May 23, 1961 J. D. LANDEROS 2,985,270

SEWING MACHINE DRIVE

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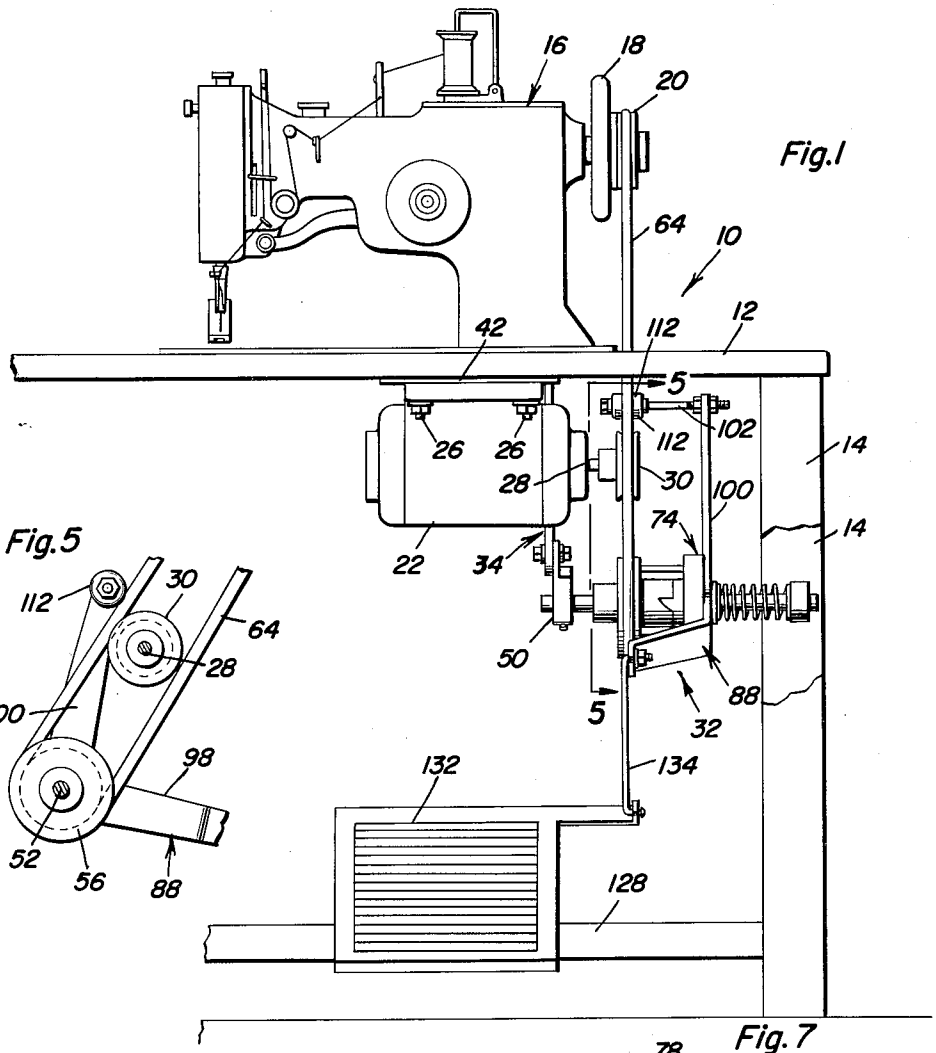


Fig.1

Fig.5

Fig.6

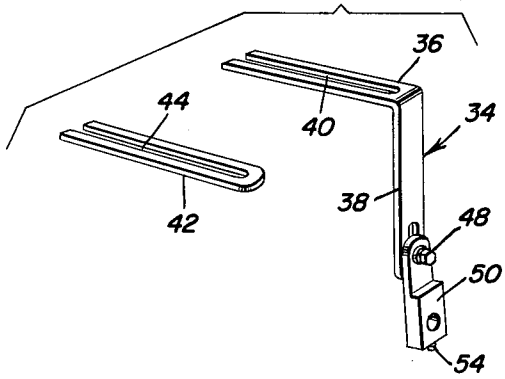
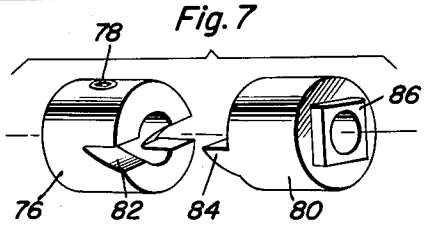


Fig.7



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Fig. 3

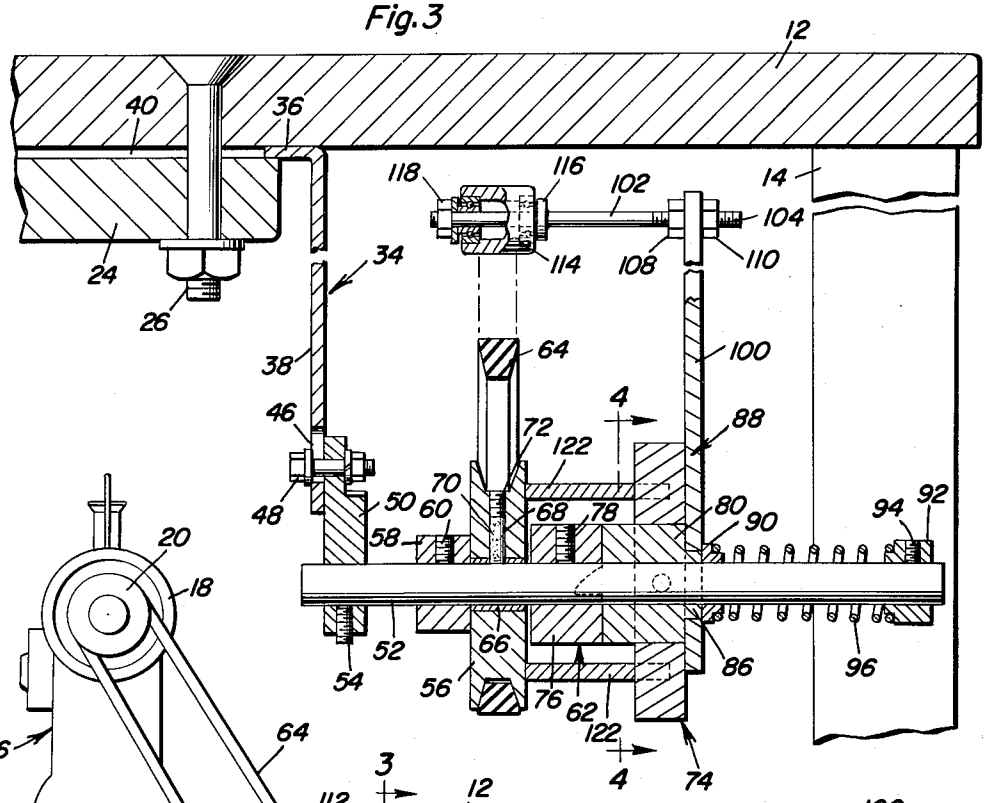


Fig. 2

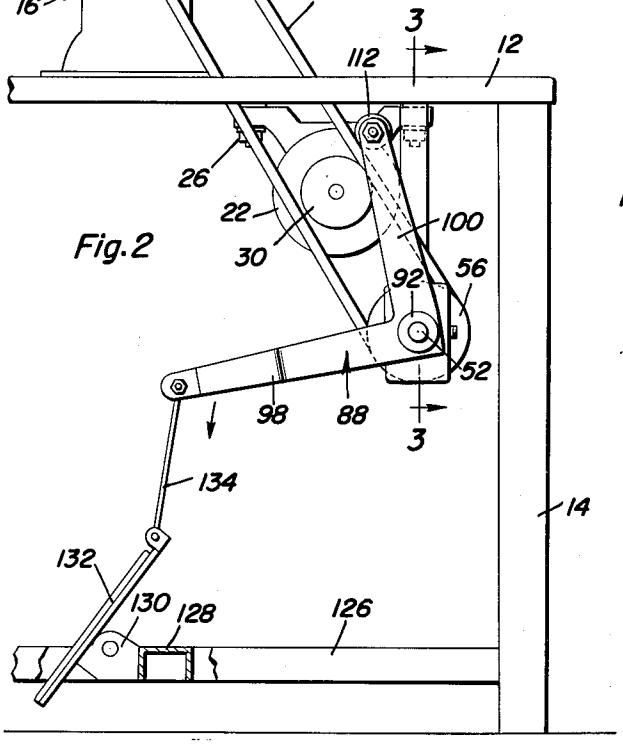
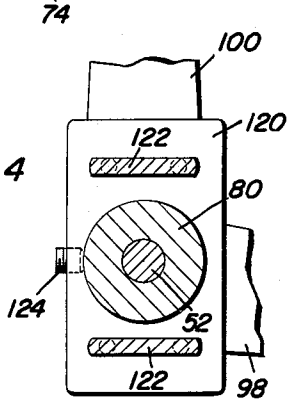


Fig. 4



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SEWING MACHINE DRIVE

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14 Claims. (Cl. 192—11)

This invention relates in general to new and useful improvements in sewing machine construction, and more specifically to an improved drive for sewing machines.

At the present time substantially all sewing machines are powered by electric motors. These motors are controlled either by means of a rheostat or by means of a clutch. However, the present controls are such that not only is the starting and stopping of the sewing machine slow, which prevents accurate control of the sewing operation, but also it is difficult for the operator of the sewing machine to obtain the desired speed.

It is therefore the primary object of this invention to provide an improved drive for sewing machines, the drive being of such a nature that the driving of the sewing machine is instantaneous upon the actuation of a control and at the same time the stopping of the drive of the sewing machine is instantaneous upon the releasing of the control.

Another object of this invention is to provide an improved sewing machine drive, the sewing machine drive being of such a nature that the speed of the sewing machine may be varied as desired by controlling the pressure exerted upon a foot pedal, the foot pedal controlling the engagement of the drive belt with a drive pulley and permitting continuous slippage between the drive spulley and drive belt, as desired.

Another object of this invention is to provide an improved drive for sewing machines, the drive being of a relatively simple construction whereby the manufacture thereof is economically feasible, and at the same time the drive being of such a nature that it may be readily mounted on existing and new machines with a minimum of modification.

A further object of this invention is to provide an improved drive for sewing machines, the drive including an idler pulley disposed remote from a driven pulley of the sewing machine, there being disposed intermediate the idler pulley and the driven pulley a drive pulley, the sizes of the driven pulley and the idler pulley relative to the drive pulley being such that the drive belt engaged over the driven pulley and the idler pulley normally is disposed closely adjacent to, but out of engagement with, the drive pulley, there being provided suitable control means for moving the drive belt into frictional engagement with the drive pulley whereby a relative driving and slipping action occurs so that the pressure exerted upon the drive belt may be used to vary the speed with which the driven pulley is driven from the drive pulley.

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 fragmentary elevational view of a conventional type of sewing machine employing the drive which is the subject of this invention;

Figure 2 is a fragmentary end view of the sewing machine of Figure 1 and shows further the relationship of the various components of the invention with respect to the sewing machine;

Figure 3 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 3—3 of Figure 2 and shows the specific mounting of the drive and a majority of the components thereof;

Figure 4 is an enlarged fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 4—4 of Figure 3 and shows further the details of a brake of the drive;

Figure 5 is a fragmentary vertical sectional view taken substantially upon the plane indicated by the section line 5—5 of Figure 1 and shows the relationship between the idler pulley, the drive pulley, the drive belt and a belt tightening roller;

Figure 6 is a fragmentary exploded perspective view showing the details of a support for the drive and a spacing shim; and

Figure 7 is an enlarged exploded perspective view showing the cam members for effecting the release of the brake.

Referring now to the drawings in detail, it will be seen that there is illustrated in Figures 1 and 2 a conventional sewing machine assembly which is referred to in general by the reference numeral **10**. The sewing machine assembly **10** includes a bench or table **12** which is supported by suitable legs **14**. Mounted on the top surface of the bench **12** is a conventional sewing machine unit which is referred to in general by the reference numeral **16**. Among other conventional components, the sewing machine unit **16** includes a balance wheel **18** to which there is attached a driven pulley **20**.

Secured to the underside of the bench **12** rearwardly of the sewing machine unit **16**, as is best illustrated in Figure 2, is a drive unit in the form of an electric motor **22**. The electric motor **22** includes a base **24** which is secured to the underside of the bench **12** by means of bolts **26**. The electric motor **22** also includes an armature shaft **28** which carries a drive pulley **30**. The drive pulley **30** is aligned with the driven pulley **20**.

Also carried by the bench **12** are the primary components of the drive, which are the subject of this invention, the drive being referred to in general by the reference numeral **32**. The drive **32** includes a hanger, which is referred to in general by the reference numeral **34**. The hanger **34** includes an upper horizontal part **36** and a depending part **38**. The upper horizontal part **36** is provided with an elongated slot **40** which opens through the free end of the part **36**. The slot **40** receives two of the bolts **26** mounting the electric motor **22** on the underside of the bench **12**. In order to compensate for the mounting of the hanger **34**, there is also provided a spacer **42** which corresponds to the horizontal part **36** and which is provided with an elongated slot **44**. The spacer **42** is passed over the other two bolts **26** securing the motor **22** in place.

Referring now to Figure 3 in particular, it will be seen that the vertical part **38** of the hanger **34** is provided with a vertically elongated slot **46**. The slot **46** has passed therethrough a bolt **48** which in turn carries a support **50**. Carried by the support **50** and extending to the right therefrom in cantilever relation is a shaft **52**. The shaft **52** is fixed to the support **50** by means of a setscrew **54**.

Mounted on the shaft **52** for rotation is an idler pulley **56**. The idler pulley is limited in its movement to the left, as viewed in Figure 3, by a collar **58** which is retained on the shaft **52** by means of a setscrew **60**. The

idler pulley **56** is limited in its movement to the right by means of a cam assembly which is referred to in general by the reference numeral **62**. Thus the idler pulley **56** is maintained in alignment with the drive pulley **30** and the driven pulley **20**. It is to be noted that the drive pulley **30** is disposed intermediate the driven pulley **20** and the idler pulley **56**. It is also to be noted that the proportions of the idler pulley **56** and the driven pulley **20** as compared to the drive pulley **30** is such that a drive belt **64** entrained over the idler pulley **56** and the driven pulley **20** is normally disposed closely adjacent to, but out of contact with the drive pulley **30**.

In order to assure the proper freedom of movement of the idler pulley **56**, it is provided with a bushing **66**. Extending through the idler pulley **56** and the bushing **66** is a bore **68** which has disposed in the inner part thereof a lubricating wick **70**. The outer end of the bore **68** is closed by means of a setscrew **72**.

The cam assembly **62** is part of a brake which is referred to in general by the reference numeral **74**. The cam assembly **62** includes a female cam member **76** which is retained in place on the shaft **52** by means of a setscrew **78**. The female cam member **76** also functions as a positioning collar for the idler pulley **56**.

The cam assembly also includes a male cam member **80** which is rotatably journaled on the shaft **52**. As is best shown in Figure 7, the female cam member **76** is provided in that end thereof which opposes the male cam member **80** with a cam slot **82** in which there is normally seated a projecting cam member **84** of the male cam member **80**.

The right end of the male member **80** is provided with a polygonal cross-sectional extension **86**. Engaged on the projection **86** and coupled to the male cam member **80** thereby is an intermediate part of a bell crank **88**. The bell crank **88** is retained on the male cam member **80** by means of a thrust washer **90** which bears against both the projection **86** and the bell crank **88**. Disposed remote from the thrust washer **90** is a collar **92** which is retained in place on the right end of the shaft **52** by means of a setscrew **94**. Extending between the collar **92** and the thrust washer **90** is a spring **96** which retains the bell crank **88** on the projection **86**.

The bell crank **88** includes a generally horizontal arm **98** and a generally vertical arm **100**. Carried by the upper end of the arm **100** is a shaft **102**. The shaft **102** includes a threaded end portion **104** which extends through a bore in the arm **100** and which is retained in an adjusted position by means of nuts **108** and **110** disposed on opposite sides of the arm **100**.

Carried by the opposite end of the shaft **102** in alignment with the drive belt **64** is a belt tensioning roller **112**. The belt tensioning roller **112** is provided with bearings **114** mounting it on the shaft **102** and to assure the freedom of rotation thereof. The roller **112** is positioned by means of a collar **116** and a nut **118** disposed at opposite ends thereof.

As is best illustrated in Figures 3 and 4, carried by the male cam member **80** is a brake mounting plate **120** which is generally rectangular in outline. Secured to the brake mounting plate **120** is a pair of projecting brake shoes **122**. The brake shoes **122** are of a length whereby the ends thereof engage the idler pulley **56** and prevent rotation thereof when the cam assembly **62** is in its inoperative position, as is illustrated in Figure 3. The plate **120** is secured on the male cam member **80** by means of a setscrew **124**.

The legs **14** at opposite ends of the bench **12** have lower portions thereof connected together by transverse frame members **126**. Extending between the transverse frame members is the longitudinal bar **128**. Secured to the right portion of the bar **128** is a hinge **130** which carries a foot pedal **132**. The foot pedal **132** is connected to the arm **98** by means of the link **134**.

The connection between the hanger **34** and the support **50** is such that the idler pulley **56** may be properly aligned with respect to the driven pulley and the drive pulley **30** whereby the drive belt **64** is disposed closely adjacent the drive pulley **30**, but out of engagement therewith, and at the same time the drive belt **64** is properly tensioned.

It is to be understood that during the general use of the sewing machine construction **10**, the electric motor **22** will run continuously. When it is desired to actuate the sewing machine unit **16**, the foot pedal **132** is depressed with the result that the bell crank **88** is pivoted. The pivoting of the bell crank **88** simultaneously results in the releasing of the brake **74** and the movement of the drive belt **64** into engagement with the drive pulley **30**. The brake **74** is released by the rotation of the male cam member **80** which results in the movement of the male cam member **80** to the right. Movement of the male cam member **80** to the right, of course, results in movement of the brake shoes **122** to the right and out of engagement with the idler pulley **56** so that the idler pulley **56** is free to rotate.

The pivoting of the bell crank **88** also results in the movement of the belt tensioning roller **112** into engagement with the belt **64** closely adjacent to the drive pulley **30** and thus the movement of the belt **64** into frictional engagement with the drive belt **30**. By varying the pressure contact between the drive belt **64** and the drive pulley **30**, slippage may be controlled and thus the speed of rotation of the driven pulley **20** may be controlled. By increasing the downward pressure on the foot pedal **132**, the speed of the sewing machine unit **16** may be increased as is desired. Furthermore, as soon as the pedal **132** is released, the male cam member **80** will rotate back to its original position at which time the brake shoes **122** will again engage the idler pulley **56** immediately stopping the rotation of the idler pulley **56**. This, of course, will stop the driving of the drive belt **64** causing the stopping of the sewing machine unit **16**.

From the foregoing description of the present invention, it will be seen that the drive **32** is of such a nature that the response to the actuation thereof by the depressing of the foot pedal **132** is instantaneous. Further, the speed at which the driving machine unit **16** is driven may be readily varied by the operator of the sewing machine construction **10** by the pressure exerted on the foot pedal **132**. Further, as stated above, when the foot pedal **132** is released, the driving of the sewing machine unit **16** is immediately discontinued.

The foregoing is considered as illustrative only of the principles of the invention. Further, 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 and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A drive unit for sewing machines and the like having a driven pulley, said drive unit comprising a fixed power source having a drive pulley aligned with said driven pulley, an idler pulley disposed in alignment with said driven pulley and said drive pulley, said drive pulley being disposed intermediate said driven pulley and said idler pulley, a drive belt entrained over said driven pulley and said idler pulley, at least one of said driven pulley and said idler pulley being of an effective diameter larger than the effective diameter of said drive pulley whereby said drive belt is normally out of engagement with said drive pulley, means engageable with said drive belt to move said drive belt into driven engagement with said drive pulley, brake means selectively movable into and out of engagement with a side of said idler pulley for stopping overriding movement of said drive belt when said drive belt moves out of engagement with said drive pulley.

2. A drive unit for sewing machines and the like having a driven pulley, said drive unit comprising a fixed power source having a drive pulley aligned with said driven pulley, an idler pulley disposed in alignment with said driven pulley and said drive pulley, said drive pulley being disposed intermediate said driven pulley and said idler pulley, a drive belt entrained over said driven pulley and said idler pulley, at least one of said driven pulley and said idler pulley being of an effective diameter larger than the effective diameter of said drive pulley whereby said drive belt is normally out of engagement with said drive pulley, means engageable with said drive belt to move said drive belt into driven engagement with said drive pulley, brake means selectively movable into and out of engagement with a side of said idler pulley for stopping overriding movement of said drive belt when said drive belt moves out of engagement with said drive pulley, and a common control for said first mentioned means and said brake means.

3. A drive unit for sewing machines and the like having a driven pulley, said drive unit comprising a fixed power source having a drive pulley aligned with said driven pulley, an idler pulley disposed in alignment with said driven pulley and said drive pulley, said drive pulley being disposed intermediate said driven pulley and said idler pulley, a drive belt entrained over said driven pulley and said idler pulley, at least one of said driven pulley and said idler pulley being of an effective diameter larger than the effective diameter of said drive pulley whereby said drive belt is normally out of engagement with said drive pulley, means engageable with said drive belt to move said drive belt into driven engagement with said drive pulley, brake means releasably connected to said idler pulley at the side thereof for stopping overriding movement of said drive belt when said drive belt moves out of engagement with said drive pulley.

4. A drive unit for sewing machines and the like having a driven pulley, said drive unit comprising a fixed power source having a drive pulley aligned with said driven pulley, an idler pulley disposed in alignment with said driven pulley and said drive pulley, said drive pulley being disposed intermediate said driven pulley and said idler pulley, a drive belt entrained over said driven pulley and said idler pulley, at least one of said driven pulley and said idler pulley being of an effective diameter larger than the effective diameter of said drive pulley whereby said drive belt is normally out of engagement with said drive pulley, means engageable with said drive belt to move said drive belt into driven engagement with said drive pulley, brake means releasably frictionally connected to said idler pulley at one side thereof for stopping overriding movement of said drive belt when said drive belt moves out of engagement with said drive pulley, and a common control for simultaneous but opposite operation of said first mentioned means and said brake means.

5. A drive unit for sewing machines and the like having a driven pulley, said drive unit comprising a fixed power source having a drive pulley aligned with said driven pulley, an idler pulley disposed in alignment with said driven pulley and said drive pulley, said drive pulley being disposed intermediate said driven pulley and said idler pulley, a drive belt entrained over said driven pulley and said idler pulley, at least one of said driven pulley and said idler pulley being of an effective diameter larger than the effective diameter of said drive pulley whereby said drive belt is normally out of engagement with said drive pulley, a belt tensioning roller disposed adjacent said drive pulley and engageable with said outer surface of said drive belt, and means connected to said belt tensioning roller for moving said belt tensioning roller into frictional engagement with said drive belt and said drive belt into frictional engagement with said drive pulley, brake means selectively movable into and out of engagement with a side of said idler pulley for stopping overriding movement of said drive belt when said drive belt moves out of engagement with said drive pulley.

6. A drive unit for sewing machines and the like having a driven pulley, said drive unit comprising a fixed power source having a drive pulley aligned with said driven pulley, an idler pulley disposed in alignment with said driven pulley and said drive pulley, said drive pulley being disposed intermediate said driven pulley and said idler pulley, a drive belt entrained over said driven pulley and said idler pulley, at least one of said driven pulley and said idler pulley being of an effective diameter larger than the effective diameter of said drive pulley whereby said drive belt is normally out of engagement with said drive pulley, a belt tensioning roller disposed adjacent said drive pulley and engageable with said outer surface of said drive belt, and means connected to said belt tensioning roller for moving said belt tensioning roller into frictional engagement with said drive belt and said drive belt into frictional engagement with said drive pulley, brake means selectively movable into and out of engagement with a side of said idler pulley for stopping overriding movement of said drive belt when said drive belt moves out of engagement with said drive pulley, means connecting said first mentioned means to said brake means for controlling the operation of said brake means.

7. A drive unit for sewing machines and the like having a driven pulley, said drive unit comprising a fixed power source having a drive pulley aligned with said driven pulley, an idler pulley disposed in alignment with said driven pulley and said drive pulley, said drive pulley being disposed intermediate said driven pulley and said idler pulley, a drive belt entrained over said driven pulley and said idler pulley, at least one of said driven pulley and said idler pulley being of an effective diameter larger than the effective diameter of said drive pulley whereby said drive belt is normally out of engagement with said drive pulley, a belt tensioning roller disposed adjacent said drive pulley and engageable with an outer surface of said drive belt, and means connected to said belt tensioning roller for moving said belt tensioning roller into frictional engagement with said drive belt and said drive belt into frictional engagement with said drive pulley, brake means engaged with said idler pulley and including a pair of axially extending friction plates movable axially into engagement with one side of said idler pulley for stopping overriding movement of said drive belt when said drive belt moves out of engagement with said drive pulley.

8. A drive unit for sewing machines and the like having a driven pulley, said drive unit comprising a fixed power source having a drive pulley aligned with said driven pulley, an idler pulley disposed in alignment with said driven pulley and said drive pulley, said drive pulley being disposed intermediate said driven pulley and said idler pulley, a drive belt entrained over said driven pulley and said idler pulley, at least one of said driven pulley and said idler pulley being of an effective diameter larger than the effective diameter of said drive pulley whereby said drive belt is normally out of engagement with said drive pulley, a belt tensioning roller disposed adjacent said drive pulley and engageable with an outer surface of said drive belt, and means connected to said belt tensioning roller for moving said belt tensioning roller into frictional engagement with said drive belt and said drive belt into frictional engagement with said drive pulley, brake means engaged with said idler pulley for stopping overriding movement of said drive belt when said drive belt moves out of engagement with said drive pulley, means connecting said first mentioned means to said brake means for controlling the operation of said brake means.

9. The combination of claim 1 wherein said brake means is directly engageable with a side of said idler pulley upon diametrically opposite portions thereof.

10. The combination of claim 1 including an axle upon

which said idler pulley is rotatably journaled, said brake means including a member movable axially upon said axle and having portions directly engageable with a side of said idler pulley.

11. The combination of claim 1 including an axle upon which said idler pulley is rotatably journaled, said brake means including a member movable rotationally upon said axle and having portions directly engageable with a side of said idler pulley, said first means including a lever mounted on said member and rotatable in unison therewith, means for actuating said lever.

12. The combination of claim 1 including an axle upon which said idler pulley is rotatably journaled, said brake means including a member movable rotationally upon said axle and having portions directly engageable with a side of said idler pulley, said first means including a lever mounted on said member and rotatable in unison therewith, means for actuating said lever, and a belt tensioning rolled journaled on said lever and directly engageable with said belt.

13. The combination of claim 1 including an axle upon which said idler pulley is rotatably journaled, said brake means including a member movable axially and rotationally upon said axle and having portions directly engageable with a side of said idler pulley, said portions comprising plates on opposite sides of said axle engageable with the side of said idler pulley.

14. The combination of claim 1 including an axle upon which said idler pulley is rotatably journaled, said brake means including a member movable upon said axle and having portions directly engageable with a side of said idler pulley, said first means including a lever mounted on said member and rotatable in unison therewith, means for actuating said lever, and a belt tensioning roller journaled on said lever and directly engageable with said belt, said lever having a cantilever shaft projecting laterally to one side thereof, said tensioning roller being journaled on said shaft and extending into alignment with said belt, driving and driven pulleys.

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