had to said patent for the basic glassware forming machine, and particularly for the arrangement for oscillating the fluid pressure motor about a vertically extending axis and for the mode of operation of said arrangement.

Referring particularly to FIGS. 6 and 7, which show the fluid pressure motor 10 in the environment for which it is intended, newly formed glass bottles 144 are deposited upon a deadplate 146. The function of the motor 10 is to push or sweep these bottles from the deadplate onto the conveyor belt 148. As shown in full lines, the motor 10 faces the deadplate and the pusher plate and piston rods are in retracted positions. The latter are then extended to the broken line position thereof, over the deadplate, so that the pusher arms 88 are disposed respectively behind the bottles 144. Thereupon, the shaft 128 makes a quarter turn, swinging the motor 10 to the dotted line position thereof, over the conveyor belt 148. The bottles 144 are thereby swept in an arcuate path before the pusher arms 88 to the dotted line positions thereof over the conveyor belt 148. Thereupon, the pusher plate and piston rods are retracted to prevent interference with the movement of bottles on the conveyor belt. The shaft 128 is now turned back to its initial position, whereupon the motor 10, piston rods and pusher plate assume the full line positions thereof, thus completing a full cycle of operation.

If the motor 10 is in use with a section of the glassware forming machine assembled to one hand and it is desired to transfer it to a section of the glassware forming machine assembled to the opposite hand, after detaching it from the plate 124 and shaft 128 of the first section and before mounting it upon the plate 124 and shaft 128 of the second section, it is only necessary to reverse the pusher plate 82. Thus it will be noted that the fluid pressure motor 10 is suited for use in a section of the glassware forming machine whether the section, i.e., the deadplate and conveyor, is assembled to the right hand, as in FIG. 6, or to the left hand, as in FIG. 7. Furthermore, it will be noted that the fluid pressure motor is centrally mounted, i.e., the weights of the parts thereof on opposite sides or fore and aft, with respect to the shaft 128, are substantially equal.

Referring particularly to FIGS. 6 and 7, when it is desired to detach the motor 10 from the plate 124 and shaft 128, it is necessary to reach over the hot glassware carried by the conveyor belt 146. Accordingly, it is convenient to have the motor 10 and swival plate 120 attached to the plate 124 by means of studs 132, which extend downwardly through the block 12, with heads fully exposed for easy application of a tool thereto.

While in accordance with the provisions of the patent statutes, I have illustrated and described the best form of the embodiment of my invention now known to me, it will be apparent to those skilled in the art that changes may be made in the form of the apparatus described without departing from the spirit and scope of the invention as set forth in the appended claims, and that in some cases certain features of my invention may be used to advantage without a corresponding use of other features.

What is claimed is:

1. In apparatus for transferring glassware from a deadplate onto a continuously moving conveyor, the combination comprising

A. a vertically extending shaft,

B. means for oscillating said shaft about its axis through a substantial angle between a first and a second position,

C. a fluid pressure motor carried by said shaft including

1. a pair of laterally spaced, parallel members extensible and retractable laterally relative to the axis of said shaft, the axis of said shaft being disposed substantially midway between said members,

D. means on said shaft providing a seat for said fluid pressure motor and detachably affixing it to said shaft for movement therewith including

1. a collar plate extending cross-axially of and affixed to the upper end portion of said shaft,

2. a base plate seated upon said collar plate and in turn providing a seat for said fluid pressure motor, a portion of said shaft extending upwardly from said collar plate being detachably projected into an opening in said base plate, and

3. means projected downwardly freely through the main body of said fluid pressure motor and through said base plate and threaded into said collar plate,

E. work engaging means carried by said pair of members for being extended and retracted threrewith, and

F. means for oscillating said fluid pressure motor about the axis of said shaft and for extending and retracting said pair of members and said work engaging means in predetermined timed relation in repeating cycles for transferring work from said deadplate to said conveyor.

2. In apparatus for transferring glassware from a deadplate onto a continuously moving conveyor, the combination comprising

A. a vertically extending shaft,

B. means for oscillating said shaft about its axis through a substantial angle between a first and a second position,

C. a fluid pressure motor carried by said shaft including

1. a block having a pair of laterally spaced, parallel cylinders,

2. front and back plates respectively extending across the fore and aft ends of said block,

3. a pair of pistons respectively workable in said cylinders, and

4. a pair of piston rods extending forwardly respectively from said pistons and through said front plate, said pistons and piston rods being extensible and retractable laterally relative to the axis of said shaft,

D. means on said shaft providing a seat for said fluid pressure motor,

E. means projected downwardly through said block and detachably securing said fluid pressure motor in position on said seating means,

F. interconnecting passage sections respectively in said motor seating means and fluid pressure motor for placing a source of pressurized air in communication with the fore ends of said cylinders for retracting said pistons including an air passage section in the form of an open groove extending across the inner face of said front plate and having opposite end portions in communication respectively with the fore ends of said cylinders,

G. interconnecting passage sections respectively in said motor seating means and fluid pressure motor for placing said source of pressurized air in communication with the aft ends of said cylinders for extending said pistons including an air passage sec-

tion in the form of an open groove extending across the inner face of said back plate and having opposite end portions in communication respectively with the aft ends of said cylinders,

H. work engaging means carried by said pair of piston rods for being extended and retracted therewith, and

I. means for oscillating said fluid pressure motor about the axis of said shaft and for extending and retracting said pair of pistons and said work engaging means in predetermined timed relation in repeating cycles for transferring work from said deadplate to said conveyor.

3. The combination according to claim **2** wherein the fore end of each cylinder communicates with the associated end of the air passage section provided by the groove extending across the inner face of the front plate through an annular space extending about the piston rod and provided by a recess in the inner face of the front plate.

4. In apparatus for transferring glassware from a deadplate onto a continuously moving conveyor, the combination comprising

A. a vertically extending shaft,

B. means for oscillating said shaft about its axis through a substantial angle between a first and a second position,

C. a fluid pressure motor carried by said shaft including

1. a block having a pair of laterally spaced parallel cylinders and detachably affixed to the head of said shaft for oscillating therewith,
2. front and back plates respectively extending across the fore and aft ends of said block,
3. a pair of pistons respectively workable in said cylinders, and
4. a pair of piston rods extending forwardly respectively from said pistons and through said front plate, said pistons and piston rods being extensible and retractable laterally relative to the axis of said shaft, and one of said piston rods being provided with a hollow inner end section,

D. means operable for selectively adjusting the outward stroke or traverse of the piston and piston rod assembly working in said cylinders including,

1. a stop disposed in the hollow of said piston rod section,
2. a rod extending through the back plate forwardly into the hollow of said piston rod section, the fore end of said rod being threaded through said stop, and the aft end of said rod being fully exposed at the outer face of said back plate for application of a tool thereto, and
3. means for securing the rod against axial movement including
   a. a cylindrical lock member provided with a pair of axially spaced circumferentially extending grooves,
   b. an O-ring accommodated by one of said grooves for pneumatically sealing the opening in which said lock member is nested, and
   c. one end portion of a pin carried by the back plate and accommodated by the other of said grooves,

E. lock means at the inner extremity of said hollow piston rod section arranged for engaging said stop to thereby limit the outward stroke or traverse of said piston and piston rod assemblies,

F. work engaging means carried by said pair of piston rods for being extended and retracted therewith, and

G. means for oscillating said fluid pressure motor about the axis of said shaft and for extending and retracting said pair of pistons and said work engaging means in predetermined timed relation in repeating cycles for transferring work from said deadplate to said conveyor.

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