April 12, 1966 G. MYSKA 3,245,369

SERVOSYSTEM FOR SEWING MACHINES

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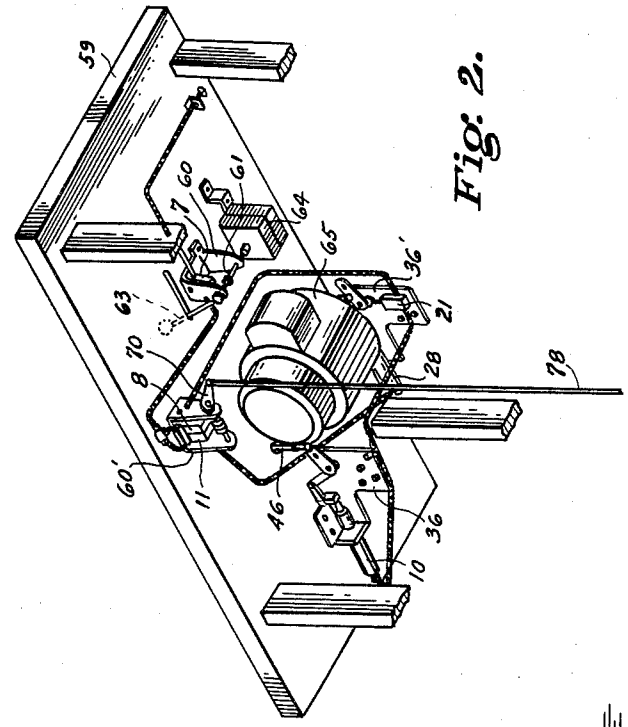


Fig. 2.

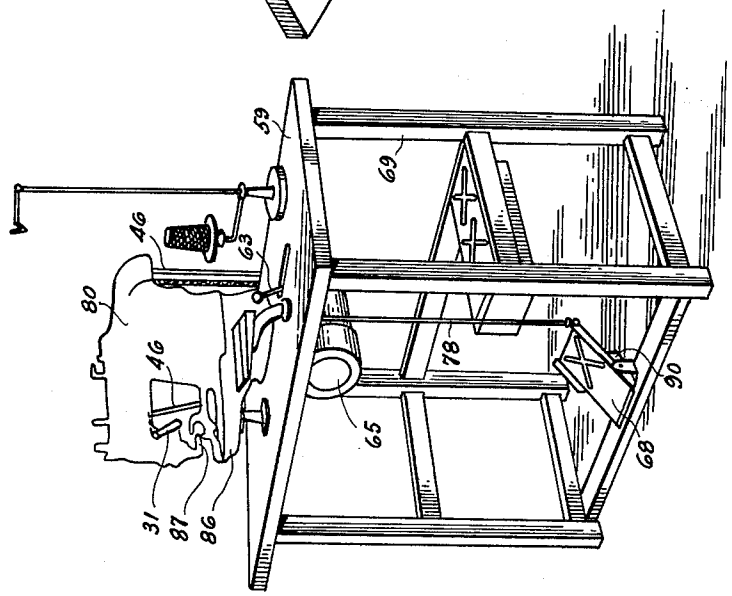


Fig. 1.

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SERVOSYSTEM FOR SEWING MACHINES

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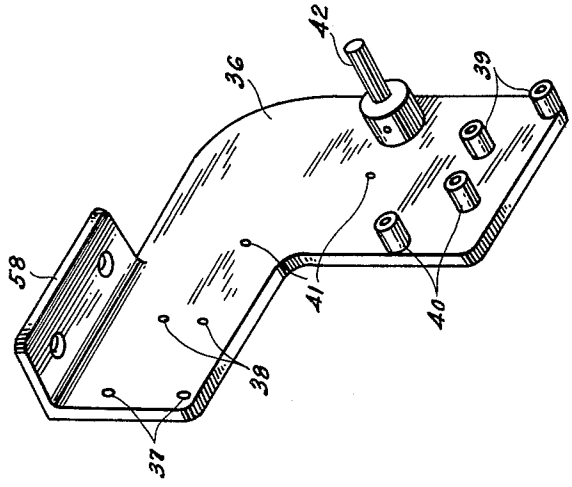


Fig. 3.

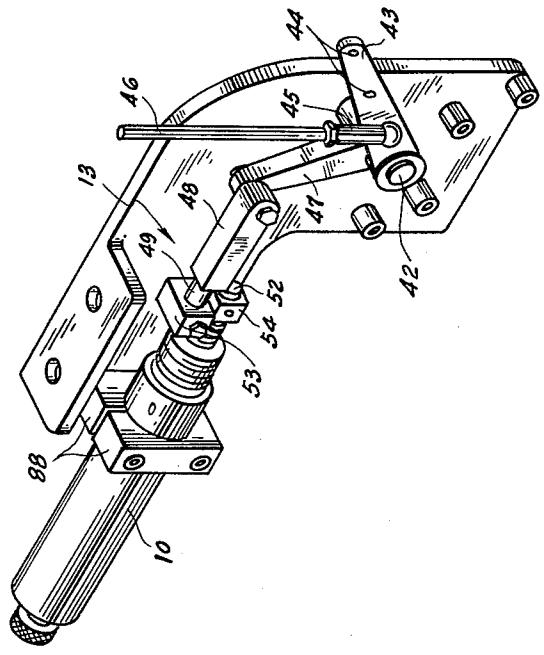


Fig. 4.

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SERVOSYSTEM FOR SEWING MACHINES

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Fig. 7.

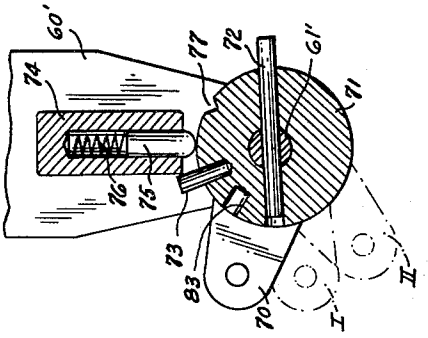


Fig. 6.

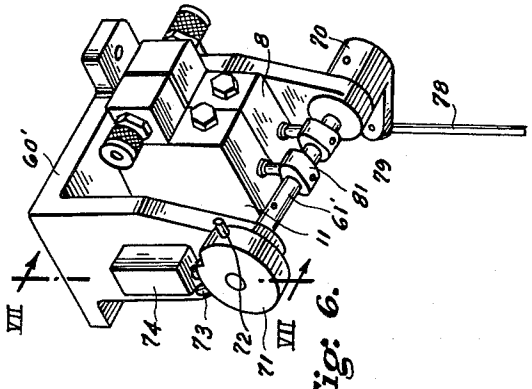
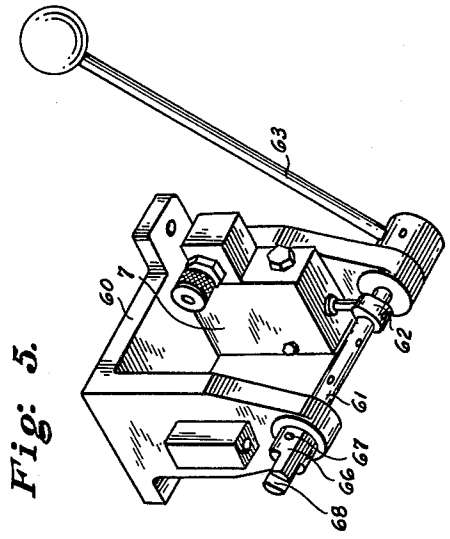


Fig. 5.



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SERVOSYSTEM FOR SEWING MACHINES

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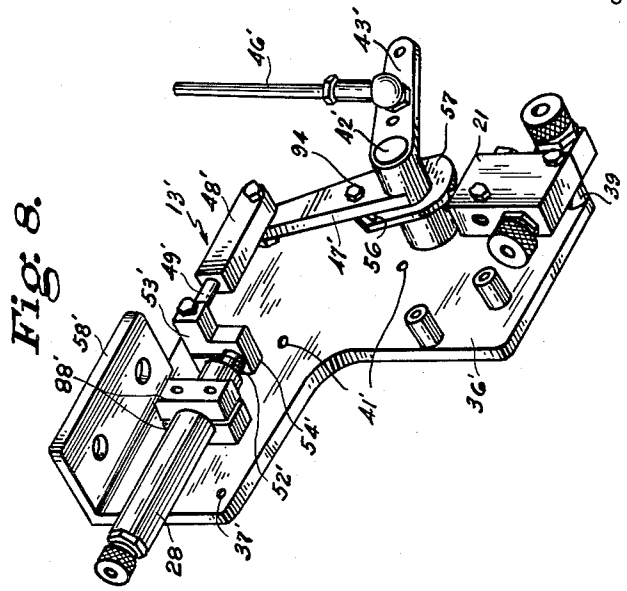


Fig. 8.

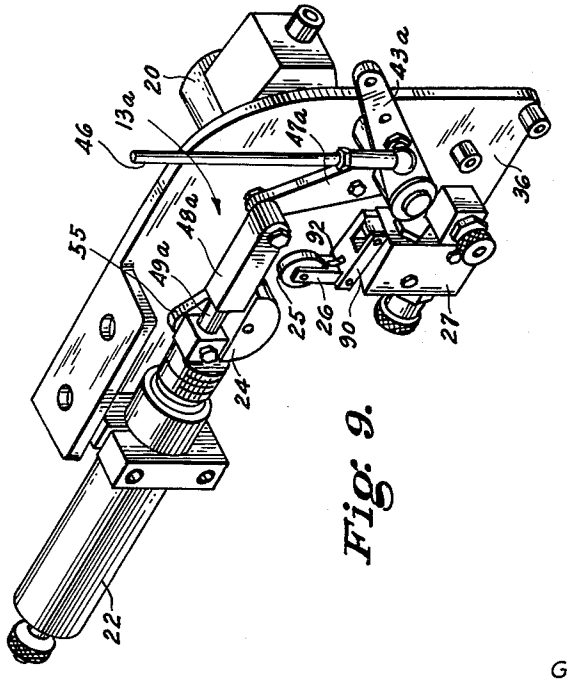


Fig. 9.

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SERVOSYSTEM FOR SEWING MACHINES

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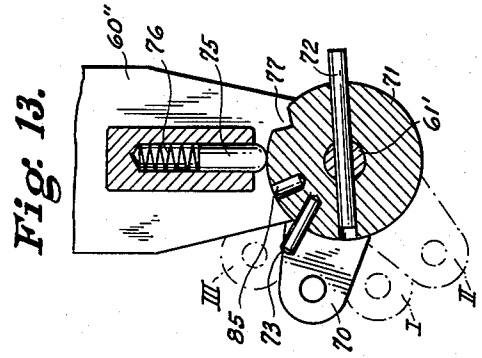


Fig. 13.

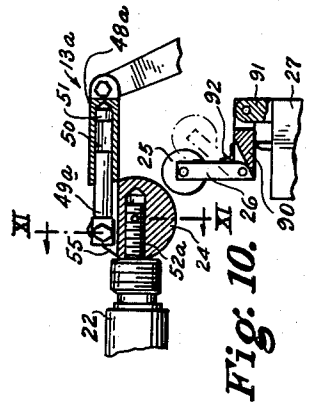


Fig. 10.

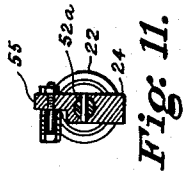


Fig. 11.

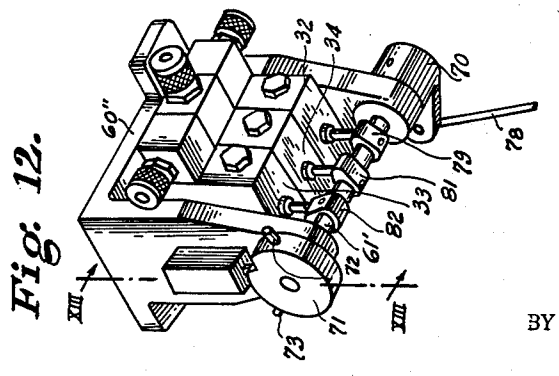


Fig. 12.

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SERVOSYSTEM FOR SEWING MACHINES

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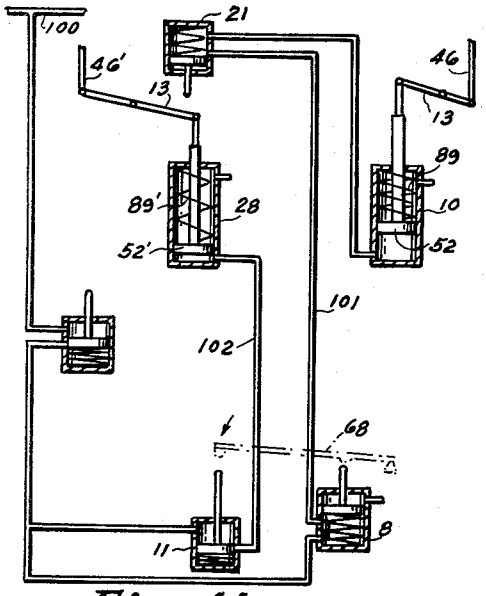


Fig. 14.

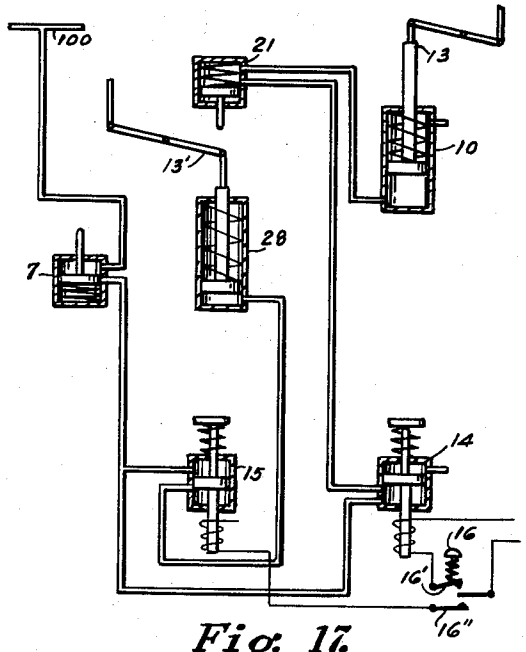


Fig. 17.

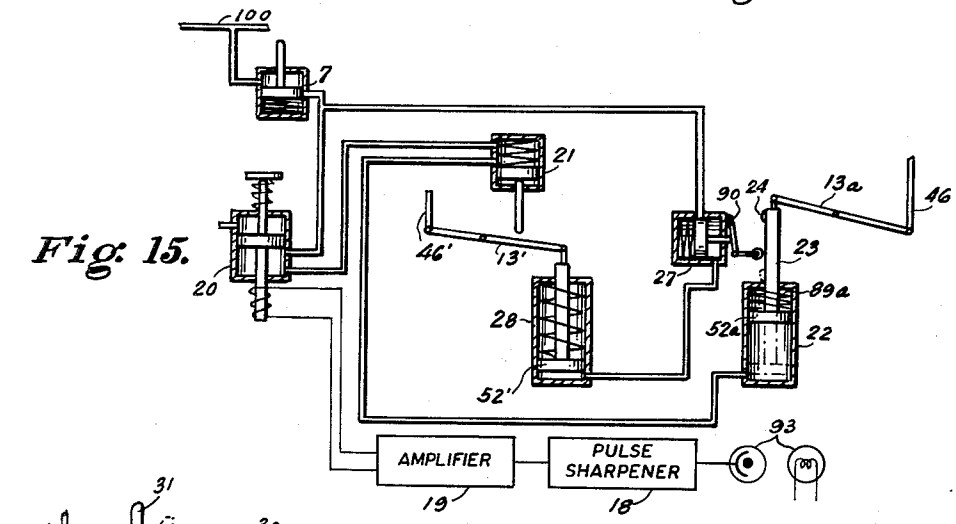


Fig. 15.

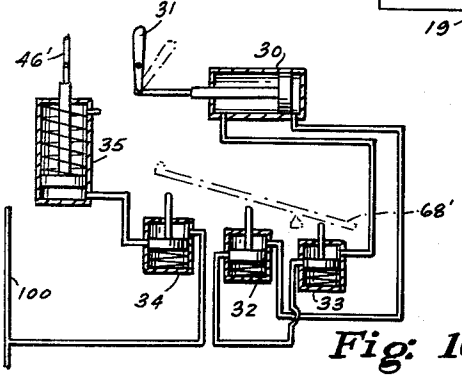


Fig. 16.

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United States Patent Office 3,245,369 Patented Apr. 12, 1966

3,245,369

SERVOSYSTEM FOR SEWING MACHINES

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Filed Oct. 22, 1963, Ser. No. 317,952
Claims priority, application Germany, Oct. 24, 1962, D 25,704
11 Claims. (Cl. 112—67)

My present invention relates to sewing machines and, more specifically, to machines of the group-stitch type, e.g. as disclosed in my prior U.S. Patents Nos. 2,906,217 and 3,025,444, in which a sewing cycle is performed in a predetermined manner with the aid of a timing device or program unit adapted to repeat the same cycle over and over again.

Machines of this type are used for the stitching of buttons, buttonholes, hinges and so forth.

To initiate the sewing cycle of the machine, an operator may actuate a manual control lever (the term being intended to include foot-operated elements such as pedals) or a start signal may be produced by an automatic detector, such as a photoelectric scanner, responsive to the approach of a properly positioned workpiece. When this occurs, the presser foot of the machine is lowered onto the workpiece to clamp the latter against the worktable whereupon the feeding mechanism is set in motion, along with the needle drive, to start the stitching operation controlled by the program unit. The latter step is usually accomplished by actuating a clutch which couples a continuously running motor to a drive shaft.

The means heretofore used for the raising and lowering of the presser foot were usually electromagnetic devices such as solenoids which are characterized by a rapid action that is not always desirable in the clamping of sensitive fabrics or the like. It is, therefore, an object of this invention to provide a manually or automatically controlled servosystem for sewing machines, adapted to initiate a predetermined operating cycle in the general manner described above, which acts more gradually upon the work-clamping mechanism of the machine than do conventional electrical systems.

A more specific object of the invention is to utilize, for the operation of sewing machines in a commercial establishment, the power of a source of fluid pressure frequently available, e.g. in the form of steam supplied to clothes presses, in such establishments.

It is also an object of my invention to provide a servosystem which can be conveniently installed in existing machinery.

A further object of my invention is to provide an assembly for such servosystem which utilizes only a small number of basic parts so designed as to accommodate various types of pneumatic units.

The servosystem conforming to my present invention includes fluid-pressure-responsive means, preferably of the pneumatic type, for successively operating the clamping assembly of a sewing machine and the starter for its work-feed and sewing mechanism. More specifically, the system comprises a single control element so coupled with two pneumatic drives as to result in their successive operation in a predetermined order, with actuation of the clamping means by the first drive and of the start means for the sewing and feed mechanism by the second drive.

Such a system may also be used for the simultaneous control of more than one sewing machine, e.g. a pair of such machines operating simultaneously on a single fabric as described in my copending application Ser. No. 223,466, filed September 13, 1962.

The invention will be described in greater detail with reference to the accompanying drawing in which:

FIG. 1 is a perspective view of a support table for a sewing machine equipped with a pneumatic servosystem according to my invention;

FIG. 2 is a perspective bottom view of the table, showing additional elements of the system;

FIG. 3 is a perspective view, drawn to a larger scale, of a mounting plate forming part of the system of FIGS. 1 and 2;

FIG. 4 is a view similar to FIG. 3, showing components of the pneumatic system mounted on the plate;

FIG. 5 is a perspective view of a yoke member also supporting certain components of the system;

FIG. 6 similarly illustrates an identical yoke member supporting other components;

FIG. 7 is a sectional view on the line VII—VII of FIG. 6;

FIG. 8 is a perspective view showing a second mounting plate with additional components carried thereon;

FIG. 9 is a view similar to FIG. 4, illustrating a modified assembly carried on the first-mentioned mounting plate;

FIG. 10 is a detail view (parts broken away) of the mechanism of FIG. 9;

FIG. 11 is a sectional view taken on line XI—XI of FIG. 10;

FIG. 12 is a view similar to FIG. 5, showing the yoke member thereof with a modified assembly of components;

FIG. 13 is a sectional view similar to FIG. 7 but taken on the line XIII—XIII of FIG. 12;

FIG. 14 is a diagrammatic view of the pneumatic system illustrated in FIGS. 1–8;

FIG. 15 is a diagram similar to that of FIG. 14 but relating to a system incorporating an assembly of the type shown in FIG. 9;

FIG. 16 is a further diagram for a system comprising the assembly of FIG. 12; and

FIG. 17 is a diagram directed to still another modification.

In FIGS. 1 and 2 I have shown a table **59** which supports a sewing machine **80**, the latter being provided with the usual mechanism for operating on a fabric or other workpiece as the latter is clamped between a base **86** and a presser foot **87** which may be manually controlled by means of a lever **31**. The clamping mechanism, represented by lever **31** and foot **87**, is also linked to a control rod **46** extending downwardly through the table **59**, a similar control rod **46'** being linked to the starting handle (not shown) for setting the sewing and feed mechanism in motion by coupling it to an electromotor **65** which is kept continuously running during and between operating cycles. The starting and stopping of motor **65** can be controlled by an on-off switch **64** whose handle **63** projects upwardly through a slot in table **59**.

A pedal **68**, disposed between the legs **69** of the table, is articulated via a rod **78** to a lever arm **70** on a yoke **60'** which is fastened to the underside of table **59** and carries a pair of pneumatic valves **8** and **11**; an identical yoke **60**, also secured to the underside of the table, supports a valve **7** as well as the shaft **61** of motor switch **64**. Two identical mounting plates **36** and **36'** are likewise fastened to the lower table surface and serve as supports for a pair of pneumatic cylinders **10** and **28**, respectively.

The mounting plates **36** and **36'** have the shape illustrated in FIG. 3 in which plate **36** is shown provided with bores **37**, **38** and **41** to accommodate various bolts or studs, bosses **39** and **40** serving as bolt guides for similar mounting purposes, and a shaft **42** rotatably journaled therein. A flange **58** serves for the attachment of the plate **36** to the table **59**. In the assembly of FIG. 4, in which the bosses **39** and **40** are not utilized, the pneumatic

motor or piston cylinder **10** is held in place by jaws **88** secured to the plate **36** by bolts traversing the bores **37**. Shaft **42** serves as a fulcrum for a lever **43** with several holes **44**, one of these holes being engaged by a universal joint forming a socket **45** for the control rod **46**. Another arm **47**, also pivoted on shaft **42** and rigid with arm **43**, is articulated to the piston **52** of cylinder **10** which has a telescoped extension **48**, **49** secured to it by means of interconnected blocks **53**, **54**, the rod-shaped transmission member **49** being received in a blind axial bore of the tubular transmission member **48**. The articulated linkage between piston **52** and rod **46** has been generally designated by the numeral **13**.

The companion plate **36'** shown in FIG. 8, in which elements corresponding to those of FIGS. 3 and 4 have been distinguished therefrom by primes, carries the pneumatic cylinder **28** whose clamping jaws **88'** are secured to it at the bores **38** (FIG. 3). The transmission **13'** shown in FIG. 8 is substantially identical with the linkage **13** of FIG. 4. In addition, however, arm **47'** is rigid with a cam plate **57** which swings with it about the stud shaft **42'** and acts upon a pneumatic valve **21** fastened to the plate **36'** by way of the bosses **39'** thereof. The cam **57** is adjustable with reference to arm **47'** by being provided with an arcuate slot **56** which is traversed by a screw **94**.

The yoke **60**, shown in FIG. 5, has two arms in which the shaft **61** is journaled, the pneumatic valve **7** being positioned between these arms so as to be actuatable by a cam **62** carried on shaft **61**. Fixed to the free end of shaft **61**, by means of a pin **67**, is a coupling **66** with a notch **68** adapted to mate with an extension shaft forming part of the switch **64** (see also FIG. 2).

Yoke **60'**, illustrated in FIGS. 6 and 7, is structurally identical with yoke **60** and supports a shaft **61'** with a pair of cams **79**, **81** mounted thereon. Shaft **61'** carries at one end the aforementioned lever arm **70**, linked to pedal-controlled rod **78**, and is provided on its opposite end with an indexing disk **71** having pins **72**, **73** radially projecting therefrom. These pins act as stop members in cooperation with a casing **74**, externally secured to one of the arms of the yoke, in which a pin **75** is vertically slidable under pressure of a spring **76**. The tip of pin **75**, bearing upon the periphery of disk **71**, is adapted to drop into a notch **77** on that periphery to hold the disk in an intermediate position in which the lever arm **70** occupies the position I shown in dot-dash lines in FIG. 7. The two extreme positions, respectively defined by the pins **73** and **72**, have been shown in solid lines and at II in dot-dash lines. Disk **71** also has a radial bore **83**, next to the one accommodating the pin **73**, which is not used in the arrangement of FIGS. 6 and 7.

The operation of the servosystem described in conjunction with FIGS. 1–8 will now be described with reference to FIG. 14. This figure diagrammatically shows the pneumatic cylinders **10** and **28**, together with their piston linkages **13** and **13'** leading to the rods **46** and **46'**, along with the pneumatic valves **7**, **8**, **11** and **21** as well as the pedal **68**. A source of air, steam or other fluid under pressure has been indicated by a pipe **100**.

When the motor **65** (FIGS. 1 and 2) is switched on by means of the handle **63**, the cam **62** seen in FIG. 5 opens the valve **7** so that fluid from line **100** passes through this valve and the normally open valves **8** and **21**, connected in series therewith in a conduit **101**, to the bottom of cylinder **10** to lift its piston **52**. This action displaces the rod **46** along with the handle **31** to raise the presser foot **87** (FIG. 1) preparatorily to the deposition of a workpiece on machine base **86**. When the workpiece is in place, the operator steps on the pedal **68** to rotate it counterclockwise as viewed in FIG. 14; its initial rotation, communicated via rod **78** to the arm **70** of FIGS. 6 and 7, brings about a displacement into the indexed position I (FIG. 7) in which cam **79** actuates the valve **8** so as to cut off the fluid supply from the cylinder **10** and to vent the latter to the atmosphere. Piston **52**, under the pressure of its spring **89**, descends to its bottom position (as viewed in FIG. 14) and entrains the male member **49** (FIG. 4) of its two-part extension **48**, **49**, the female member **48** following it, under the action of a spring (not shown) bearing upon the presser foot **87** of the machine, only to the extent permitted by the thickness of the workpiece. Next, the operator continues the swing of pedal **68** so that, as the assembly shown in FIGS. 6 and 7 reaches the position II, cam **81** opens the valve **11** while cam **79** maintains its effect upon valve **8**. Fluid now streams into the cylinder **28** through a conduit **102** and lifts the piston **52'** thereof against the force of its spring **89'**, the linkage **30'** displacing the rod **46'** to start the operation of machine **80**. At the same time, as will be apparent from FIG. 8, transmission **13'** by cam **57** closes the valve **21** to disconnect the cylinder **10** from its supply conduit **101**, thereby insulating it from the valve **8** and preventing the readmission of fluid into the cylinder upon the subsequent release of pedal **68**. The pedal, under the action of its restoring spring **90** (FIG. 1), thereupon returns to normal whereby fluid pressure is removed from cylinder **28** and its piston **52'** descends, yet a part of the transmission **13'** including member **48'** and cam **57** remains in an off-normal position in which it is held by the control rod **46'** and the associated starting member until the latter is restored by the program unit, not shown, upon completion of a sewing cycle. Thus, the splitting of each linkage **13**, **13'** into two separate parts, interconnected only for pressure transmission, has the advantage of relieving the rods **46**, **46'** and their associated mechanisms from the stress of the restoring spring **52**, **52'** of the pneumatic pistons.

Another advantage of the split linkage resides in increased adjustability to fit different requirements, as will be apparent from the following description of the modified assembly illustrated in FIGS. 9–11. This assembly comprises a pneumatic cylinder **22**, replacing cylinder **10** of the preceding embodiment, which is carried on the mounting plate **36** and has connected to it a linkage **13***a* differing from the aforedescribed linkages **13** and **13'** mainly by the presence of a cam **24** on its piston **52***a*. Cam **24** has a shoulder **55** to which a block **53***a*, rigid with the male transmission member **49***a*, is articulated; the corresponding female member **48***a*, whose blind bore has been shown at **50**, contains a removable spacer **51** designed to adapt the free path of rod-shaped transmission member **49***a* to the stroke length of piston **52***a* in cylinder **52**.

A valve **27**, secured to the mounting plate **36** by its bosses **40** (FIG. 3), has its stem overlain by a lever **90** articulated to the valve body at **91**; the free end of lever **90** has pivoted to it an arm **26** with a roller **25** acting as a follower for cam **24**. Arm **26**, which can swing limitedly clockwise from its position shown in FIG. 10, is normally maintained in that position by a spring **92**. Thus, when the piston **52***a* is retracted into the cylinder **22**, cam **24**, moving to the left, depresses the roller **25** and actuates the valve **27**; when the piston **52***a* is driven outwardly, cam **24** in its rightward motion merely deflects the roller **25** and the arm **26** into the position shown in dot-dash lines in FIG. 10 so that the valve **27** is not affected thereby.

The operation of this unidirectionally effective camming arrangement will be described with reference to FIG. 15 which diagrammatically illustrates a servosystem controlled by a photoelectric scanner **93** instead of the aforedescribed pedal **68**. Scanner **93**, upon detecting the edge of an approaching fabric or other workpiece, produces a single pulse which is sharpened by a network **18**, e.g. a Schmitt trigger circuit, and amplified at **19** before being applied to a solenoid valve **20**. This solenoid valve has been shown supported on the mounting plate **36** in FIG. 9. With pneumatic valve **7** open, as

before, in the running condition of the drive motor **65** (FIGS. 1 and 2), solenoid valve **20** normally admits pressure fluid by way of the likewise open valve **21** to the bottom of cylinder **22** to raise its piston **52***a* so as to maintain the presser foot **87** of the machine in a released position. When a pulse from the output of scanner **93** appears in the output of amplifier **19**, solenoid valve **20** cuts off pressure from cylinder **22** and vents it to the atmosphere, thereby letting the piston **52***a* descend under the action of its spring **89***a*, and allows the presser foot to follow suit in the manner previously described. The descent of the piston, furthermore, opens the normally closed pneumatic valve **27** by the action of a camming assembly **23–26** so that fluid now streams into the cylinder **28** to raise its piston **52'**; the latter, in the manner described in connection with FIG. 14, starts the feeding and sewing mechanism and opens the valve **21** to insulate the cylinder **22** against further fluid pressure. When valve **21** closes thereafter upon the completion of the sewing cycle, fluid from source **100** is again able to enter the cylinder **22** to unclamp the fabric or other workpiece held engaged by the presser foot. It will thus be seen that the system of FIG. 15 is particularly adapted for an arrangement in which the workpieces are automatically delivered to and possibly taken from the machine by suitable conveyor means.

In FIGS. 12 and 13 I have shown a single yoke **60''** which replaces the two yokes **60**, **60'** of the prior embodiments and is of the same construction. Yoke **60''** carries the aforedescribed shaft **61'** on which, however, a further cam **82** has been disposed alongside the cams **79** and **81**. Disk **71**, as best seen in FIG. 13, has been modified by the insertion of a plug **85** into the bore previously occupied by pin **73** and the transfer of this pin to bore **83** (FIGS. 6 and 7). Thus, the disk **71** is now free to turn, from the position shown in full lines in FIG. 13, not only counterclockwise into positions I and II previously referred to, but also clockwise into a position III also shown in dot-dash lines. The yoke **60''** accommodates between its arms a set of three valves **32**, **33** and **34** respectively cooperating with the cams **79**, **82** and **81**.

Reference is now made to FIG. 16 for a description of a system utilizing the three valves **32–34** of FIGS. 12 and 13. The system is designed for use with machines, e.g. for sewing grommets, which operate on relatively heavy workpieces such as coats, jackets or the like requiring proper positioning below the presser foot under the control of the operator. In order that the latter may have both hands free for this work, the pedal **68** is again used in this system. When this pedal is swung partially counterclockwise as viewed in FIG. 16, disk **71** and arm **70** assume the position I in FIG. 13 in which pin **75** drops into notch **77** while the cam **79** opens the normally closed valve **32**. Pressure fluid now enters a pneumatic cylinder **30**, replacing the cylinder **10** of FIG. 14, whose piston is linked via rod **46** with the clamping lever **31** and which now operates this lever to lower the presser foot upon the fabric. If the latter is not properly positioned, the operator reverses the pedal **68** so that, as a result of its clockwise rotation, disk **71** and arm **70** assume the position III in disk **13** whereby cam **82** opens the normally closed valve **33** and admits fluid into the cylinder **30** in the opposite direction, thereby again lifting the presser foot. The pedal **68** is then once more rotated counterclockwise, to reclamp the workpiece, whereupon the rotation of the pedal is continued in the same sense until position II (FIG. 13) is reached in which cam **81** opens the normally closed valve **34**. Pressure fluid now enters a cylinder **35**, replacing cylinder **28** of the prior embodiments, to displace the rod **46'** for starting the machine. The pedal is then returned only to position I in which the disk **71** is indexed by the pin **75**. The neutral position shown in full lines in FIG. 13 is in this case without much practical significance so that, when the operation is completed, the operator may simply leave the assembly in position III for keeping the presser foot raised.

FIG. 17 shows the same valves as FIG. 14, except for valves **8** and **11** which have been replaced by two solenoid valves **14** and **15**, respectively. A manual switch **16**, upon being depressed by the operator, closes first a pair of contacts **16'** and then also a pair of contacts **16''** to operate the solenoid valves **14** and **15** in staggered succession. Solenoid valve **14**, which had previously admitted fluid from source **100** to cylinder **10** to raise its piston, now vents that cylinder to bring about the aforedescribed clamping operation; valve **15**, immediately thereafter, applies pressure to cylinder **28** to initiate the sewing cycle and to operate the pneumatic valve **21** for insulating the cylinder **10** from its pressure source. The switch **16** may thereupon be released and the system operates in the same manner as has been described with reference to FIGS. 14 and 15.

Various modifications of the arrangements described and illustrated are of course possible without departing from the spirit and scope of my invention as defined in the appended claims.

I claim:

1. In a sewing machine having clamping means for pressing a workpiece against a base and further having start means for initiating a sewing cycle on said workpiece, the combination therewith of a servo system including first pneumatic means coupled with said clamping means, second pneumatic means coupled with said start means, a single control element coupled with both said pneumatic means for actuating same in staggered relationship, thereby successively operating said clamping means and said start means, said pneumatic means each including a respective piston-and-cylinder arrangement and a respective valve means connected with the respective piston-and-cylinder arrangement for controlling same, said valve means being mechanically connected with said element for actuation thereby, and further valve means operable by said second pneumatic means for blocking operation of the piston-and-cylinder arrangement of said first pneumatic means by the valve means thereof.

2. The combination defined in claim **1** wherein said control element is progressively displaceable from a normal position into a first off-normal position for actuation of said first pneumatic means and into a second off-normal position for actuation of both said pneumatic means.

3. The combination defined in claim **2** wherein said control element is a pedal swingable in one direction into said first and second off-normal positions and in the opposite direction into a further off-normal position for deactivating said first pneumatic means, thereby releasing said clamping means.

4. In a sewing machine having clamping means for pressing a workpiece against a base and further having start means for initiating a sewing cycle on said workpiece, the combination therewith of a servo system including first pneumatic means coupled with said clamping means, second pneumatic means coupled with said start means, and a single control element coupled with both said pneumatic means for actuating same in staggered relationship, thereby successively operating said clamping means and said start means; said first pneumatic means comprising a first cylinder, a first piston in said first cylinder linked with said clamping means, first conduit means normally connecting said first cylinder to a source of pressure fluid, and first valve means in said first conduit means actuatable by said element for disconnecting said first cylinder from said source and connecting it instead to atmosphere, thereby moving said first piston from an unclamping position into a clamping position; said second pneumatic means comprising a second cylinder, a second piston in said second cylinder linked with said start means, second conduit means leading to said second cylinder and to said source of pressure fluid, normally closed second

valve means in said second conduit means openable by said element for connecting said second cylinder to said source, thereby moving said second piston into a machine-starting position, and normally open further valve means closable by said second piston in response to fluid pressure for insulating said first cylinder from said first valve means, thereby maintaining said first piston in its clamping position irrespectively of the position of said element.

5. In a sewing machine having clamping means for pressing a workpiece against a base and further having start means for initiating a sewing cycle on said workpiece, the combination therwith of a servosystem including first pneumatic means coupled with said clamping means, second pneumatic means coupled with said start means, a single control element coupled with both said pneumatic means for actuating same in staggered relationship, thereby successively operating said clamping means and said start means, said first pneumatic means comprising a first cylinder, a first piston in said first cylinder linked with said clamping means, first conduit means normally connecting said first cylinder to a source of pressure fluid, and first valve means in said first conduit means actuatable by said element for disconnecting said first cylinder from said source and connecting it instead to atmosphere, thereby moving said first piston from an unclamping position into a clamping position; said second pneumatic means comprising a second cylinder, a second piston in said second cylinder linked with said start means, second conduit means leading to said second cylinder and to said source of pressure fluid, normally closed second valve means in said second conduit means openable by said element for connecting said second cylinder to said source, thereby moving said second piston into a machine-starting position, and normally open further valve means closable by said second piston in response to fluid pressure for insulating said first cylinder from said first valve means, thereby maintaining said first piston in its clamping position irrespectively of the position of said element, said second valve means being openable by said element through the intermediary of said first valve means and said first cylinder, said first piston being provided with transmission means coupled with said second valve means.

6. The combination defined in claim 5 wherein said transmission means comprises cam means on said first piston and unidirectionally effective cam-follower means linked with said second valve means.

7. The combination defined in claim 5 wherein said element comprises an automatic detector sensing the approach of the workpiece.

8. In a sewing machine having clamping means for pressing a workpiece against a base and further having start means for initiating a sewing cycle on said workpiece, the combination therewith of a servosystem including first pneumatic means coupled with said clamping means, second pneumatic means coupled with said start means, and a single control element coupled with both said pneumatic means for actuating same in staggered relationship, thereby successively operating said clamping means and said start means; said first pneumatic means comprising a first cylinder, a first piston in said first cylinder linked with said clamping means, first conduit means normally connecting said first cylinder to a source of pressure fluid, and first valve means in said first conduit means actuatable by said element for disconnecting said first cylinder from said source and connecting it instead to atmosphere, thereby moving said first piston from an unclamping position into a clamping position; said second pneumatic means comprising a second cylinder, a second piston in said second cylinder linked with said start means, second conduit means leading to said second cylinder and to said source of pressure fluid, normally closed second valve means in said second conduit means openable by said element for connecting said second cylinder to said source, thereby moving said second piston into a machine-starting position, and normally open further valve means closable by said second piston in response to fluid pressure for insulating said first cylinder from said first valve means, thereby maintaining said first piston in its clamping position, irrespectively of the position of said element, said second piston comprising two telescoped portions including a spring-loaded first portion and a second portion positively connected with said start means, said second portion being coupled with said further valve means for holding same closed until restoration of said start means to an initial position.

9. In a sewing machine provided with a supporting table, clamping means for pressing a workpiece against a base on said table and start means for initiating a sewing cycle on said workpiece, the combination therewith of a servosystem including two mounting plates on the underside of said table, at least one yoke on the underside of said table, a pair of pneumatic cylinders and pistons respectively secured to said plates, valve means for controlling said pistons disposed on said yoke, a shaft spanning said yoke, cam means for actuating said valve means on said shaft, a pair of links respectively connecting said pistons with said clamping means and with said start means, a single control element on said table, means including a source of fluid pressure, said element, said cam means, said valve means and said pistons for successively operating said clamping means and said start means, cam means on the piston linked with said clamping means, and cam-controlled additional valve means on the plate supporting the last-mentioned piston for actuation by the latter, said additional valve means being included in a pneumatic circuit for operating the piston linked with said start means.

10. In a sewing machine provided with a supporting table, clamping means for pressing a workpiece against a base on said table and start means for initiating a sewing cycle on said workpiece, the combination therewith of a servosystem including two mounting plates on the underside of said table, at least one yoke on the underside of said table, a pair of pneumatic cylinders and pistons respectively secured to said plates, valve means for controlling said pistons disposed on said yoke, a shaft spanning said yoke, cam means for actuating said valve means on said shaft, a pair of links respectively connecting said pistons with said clamping means and with said start means, a single control element on said table, means including a source of fluid pressure, said element, said cam means, said valve means and said pistons for successively operating said clamping means and said start means, and articulated transmission means pivoted on each of said mounting plates and connecting the respective pistons to the associated links, at least one of said transmission means including an arm constituted by a rod-shaped member and a tubular member telescopically receiving said rod-shaped member.

11. The combination defined in claim 10 wherein said tubular member has a blind axial bore accommodating said rod-shaped member, further comprising spacer means removably disposed in said bore for contact with said rod-shaped member.

References Cited by the Examiner

UNITED STATES PATENTS

2,718,201	9/1955	Kindseth et al.	112—219 X
2,722,184	11/1955	Sweet	112—219 X
2,750,908	5/1956	Odermann et al.	112—235
2,758,556	8/1956	Hopkins	112—219 X
2,764,112	9/1956	Happe	112—219 X
3,156,204	11/1964	Harnish et al.	112—219 X

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