May 31, 1966 A. E. MAROLA ETAL 3,253,685

CLUTCH AND BRAKES FOR SEWING MACHINE

Filed July 25, 1963 5 Sheets-Sheet 1

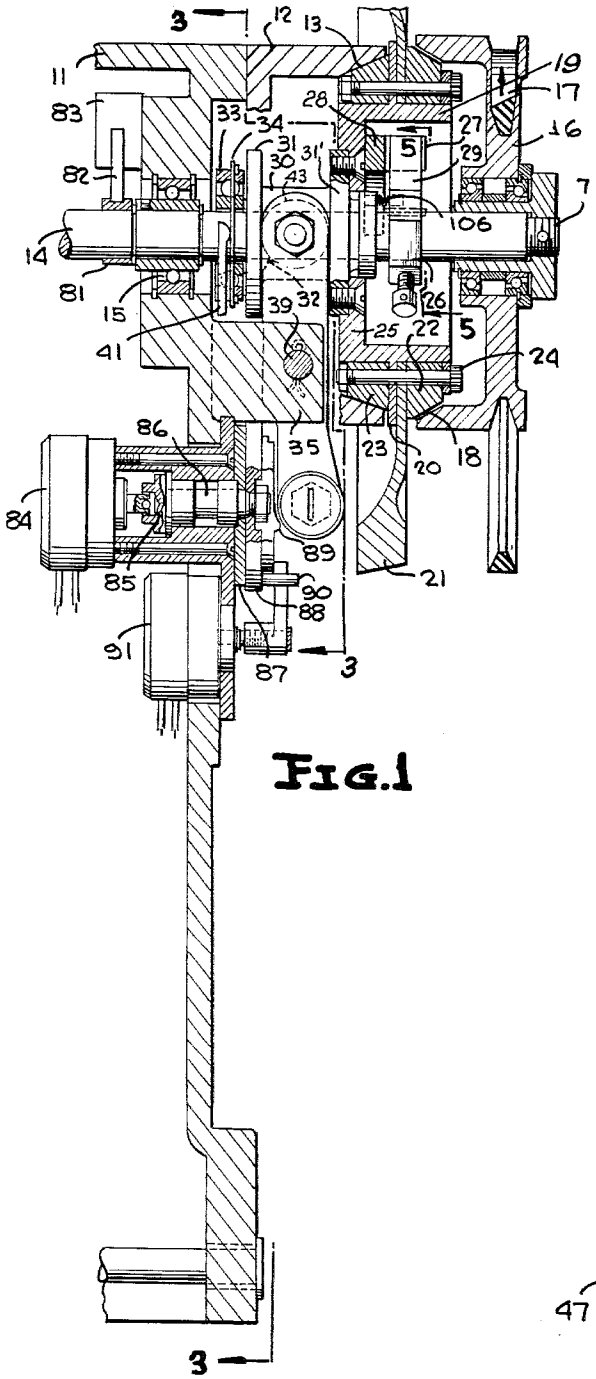


FIG. 1

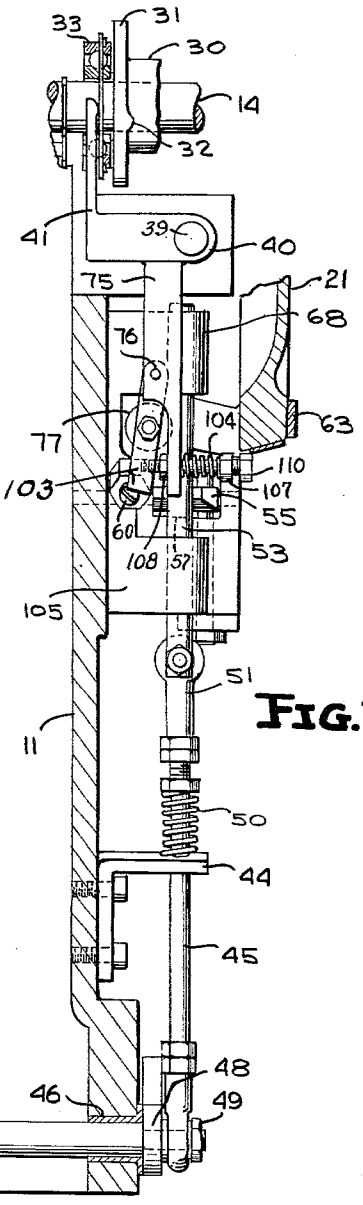


FIG. 2

AMERICO E. MAROLA
& NORMAN W. STARR
INVENTORS

BY Mason, Portas, Miller & Stewart

ATTORNEYS

May 31, 1966 A. E. MAROLA ETAL 3,253,685

CLUTCH AND BRAKES FOR SEWING MACHINE

Filed July 25, 1963 5 Sheets-Sheet 2

FIG. 3

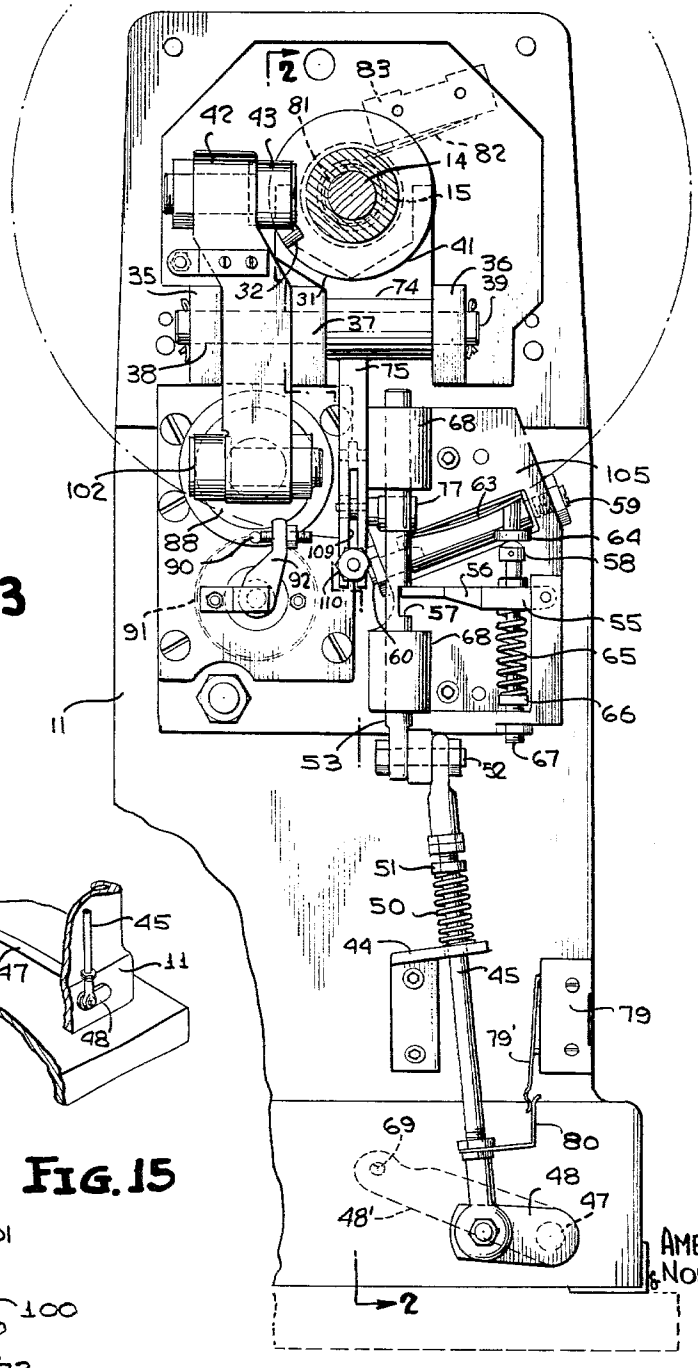


FIG. 15

AMERICO E. MAROLA
& NORMAN W. STARR
INVENTORS

BY Mason, Portas, Hiller & Stewart

ATTORNEYS

May 31, 1966 A. E. MAROLA ETAL 3,253,685

CLUTCH AND BRAKES FOR SEWING MACHINE

Filed July 25, 1963 5 Sheets-Sheet 3

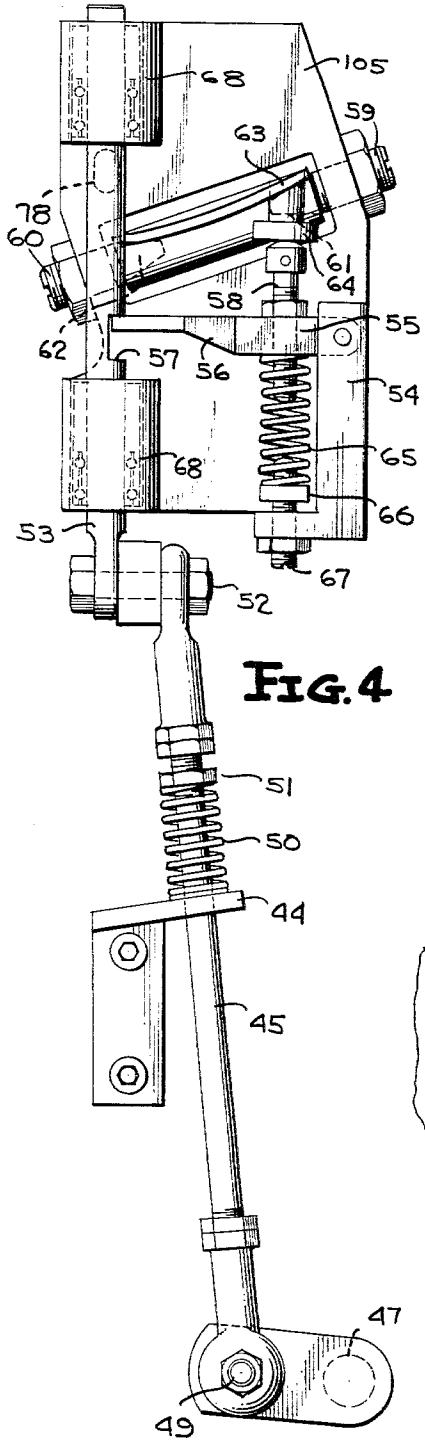


FIG. 4

FIG. 5

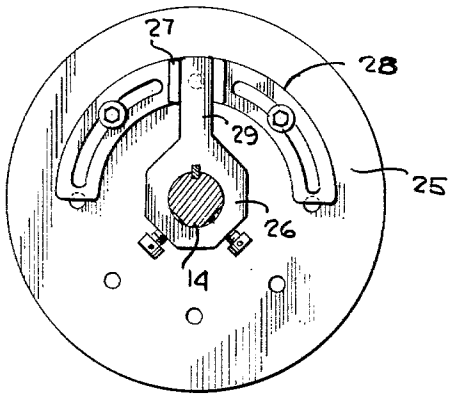
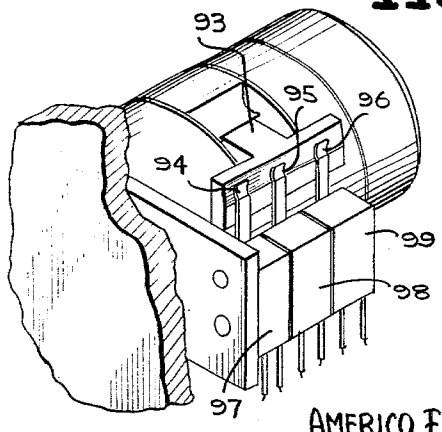


FIG. 6



AMERICO E. MAROLA
& NORMAN W. STARR
INVENTORS

BY Mason, Porter, Hilla & Stewart

ATTORNEYS

May 31, 1966 A. E. MAROLA ETAL 3,253,685

CLUTCH AND BRAKES FOR SEWING MACHINE

Filed July 25, 1963 5 Sheets-Sheet 4

FIG. 7

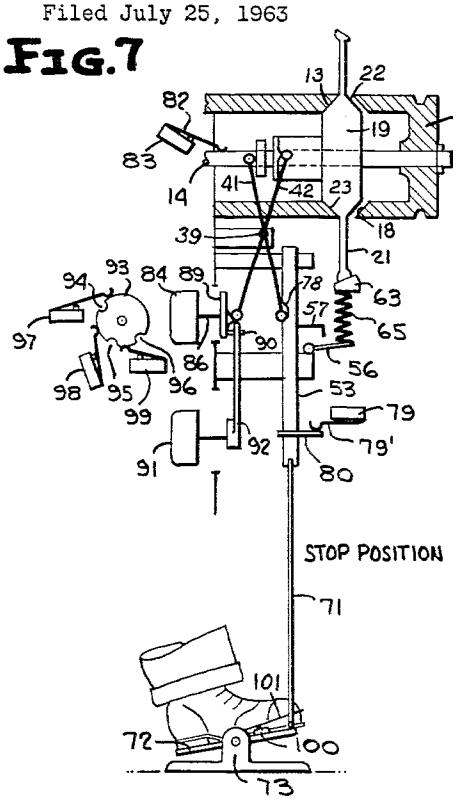


FIG. 9

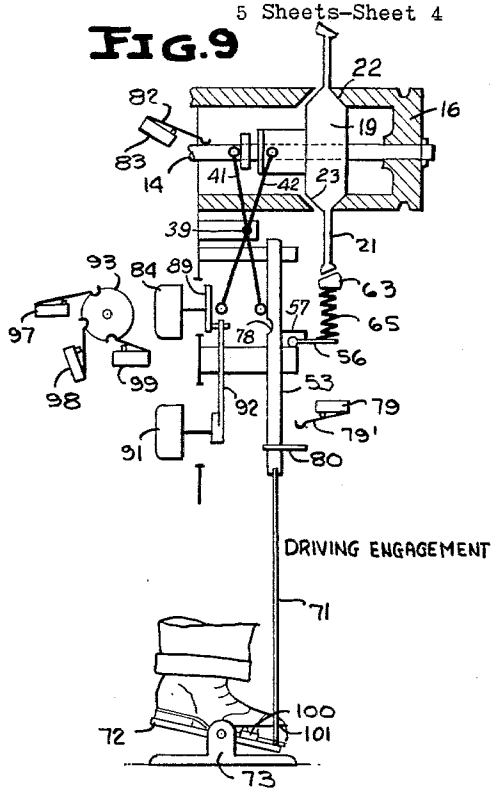


FIG. 8 WIRING DIAGRAM STOP POSITION

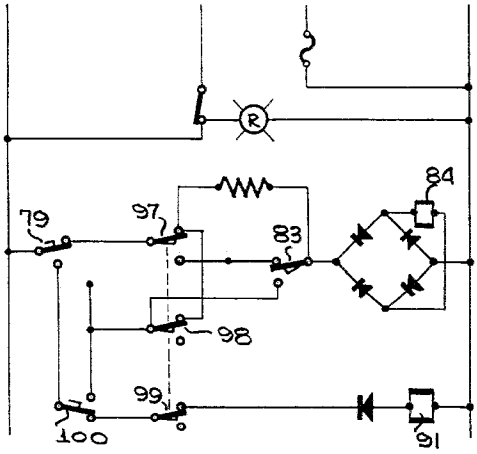
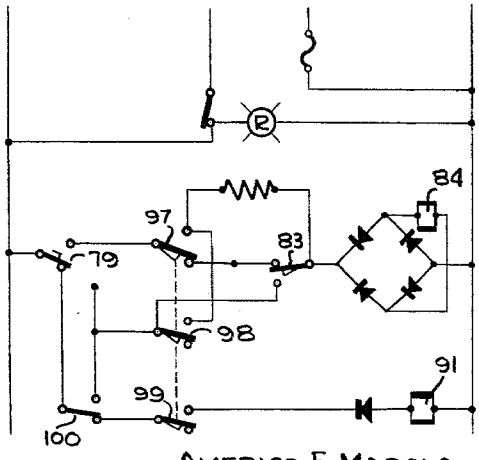


FIG. 10 WIRING DIAGRAM DRIVING ENGAGEMENT



AMERICO E. MAROLA
& NORMAN W. STARR
INVENTORS

BY Mason, Porter, Waller & Stewart

ATTORNEYS

May 31, 1966 A. E. MAROLA ETAL 3,253,685

CLUTCH AND BRAKES FOR SEWING MACHINE

Filed July 25, 1963 5 Sheets-Sheet 5

FIG. 11

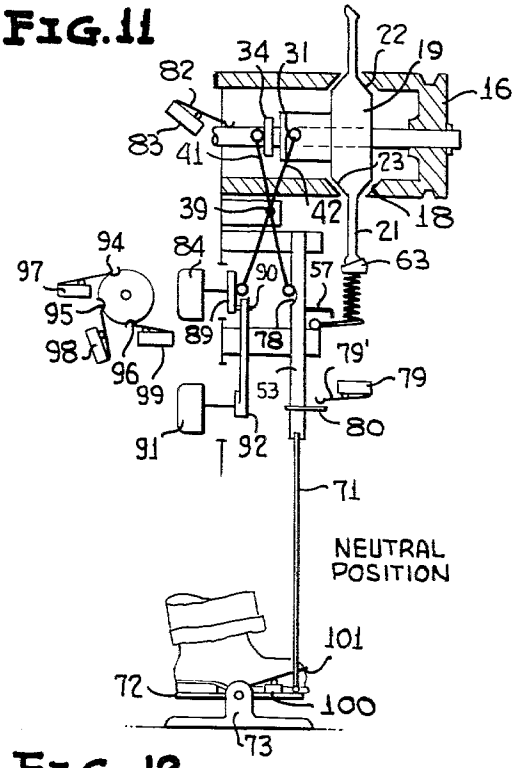


FIG. 13

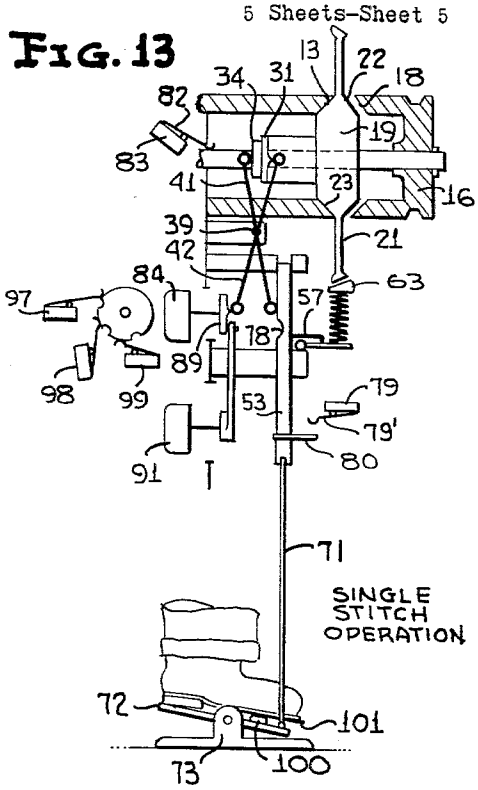


FIG. 12

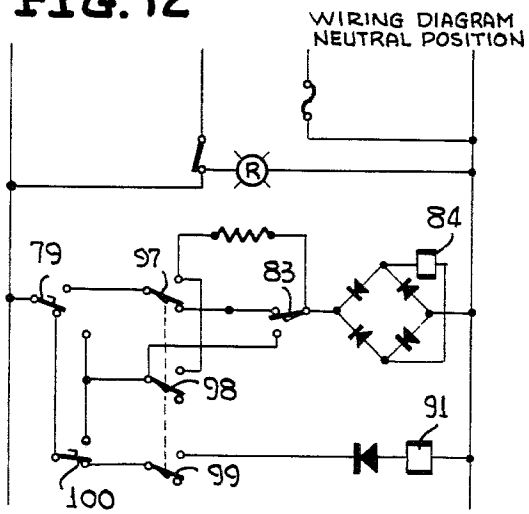
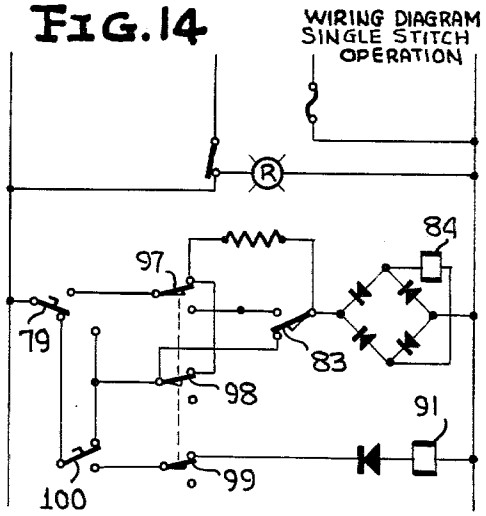


FIG. 14



INVENTORS
AMERICO E. MAROLA &
NORMAN W. STARR

BY
Olson, Porter, Miller & Stewart
ATTORNEYS

United States Patent Office 3,253,685 Patented May 31, 1966

3,253,685

CLUTCH AND BRAKES FOR SEWING MACHINE

Americo E. Marola and Norman W. Starr, Torrington, Conn., assignors to The Torrington Company, Torrington, Conn., a corporation of Maine

Filed July 25, 1963, Ser. No. 297,622
14 Claims. (Cl. 192—18)

The invention, of which the following is a detailed specification, relates to a clutch control for sewing machines. In the efficient and speedy foot control of the operation of a motor-driven sewing machine, it is desirable to operate the clutch mechanism under a variety of conditions. The ordinary engagement of the clutch mechanism can be used to control the speed. It is also important that the sewing operation be capable of stopping instantly. There are also circumstances under which it is desired to make a single stitch by the single revolution of the main or driven shaft.

One of the objects of this invention is to provide a treadle-operated clutch by which the motor power is directly connected to the main shaft of the sewing machine.

A further object of the invention is to provide a friction brake on the hand wheel of the sewing machine correlated with the clutch operating mechanism in such manner as to maintain braking action on the wheel whenever the clutch is disengaged.

A still further object of the invention is to effect mechanical disengagement of the clutch and its braking in a predetermined position of the main shaft.

It is also possible by this invention to effect a clutching engagement which will permit a single revolution of the main shaft followed by disengagement of the clutch and stoppage of the machine.

With these and other incidental objects of the invention, it has been illustrated by way of example on the accompanying drawings on which:

FIGURE 1 is a vertical section of the clutch mechanism for a sewing machine;

FIGURE 2 is an enlarged vertical section of the correlated clutch throw-out mechanism on line 2—2 of FIGURE 3;

FIGURE 3 is an enlarged vertical section on the line 3—3 on FIGURE 1;

FIGURE 4 is an enlarged detail elevation of the pivotally-mounted brake means;

FIGURE 5 is a partial vertical section on the line 5—5 of FIGURE 1;

FIGURE 6 is a detail perspective view of the solenoid-controlled micro switches;

FIGURE 7 is a schematic diagram of the parts when in a "stop" position;

FIGURE 8 is the corresponding wiring diagram for FIGURE 7;

FIGURE 9 is a schematic diagram of the parts in driving engagement;

FIGURE 10 is the corresponding wiring diagram for FIGURE 9;

FIGURE 11 is a schematic diagram of the parts in a "neutral" position;

FIGURE 12 is the corresponding wiring diagram for FIGURE 11;

FIGURE 13 is a schematic diagram of the parts in a "single stitch" position;

FIGURE 14 is the corresponding wiring diagram for FIGURE 13; and

FIGURE 15, appearing in the sheet embodying FIGURE 3, is a perspective view of the treadle.

Primarily the invention consists in controlling the clutch mechanism and drive of a motor-driven shaft on a sewing machine, so that the desired objects may be obtained by simple and effective means. On the accompanying drawings, the preferred form has been illustrated to include the following features.

There is a main frame or housing **11** forming part of the sewing machine structure. The end of the housing carries a brake housing **12**. This has a conical friction face **13**, forming a brake upon the clutch.

The customary main or driven shaft **14** is suitably mounted in the housing **11** by a ball bearing **15**.

The outer end of the shaft **14** has a loosely journalled pulley **16**. This pulley is driven by means of a belt **17** in the direction shown by the arrow on FIGURE 1.

The pulley **16** has an inner flange **18** which cooperates with the drive clutch to apply power to the shaft **14**.

A drum **19** is loosely journaled on the shaft **14**. The drum has a flange **20**.

A hand wheel **21** is fitted around the drum and against one side of the flange **20**. Adjacent the hub of the hand wheel **21**, there is a clutch disc member **22**. This has a conical face fitting frictionally in engagement with the face of the flange **18** of the pulley **16**. On the opposite side of the drum is a brake shoe **23** having a conical face. This face is brought into frictional engagement with the brake housing **13**. A series of through bolts **24** run through the clutch disc member **22**, the hand wheel **21**, the flange **20** and the brake shoe **23**, as shown in FIGURE 1.

The inside face of web **25** of the drum **19** has a slotted stop adjustment plate **28**, formed with projecting lugs **27** attached by cap screws.

Slightly spaced from the plate **28**, the shaft **14** carries a collar **26**, which may be adjusted into a selected position around the shaft **14**. This collar **26** carries a dog **29**, which is engaged by the lugs **27**. Three compression springs **106**, seated in holes in collar **26**, bear against the outer face of flange **31'**.

A loose brake collar **30** is provided with two flanges **31** and **31'**, one **31'** of which is bolted tightly to the web **25** of the drum **19**. A second spaced flange **31** provides a track for the operation of a cam roller **43**. The inside face of the flange **31** has a cam lobe or boss **32**.

Adjacent the flange **31**, the shaft **14** carries a loosely journaled clutch throw-out bearing **33**, having a wear plate or flange **34**.

Beneath the brake housing **12**, the housing **11** has projections **35** in which three spaced bearings **36**, **37** and **38** form journals for a pivot shaft **39**. Between bearings **36** and **37** there is journaled a clutch lever **40**. This clutch lever has a yoke **41**, by which the clutch throw-out wear plate and bearing are moved toward the pulley **16**, with which the clutch face **22** is brought into engagement.

A rock arm **42** is pivotally carried between the bearings **37** and **38**. The upper end of the rock arm carries a roller **43**. This roller **43** travels continuously within the spacing between the inner faces of the flanges **31** and **31'** of the loose brake collar **30** and is in operative engagement with the cam lobe **32**, as indicated by FIGURES 1 and 3.

The housing **11** also forms the support for a bracket **44**, through which a treadle control rod **45** is slidable, as shown in FIGURE 4. The housing **11** at its base forms a bearing **46** through which a rock shaft **47** projects, as shown in FIGURE 2. Outside of the base of the housing **11**, the projecting end of the rock shaft **47** carries a bell crank lever **48**. The treadle control rod **45** extends down to a bearing on a pivot pin **49** intermediate the ends of the bell crank lever **48**. A coil spring **50** surrounding the upper portion of the rod **45** is adjustably held between bracket **44** and stop **51** on the rod **45**.

The upper end of the rod **45** has an eye carried within a coupling pin **52**. The coupling pin **52** also has a pivotal connection with a cam bar **53**.

This cam bar is journaled in the bottom of the frame **105** and the slide bearings **68**.

The frame **105** has a bracket **54** which has a pivoted rock arm **55**. The free end of the rock arm **55** carries a finger **56** freely movable within a notch **57** on the nearer side of the cam bar **53**.

The rock arm **55** carries a pin **58** which projects upwardly.

The frame **105** carries pivot screws **59** and **60**. These carry gudgeons **61** and **62** which form a pivotal mounting for a spring-loaded brake **63** which brake is engageable with the periphery of the hand wheel **21**. The bottom side of the brake **63** carries an abutment **64**.

The pin **58** extends below the rock arm **55**, where it supports a spring **65**. The spring is held in compression by the bolt **66** screwed into bracket **54** at its lower end.

An adjustable stop nut **67** forms an abutment against bracket **54**.

The sewing machine housing **11** is normally mounted on a table (as seen in FIGURE 15). To connect the clutch control to a foot treadle, the end of the lever **48'** has a hole **69**. This receives a hook **70** on the end of a rod **71**. An eye on the end of rod **71** is pivoted to the front or toe end of a rocking treadle **72**. The treadle **72** is pivotally mounted on a bracket for foundation **73**. Operation of the treadle rocks the shaft **47** in the direction desired. This in turn provides vertical movement for the control rod **45** and the sliding cam bar **53**.

The clutch yoke **41** is offset centrally at **74**, where it is journaled on the shaft **39** between bearings **36** and **37**. Yoke **41** has a depending extension **75** on which is mounted a transverse pin **76** carrying a pendant link **103** supporting a cam follower **77**. The follower **77** moves into and out of the depression **78** on the side of the cam bar **53**. In this manner the yoke is rocked in a clockwise direction (as seen in FIGURES 1 and 2) to move the clutch disc member **22** and thus bring the driven shaft **14** into engagement with the clutch member **18**. The pendant link **103** is further connected to the depending extension **75** by a screw **110**, the threaded end of which projects through a slot **109** in the extension **75** and is threaded into the pendant link **103**. The screw **110** is surrounded by a coil spring **104** which is compressed between the extension **75** and a first nut **107** threaded on the screw **105**. A second nut **108** is also threaded on the screw **110** between the extension **75** and the point at which the screw **110** is threaded into the pendant link **103**. The spring **104** acts against the first nut **107** and the extension **75** to pull the second nut **108** against the extension **75** and to bias the pendant link and the cam follower **77** towards the extension **75**.

The clutch is adjusted by altering the position of the second nut **108** which effects the spacing between the extension **75** of the yoke **41** and the pendant link **103** which carries the cam follower **77**. The spacing between the extension **75** and the pendant link **103** is inversely proportional to the amount of clockwise (as seen in FIGURES 1–2) movement of the yoke **41** when the cam follower **77** is removed from the depression **78** in the cam bar **53**.

Initially the machine drive is in neutral and disconnected from the clutch and drive shaft **14**. This condition exists when the treadle **72** is in its central position (as seen in FIGURE 11), or at any time when the operator's foot is removed from the treadle. At such time the pressure of the spring **65** against the stop lever **56** pushes the pin **58** upward and causes the pivotally-mounted spring-loaded brake **63** to bear on the periphery of the hand wheel **21**. This prevents accidental rotation of the hand wheel and driven shaft **14**, precluding accidental rotation of the latter in the central position of the treadle.

By depressing the toe of the foot treadle **72**, the rock shaft **47** is rotated to pull down the treadle control rod **45**. It follows that cam bar **53** is also lowered and its cam surface moves the cam follower **77**, resulting in movement of the clutch fork **41** in a clockwise direction (as seen in FIGURES 1 and 2). This then strikes the clutch throw-out washer or wear plate **34**, its bearing **33** and the brake collar-flange **31**. As a consequence, the drum **19** moves to the right (as seen in FIGURES 1–2) and the clutch disc member **22** engages the face **18** on the pulley **16**. The main shaft **14** is thus caused to rotate by engagement of the stop adjustment plate **28** with the clutch dog **29** on the driven shaft **14**. Almost simultaneously the cam bar **53** pulls down on the lever **55**, thus allowing the pivotally-mounted spring-loaded brake **63** to release the hand wheel **21**. The main shaft **14** is therefore set in rotation. This initiation of operation is entirely mechanical and does not allow the operation of any of the auxiliary electric circuits.

The housing **11** carries a two-position microswitch **79** adjacent the treadle control rod **45**. The control rod **45** has a finger **80** which on rising comes in contact with a blade operator **79'** of the switch **79**, thus releasing the latter from a first to a second position.

Driven shaft **14** carries a cam **81** which rotates and strikes an operating lever of a two-position microswitch **83**.

A solenoid **84** is mounted within the housing **11** and adapted for intermittent operation. This solenoid has a coupling **85** forming part of a shaft **86** which projects through an opening of the housing. The end of the shaft **86** carries a friction plate **87**. Adjacent the friction plate **87** is a cam plate **88**. Beyond the cam plate is a cam **89**. The cam plate **88** and the cam **89** are keyed for rotation on the shaft **86**. The cam **89** has a cam release pin **90**.

Below the solenoid **84** there is mounted on the housing **11**, a release solenoid **91**. A shaft of this solenoid projects through the housing wall and at its end carries a release arm **92**. This release arm may be brought into the path of the release pin **90** by the operation of the solenoid **91**.

A drum **93** on the shaft **86** has three axially spaced depressions **94, 95, 96**.

Fixedly mounted around the drum **93** are a two-position microswitch **97** for the solenoid **84**; a two-position microswitch **98** for the single stitch operation solenoid (as seen in FIGS. 13 and 14); and a two-position microswitch **99** for the release solenoid **91**.

For limiting the motion of the driven shaft **14** to a single revolution, a two-position microswitch **100** is mounted on the forward end of the treadle **72**. This switch **100** is operated by depression of a small toe lever **101**.

In depressing the heel of the treadle for stopping the operation (as seen in FIGS. 7–8), the finger **80** is raised into contact with the blade operator **79'** and the two-position microswitch **79** is moved to the second of its two-positions.

With the microswitch **97** in the first of its two-positions, contact of the operating lever **82** of the switch **83** with the cam **81** on the driven shaft **14** establishes alternating positions of switch **83**.

With finger **80** in contact with blade operator **79'**, placing switch **79** in its second position, and with switches **97** and **83** in their first positions current is applied to the solenoid **84**. This rotates the shaft **86**, causing the microswitches **97–99** to move to their second positions (as seen in FIGURES 7–8) and inserts a resistor into the circuit to prevent burn-out of the coil of solenoid **84**. Rotation of the cam **89** brings the high point of the cam into contact with the lower roller **102** of the rock arm **42**. This pivots the rock arm **42**, bringing the upper roller **43** toward the frame **11** and into position to be hit by the brake cam lobe **32**. This draws the brake collar **30** and clutch plate assembly **19** towards the frame **11**, causing the brake shoe **23** to be forced into the cone **13** of the brake housing **12** and thus stopping rotation of the main shaft **14**.

By suitable relation between the stop position and needle and awl position of the sewing machine, the stop adjustment plate **28** is set in proper position.

As the treadle **72** is returned to its neutral position (as

seen in FIGS. 11–12), finger **80** moves out of contact with blade operator **79'** placing switch **79** in its first position, **79** moves to closed contact, causing current to flow through single stitch microswitch **100** and to the release solenoid **91**, which returns the solenoid **84** to position of rest by the solenoid release arm **92** hitting the solenoid cam release pin **90**, restoring the microswitches **97–99** to their first positions (as seen in FIGS. 11–12) and resulting in an electrical as well as mechanical neutral condition.

By single stitch sewing or for automatic positioning in less than one stitch, the toe lever **101** enclosing switch **100** and mounted on the toe of the treadle **72**, is depressed by the operator, moving the microswitch **100** to its second position (as seen in FIGS. 13–14), also depressing the toe of the treadle **72** and engaging the clutch, as previously described. This causes the shaft **14** to rotate and causes the cam **81** to contact the operating lever **82** of switch **83**, operating the solenoid **84**, which rotates the solenoid shaft **86** and moves microswitches **97–99** to their second positions, inserting a resistor into the solenoid circuit.

The brake **13**, **23** is actuated in automatic stop position in the same manner as previously described, except for one difference. The operator is holding the clutch **18**, **22** engaged with toe treadle **72** at the same time that the brake mechanism **13**, **23** is actuated by the solenoid **84**. This causes a mechanical interference which is then relieved by compressing the spring **104** between the first nut **107** which is threaded on the screw **110** that is threaded into the pendant link **103**, and the depending extension **75** of the clutch fork **41**, preventing damage to the mechanical linkage. Upon release of the toe lever **101** by the operator, the single stitch microswitch **100** operates the same release solenoid cycle as previously described.

What we claim is:

1. In a sewing machine or the like, a shaft, means supporting the shaft for rotation, a combined pulley and clutch member loosely journaled on the shaft, control means comprising a driving dog adjustably secured to the shaft, a collar loosely journaled on the shaft, a brake drum mounted on the collar, means adjustably secured to the brake drum which are engageable with the driving dog, a clutch face mounted on the brake drum and being engageable with said pulley and clutch member, a clutch lever, means mounting said clutch lever for pivotal movement, said clutch lever being operatively engageable with the collar, cam means, and means mounting said cam means for reciprocable movement to pivot said clutch lever, whereby reciprocable movement of said cam means controls the engagement and disengagement of said combined pulley and clutch member with said shaft.

2. The combination as defined in claim **1** wherein there is further included adjustable cam follower means mounted on said clutch lever and engageable with said cam means.

3. In a sewing machine or the like, a shaft, means for supporting the shaft for rotation, a combined pulley and clutch member loosely journaled on the shaft, control means comprising a driving dog adjustably affixed to the shaft, a collar loosely journaled on the shaft, a brake drum mounted on the collar, means adjustably secured to the brake drum which are engageable with the driving dog, a clutch face mounted on the brake drum and being engageable with said pulley and clutch member, a clutch lever, means mounting said clutch lever for pivotal movement, said clutch lever being operatively engageable with the collar, brake means, means mounting said brake means for pivotal movement, said brake means being operatively engageable with the periphery of said brake drum, cam means, and means mounting said cam means for reciprocable movement to pivot said clutch lever and brake means, whereby reciprocable movement of said cam means controls the engagement and disengagement of said combined pulley and clutch member with said shaft and the engagement and disengagement of said brake means with the periphery of said brake drum.

4. The combination as defined in claim **3** wherein said brake means includes mounting means, a brake pivotally mounted on said mounting means, an actuating pin for said brake affixed to a finger member which is pivotally mounted on said mounting means, a spring located between said mounting means and said finger member for biasing said actuating pin into engagement with said brake, and wherein said finger member is operatively engageable with said cam means.

5. In a sewing machine or the like, a shaft, means for supporting the shaft for rotation, a combined pulley and clutch member loosely journaled on the shaft, control means comprising a driving dog adjustably affixed to the shaft, a collar loosely journaled on the shaft, a brake drum mounted on the collar, means adjustably secured to the brake drum which are engageable with the driving dog, a brake shoe mounted on one side of the brake drum and being engageable with said means for supporting the shaft, a clutch face mounted on the opposite side of the brake drum and being engageable with said pulley and clutch member, a clutch lever, means mounting said clutch lever for pivotal movement, said clutch lever being operatively engageable with the collar, first cam means, means mounting said first cam means for reciprocable movement to pivot said clutch lever whereby reciprocable movement of said first cam means controls the engagement of said combined pulley and clutch member with said shaft, said collar having a cam track, a rock arm mounting a first cam follower at its one end and a second cam follower at its opposite end, means mounting said rock arm for pivotal movement, the first cam follower on said rock arm being engageable with the cam track of said collar, second cam means, and means mounting said second cam means for rotary movement to engage said second cam follower on said rock arm to pivot said rock arm, whereby rotary movement of said second cam means controls the engagement of said brake shoe with said means for supporting the shaft and the disengagement of said combined pulley and clutch member from said shaft.

6. The combination as defined in claim **5** wherein there are further included mechanical means for providing said reciprocable movement and electrical means for providing said rotary movement.

7. In a sewing machine or like shaft, means for supporting the shaft for rotation, a combined pulley and clutch member loosely journaled on the shaft, control means comprising a driving dog adjustably affixed to the shaft, a collar loosely journaled on the shaft, a brake drum mounted on the collar, means adjustably secured to the brake drum which are engageable with the driving dog, a brake shoe mounted on the side of the brake drum facing said means for supporting the shaft, a clutch face mounted on the other side of the brake drum, a clutch lever, means mounting said clutch lever for pivotal movement, said clutch lever being operatively engageable with the collar, first cam means, means mounting said first cam means for reciprocable movement to pivot said clutch lever whereby reciprocable movement of said first cam means controls the engagement of said combined pulley and clutch member with said shaft, said collar having a cam track, a rock arm mounting a first cam follower at its one end and a second cam follower at its opposite end, means mounting said rock arm for pivotal movement, the first cam follower on said rock arm being engageable with the cam track of said collar, solenoid-operated cam means, and means mounting said solenoid-operated cam means for operative engagement with the second cam follower on said rock arm to pivot said rock arm whereby engagement of said solenoid-operated cam means with said second cam follower controls the engagement of said brake shoe with said means for supporting the shaft and the disengagement of said combined pulley and clutch member from said shaft.

8. The combination as defined in claim 7 wherein there is further included adjustable cam follower means resiliently mounted on said clutch lever and engageable with said first cam means.

9. The combination as defined in claim 8 wherein there is further included means to actuate said solenoid-operated cam means to engage said second cam follower causing said brake shoe to be engaged with said means for supporting the shaft and said combined pulley and clutch member to be disengaged from said shaft after only a single revolution of said shaft has been completed.

10. The combination as defined in claim 8 wherein there is further included means to actuate said solenoid-operated cam means to engage said second cam follower causing said brake shoe to be engaged with said means for supporting the shaft and said combined pulley and clutch member to be disengaged from said shaft regardless of the position of said first cam means.

11. In a sewing machine or the like, a shaft, means for supporting the shaft for rotation, a combined pulley and clutch member loosely journaled on the shaft, adjustable control means comprising a driving dog adjustably affixed to the shaft, a collar loosely journaled on the shaft, a brake drum mounted on the collar, means adjustably secured to the brake drum which are engageable with the driving dog, a brake shoe mounted on the side of the brake drum facing said means for supporting the shaft, a clutch face mounted on the other side of the brake drum, a hand wheel mounted on the brake drum between said brake shoe and clutch face, a clutch lever, means mounting said clutch lever for pivotal movement, one end of said clutch lever being operatively engageable with the collar and the opposite end of said clutch lever having adjustable cam follower means resiliently mounted thereon, brake means, means mounting said brake means for pivotal movement, said brake means being operatively engageable with the periphery of said hand wheel, first cam means, means mounting said first cam means for reciprocable movement to engage said cam follower means to pivot said clutch lever and brake means whereby reciprocable movement of said first cam means controls the engagement and disengagement of said combined pulley and clutch member with said shaft and the engagement and disengagement of said brake means with the periphery of said hand wheel, said collar having a cam track, a rock arm mounting a first cam follower at one of its ends and a second cam follower at its opposite end, means mounting

said rock arm for pivotal movement, the first cam follower of said rock arm being engageable with the cam track of said collar, solenoid-operated cam means, and means mounting said solenoid-operated cam means for operative engagement with the second cam follower on said rock arm to pivot said rock arm whereby engagement of said solenoid-operated cam means with said second cam follower controls the engagement and disengagement of said brake shoe with said means for supporting the shaft and the engagement and disengagement of said combined pulley and clutch member with said shaft regardless of the position of said first cam means.

12. The combination as defined in claim 11 wherein there is further included means to actuate said solenoid-operated cam means to engage said second cam follower causing the engagement of said brake shoe with said means for supporting the shaft and the disengagement of said pulley and clutch member from said shaft after only a single revolution of said shaft has been completed.

13. The combination as defined in claim 12 wherein there is further included treadle means connected to said first cam means, the operation of said treadle means causing reciprocable movement of said first cam means, and said means to actuate said solenoid-operated cam means comprise electric switch means mounted upon said treadle means.

14. The combination as defined in claim 13, wherein said means to actuate said solenoid-operated cam means further comprise a cam means affixed to said shaft which are operatively engageable with electric switch means connected in series with said switch means mounted upon said treadle means.

References Cited by the Examiner

UNITED STATES PATENTS

938,474	11/1909	Glass.	
958,710	5/1910	Biggert	192—24
1,048,840	12/1912	Littlefield.	
1,449,327	5/1923	Jaycox et al.	192—93 X
1,884,162	10/1932	Osman	192—17 X
2,024,293	12/1935	Keall et al.	192—18 X
2,496,793	2/1950	Herbers	192—17
2,625,248	1/1953	Gerdhof et al.	192—93 X

DON A. WAITE, *Primary Examiner.*

DAVID J. WILLIAMOWSKY, *Examiner.*

B. W. WYCHE III, *Assistant Examiner.*