Sept. 17, 1963 H. E. ALTHENS ETAL 3,103,905

FOOT TREADLES

Filed Jan. 11, 19(3 Sheets-Sheet 1

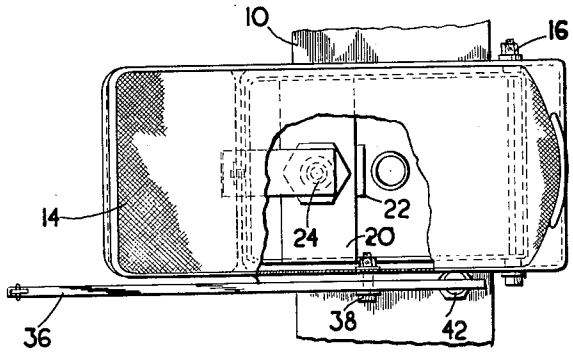


FIG. 1

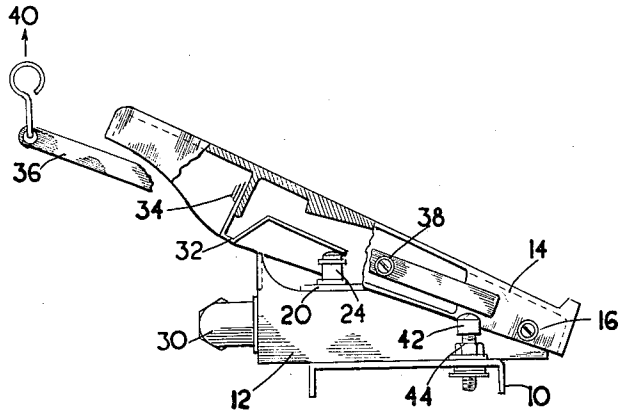


FIG. 2

INVENTORS
HERBERT E. ALTHENS
HENRY C. FRENCH
FRANKLIN A. REECE, DECEASED
BY FRANKLIN A. REECE, JR.
JOHN B. REECE
WALTER D. BROOKS, Jr.
} CO-EXECUTORS

By Garrett J. Cullen, Jr.
ATTORNEY

Sept. 17, 1963 H. E. ALTHENS ETAL 3,103,905

FOOT TREADLES

Filed Jan. 11, 1962 3 Sheets-Sheet 2

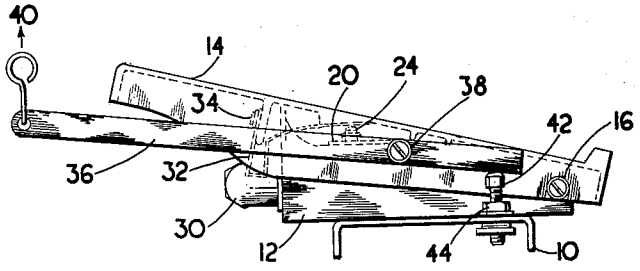


FIG. 4

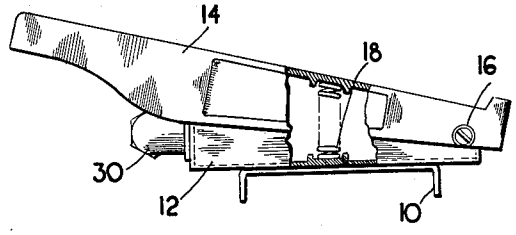


FIG. 5

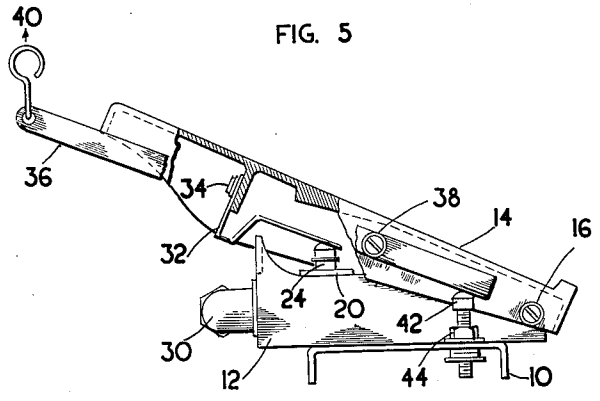


FIG. 3

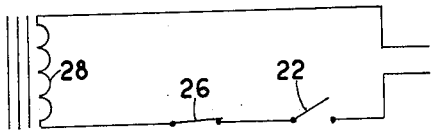


FIG. 6

INVENTORS

HERBERT E. ALTHENS
HENRY C. FRENCH
FRANKLIN A REECE, DECEASED
BY FRANKLIN A. REECE, JR.
JOHN B. REECE
WALTER D. BROOKS, Jr.
} CO-EXECUTORS

By Garrett J Cullen, Jr.
ATTORNEY

Sept. 17, 1963 H. E. ALTHENS ETAL 3,103,905

FOOT TREADLES

Filed Jan. 11, 1962 3 Sheets-Sheet 3

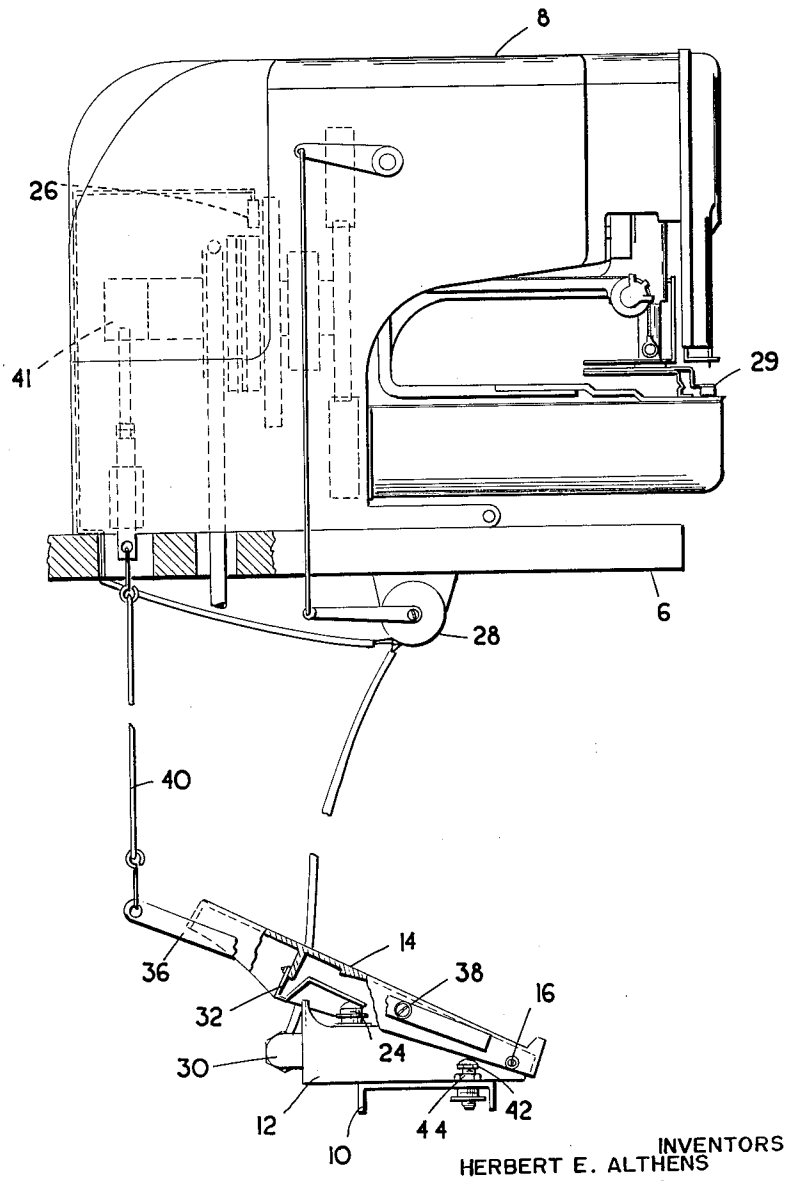


FIG. 7

INVENTORS
HERBERT E. ALTHENS
HENRY C. FRENCH
FRANKLIN A. REECE, DECEASED
BY FRANKLIN A. REECE, JR.
JOHN B. REECE
WALTER D. BROOKS, Jr.
CO-EXECUTORS

BY Garrett J. Culler, Jr.
ATTORNEY

United States Patent Office 3,103,905 Patented Sept. 17, 1963

3,103,905

FOOT TREADLES

Herbert E. Althens, Auburndale, Henry C. French, West Acton, and Franklin A. Reece, deceased, late of Chestnut Hill, Mass., by Franklin A. Reece, Jr., Milton, John E. Reece, Needham, and Walter D. Brooks, Jr., Dedham, Mass., co-executors, assignors, by mesne assignments, to The Reece Corporation, Waltham, Mass., a corporation of Massachusetts

Filed Jan. 11, 1962, Ser. No. 165,705
6 Claims. (Cl. 112—219)

This invention relates to a foot treadle for controlling the operation of a machine, and more particularly to a foot treadle for independently controlling a plurality of elements of the machine in predetermined timed relationship.

In the field of industrial sewing machines, such as buttonhole sewing machines, button sewing machines and the like, it is usually desirable to utilize foot treadles for controlling the work clamp and the starting of the machine so that the hands of the operator will be free for the handling and placement of the work in the machine. As times it may be necessary for the operator to clamp and unclamp the work several times before properly placing the work so that it is also preferable to provide means whereby the work clamp may be actuated independently of the starting of the machine so that the work may be properly placed and held prior to the starting of the machine. This is usually accomplished by providing two foot treadles, one which controls the work clamp and one which controls the starting of the machine.

The object of this invention is to provide a single foot treadle which can control the work clamp without starting the machine, when desired, and which will assure positive engagement of the starting means for the machine when the work has been properly placed and held by the work clamp.

Another object is to provide a lost motion connection between the foot treadle and one of the elements which it controls, which connection will also multiply the movement of the foot treadle after the lost motion of the connection has been overcome.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a top plan view, partly broken away, of the treadle forming the subject matter of this invention;

FIGURE 2 is a side elevational view partly broken away and showing the treadle in its rest position;

FIGURE 3 is a view similar to FIGURE 2 but with the treadle shown in partially depressed position;

FIGURE 4 is a view similar to FIGURES 2 and 3 with the treadle in fully depressed position;

FIGURE 5 is a side elevational view of the treadle partly broken away to show the means for returning the pedal to its rest position;

FIGURE 6 is a schematic view of a circuit with which the present invention is used; and

FIGURE 7 is a plan view showing the treadle connected to one form of sewing machine.

Referring now to the accompanying drawings, the foot treadle is fixedly mounted on a member **10**, which member is a part of a table **6** or other supporting means for the machine **8** with which the foot treadle is to be used. The foot treadle itself is comprised of a hollowed-out bottom member **12** rigidly secured to member **10** by any suitable means and a top member **14** which overlies the bottom member **12**. A rod **16** pivotally secures one end of the top member **14** to the bottom member **12** adjacent one end thereof. Mounted within the bottom member **12** is a coil spring **18** (see FIGURE 5) which extends between the bottom member **12** and the top member **14** to urge the free end of the top member **14** away from the bottom member **12**.

Secured to the top edge of the bottom member **12** and extending across the bottom member **12** adjacent the end opposite that which supports the rod **16** is a plate **20**. Secured to the under side of plate **20** is a switch **22** having an actuating button **24** extending upwardly through the plate **20**. The button **24** is held in its upper position by means of a spring built into the switch in the conventional manner. The switch **22** is of the normally closed type, that is, when the button **24** is in its uppermost position the contacts of the switch are closed to complete the circuit with which it is used and when the button **24** is depressed the contacts of the switch are open so that the circuit is broken. The button **24** is of such a length that in all positions thereof it will extend above the plate **20**.

The switch **22** forms part of the circuit which includes a second switch **26** and a solenoid **28** (see FIGURE 6). The switch **26** is mounted on the machine which is to use the circuit in such a way that one of the elements of the machine will close the switch **26** when the machine is in stop position and the element will allow the switch **26** to open whenever the machine is operating. The solenoid **28** is thus energized only when both switches **22** and **26** are closed and can be operated only when the machine is in stopped position. The plunger of the solenoid **28** would be connected to whichever element of the machine it is desired to operate independently of the starting of the machine. In the case of an automatic sewing machine this element would be the work clamp **29**. The electrical leads which connect the switch **22** with the rest of the circuit pass from the bottom member **12** through the fixture **30** which is mounted on one end of the bottom member **12**.

Secured to the bottom surface of the top member **14** is a leaf spring **32**. Any suitable means such as a bolt **34** may be used to secure one end of the leaf spring **32** to the top member **14**. The free end of the leaf spring **32** overlies the button **24** of the switch **22** and the leaf spring **32** has a strength sufficient to overcome the spring which urges the button **24** to its upper position. Thus, as the top member **14** is depressed, the leaf spring **32** will press the button **24** downwardly until the button reaches the limit of its downward travel. Further movement of the top member **14** will cause the leaf spring **32** to flex whereby the button **24** and switch **22** will not be damaged. The action of the leaf spring **32** and button **24** is shown in FIGURES 2, 3 and 4.

A lever **36** is pivotally mounted on the side of the top member **14** for movement about a horizontal axis parallel to the axis about which the top member **14** moves. A

bolt 38 pivotally mounts lever 36 and the pivot point is closer to one end of the lever 36 than to the other. The longer end of the lever 36 is connected by means of a chain or rod, indicated generally as 40 to an element of the machine with which the machine is to be used. In the case of an automatic sewing machine the element 40 would be connected to the element which controls the clutch 41.

Mounted on the member 10 adjacent to foot treadle and on the same side as lever 36 is a bolt 42 which is adjustable in height by means of nut 44. The bolt 42 is so positioned that the shorter end of the lever 36 extends over the bolt 42. As the top member 14 is depressed the shorter end of lever 36 will engage the bolt 42 and further movement of the top member 14 will cause the lever 36 to pivot about its pivot 38. The combination of lever 36 and bolt 42 forms with the foot treadle a lost motion linkage and a motion multiplier after the lost motion has been overcome as will be more apparent from the following description of the operation of the device.

In operation, when the machine with which the foot treadle is used is in stop position, the switches 22 and 26 are closed whereby the circuit is completed and the solenoid 28 is energized. As the upper member 14 is depressed, that is, moves from the position shown in FIGURE 2 to that shown in FIGURE 3, the switch 22 would be opened thereby breaking the circuit and de-energizing the solenoid 28. Thus by alternating the position of the top member 14 between the position shown in FIGURES 2 and 3 it is possible to actuate the solenoid 28 without starting the machine.

As seen in FIGURE 2 when the top member 14 is in its uppermost position the lever 36 will be in such a position that its shorter end is spaced above the bolt 42. As the top member is depressed the lever 36 will pivot about the bolt 38 until the shorter end thereof engages bolt 42. Prior to the engagement of the lever 36 with bolt 42 the button 24 will be depressed whereby the circuit for the solenoid will be broken. Further downward movement of the top member 14 will cause the lever 36 to pivot in the opposite direction whereby the longer end of lever 36 will move downwardly. Because of the spacing between the respective ends of the lever 36 and the pivot 38 thereof, the longer end will move downwardly at a faster rate than the top member 14. Thus lever 36 provides not only a lost motion connection whereby switch 22 may be actuated without moving the element 40 but also provides a motion multiplier for assuring positive movement of element 40 when it is desired to move the element 40.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

We claim:

1. In a sewing machine,
a work clamp movable between a raised and a lowered position,
means for raising and lowering said work clamp,
driving means for said machine,
clutch means for engaging and disengaging said driving means,
a foot treadle,
first control means for said work clamp raising and lowering means,
second control means for said clutch means,
means connecting said first control means to said foot treadle,

means connecting said second control means to said foot treadle,
said last named connecting means including a lost motion linkage whereby movement of said foot treadle operates said first and second control means in predetermined timed relation,
said last named connecting means including means for multiplying the rate of movement of said foot treadle when said lost-motion has been overcome.

2. The combination of claim 1 wherein said last named connecting means comprises a lever pivotally mounted on said foot treadle at a point offset from the longitudinal center of said lever,
linkage connecting the longer end of said lever to said second control means,
a stop mounted in fixed position adjacent the shorter end of the lever,
to be engaged thereby.

3. In a sewing machine,
a work clamp movable between a raised and a lowered position,
spring means connected to said work clamp urging said clamp to lowered position,
a solenoid connected to said clamp for raising said clamp upon energization of said solenoid,
driving means for said machine,
clutch means for engaging and disengaging said driving means,
means for controlling said clutch means,
a foot treadle,
mounted for pivotal movement about one end thereof,
switch means for controlling said solenoid,
said switch means being mounted for actuation by said foot treadle,
a lever mounted on said foot treadle for pivotal movement about an axis parallel to the pivotal axis of said foot treadle,
said lever being mounted at a point offset from its center line,
a link connecting the longer end of said lever to the clutch controlling means,
a stop mounted adjacent said foot treadle and adjacent the shorter end of said lever whereby movement of the foot treadle first actuates the switch and then causes the shorter end of the lever to engage the stop whereby further movement of the foot treadle will move the longer end of the lever a greater distance than that moved by the foot treadle.

4. A foot treadle for controlling two elements of a machine in predetermined timed relationship comprising,
a pedal pivotally mounted adjacent one end for movement about a horizontal axis,
switch means connected to one of the elements of the machine and mounted in fixed position so as to be constantly in engagement with said pedal,
a lever pivotally mounted on said pedal for movement about an axis parallel to said pedal axis,
a stop member mounted in fixed position adjacent one end of said lever to be engaged by the lever where said pedal is depressed,
and a link connecting the other end of the lever to the other element of the machine.

5. A foot treadle for controlling two separate elements comprising,
a pedal pivotally mounted for movement about a horizontal axis,
a first element mounted in position adjacent said pedal and engageable thereby,
a second element mounted in position at a distance from said pedal,
linkage connecting said pedal to said second element, said linkage including a lost motion and a motion multiplying means whereby initial motion of said pedal will move said first element and further movement of said pedal will move the linkage at a faster

rate than the movement of said pedal to actuate said second element.

6. The combination of claim 5 wherein said linkage comprises a lever pivotally mounted on said pedal,

said lever pivoting about an axis parallel to the axis of movement of the pedal,

a chain connecting one end of said lever to said second element,

a stop member mounted in fixed position adjacent the other end of said lever,

said other end of said lever engaging said stop member after the initial movement of each pedal.

References Cited in the file of this patent

UNITED STATES PATENTS

2,604,864	Merchant	July 29, 1952
2,708,415	White	May 17, 1955

FOREIGN PATENTS

953,032	Germany	Nov. 22, 1956