

Jan. 24, 1956

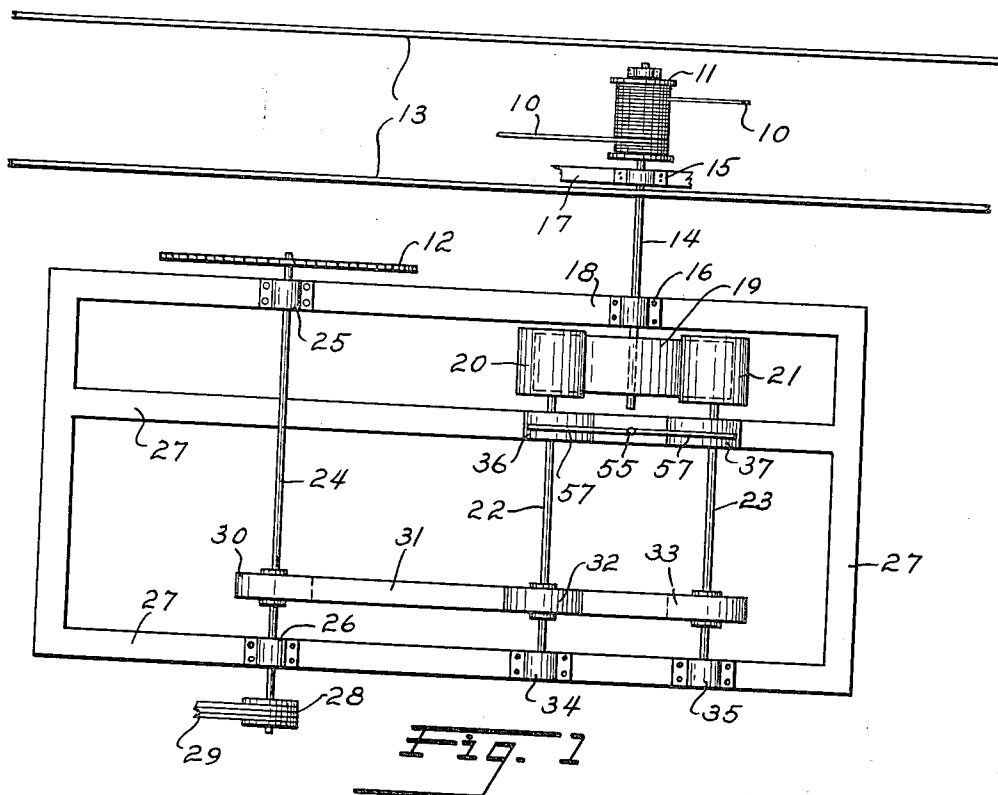
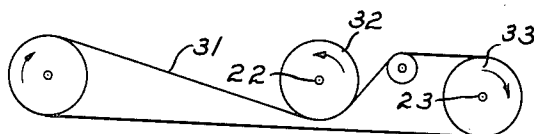
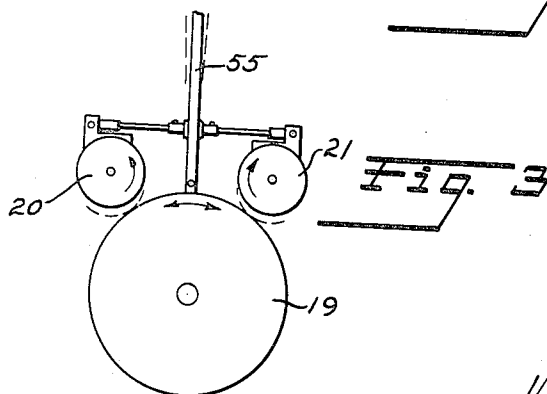
E. E. WASHBURN

2,731,844

DRIVE FOR SAW MILL CARRIAGES AND THE LIKE

Filed Dec. 3, 1954

2 Sheets-Sheet 1



INVENTOR

ERNEST E. WASHBURN

BY *Hutchinson, Hutchinson & Milam*

ATTORNEYS

Jan. 24, 1956

E. E. WASHBURN

2,731,844

DRIVE FOR SAW MILL CARRIAGES AND THE LIKE

Filed Dec. 3, 1954

2 Sheets-Sheet 2

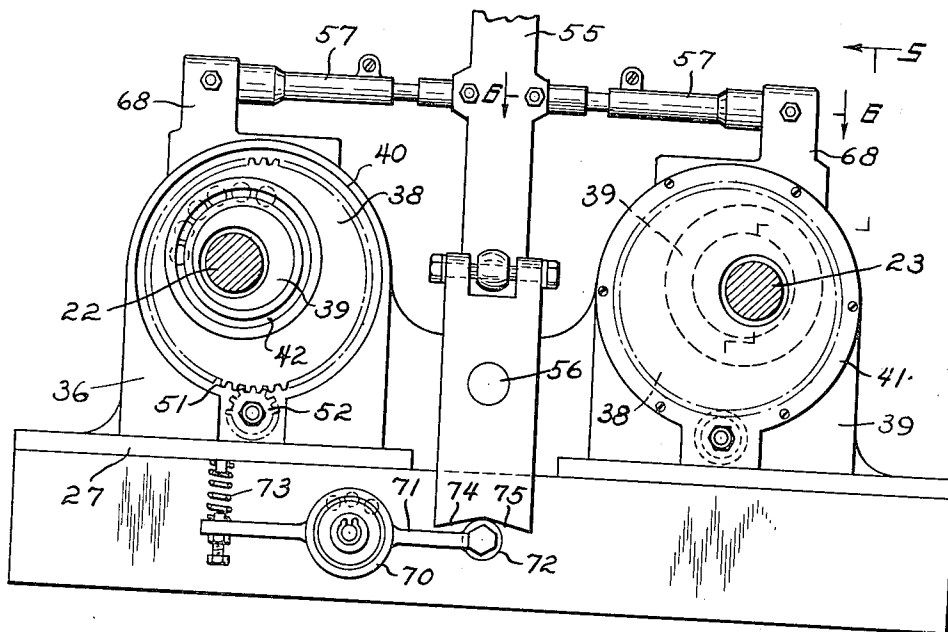


Fig. 4

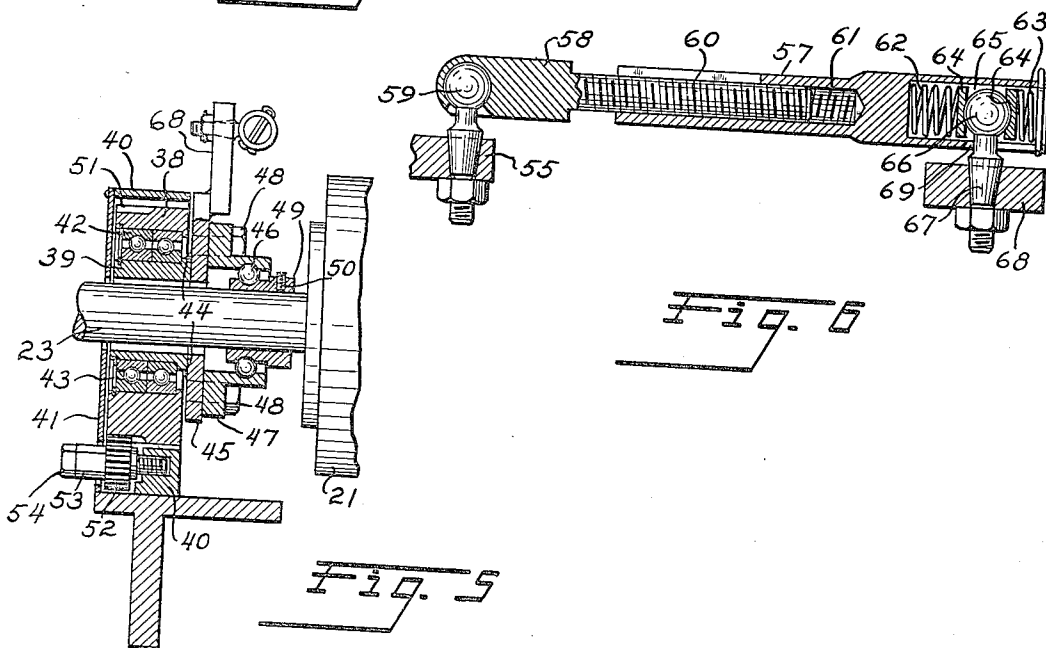


Fig. 5

Fig. 6

INVENTOR

ERNEST E. WASHBURN

BY *Hutchinson, Hutchinson & Milnes*
ATTORNEYS

2,731,844

DRIVE FOR SAW MILL CARRIAGES AND THE LIKE

Ernest E. Washburn, Brunswick, Maine

Application December 3, 1954, Serial No. 472,849

13 Claims. (Cl. 74-202)

The present invention relates to improvements in frictional transmission mechanisms for saw mill carriages and the like, and has for its primary purpose the provision of a novel arrangement of the double friction drive commonly employed in the lumber industry to move the log back and forth past the saw incident to the manufacture of the required type of rough lumber desired.

Such double friction drives in part commonly include a driven feed drum cooperatively related to a cable drum for effecting advancing and returning movements of a log carriage during a log sawing operation, combined with oppositely rotating friction drives to engage the periphery of the feed drum for driving said feed drum and its associated cable drum in opposite directions dependent upon the direction of rotation of the friction drives, and furthermore with some means for forcing the friction drives alternately into operating engagement with the driven feed drum for the purposes intended.

In a frictional transmission mechanism of this general type, an important object of the present invention resides in providing a double eccentric mounting for each friction drive, each mounting having one eccentric adapted for relatively fine manual adjustment and functioning to place its related friction drive in its normal predetermined inoperative spaced relationship with the feed drum to be ultimately driven thereby when brought into peripheral contact with the feed drum; and the other eccentric, an applying eccentric, so arranged and adapted for moving its related friction drive from the inoperative spaced relationship with the feed drum, into peripheral driving engagement therewith, the applying eccentric of one of the mountings being coupled with the applying eccentric of the other mounting so that by manually operated means connected to said coupling means, said applying eccentrics may be simultaneously oscillated back and forth to serve in placing the two friction drives alternately in driving relation with the feed drum for accomplishing the back and forth movement of the log carriage as desired.

Another object of the invention is the provision of a novel coupling means between the two applying eccentrics, together with a friction drive operating lever attached to said coupling means and located centrally of its length between the two applying eccentrics, said applying eccentrics being oppositely disposed and so arranged that when the coupling means is moved in one longitudinal direction by the operating lever, a friction drive is placed in driving peripheral engagement with the feed drum and simultaneously therewith the other friction drive is moved to a position where it is maintained out of such driving relationship, and correspondingly with the reversal of such operations brought about when the coupling means is moved in the opposite direction, thus permitting the feed drum to be rotatably driven in opposite directions at the will of the operator and in a direction according to which friction drive is placed in peripheral contact with the feed drum, the friction drive shafts for such purpose rotating in opposite directions to provide the necessary frictional transmission mechanism for the back and forth movements of the saw mill carriage.

A further object of the invention is to provide a manually operated lever associated with the coupling means

and centrally located between the two double eccentric mountings, said lever being so related to the coupling means and the two applying eccentrics as connected thereto, that when the lever is in neutral vertical position both friction drives are maintained out of peripheral contact with the feed drum.

A still further object of the invention is the provision of an automatic self centering device for the manually operated lever for holding said lever in its said neutral vertical position, and to thereby permit the release of the operator's hands without fear of either one or the other of the friction drives being unnecessarily applied in driving relationship with the feed drum.

Another object of the invention is to provide a shock absorbing means between the manually operated lever and each applying eccentric, and to thereby prevent unnecessary shock when either friction drive is initially placed into driving relation with the feed drum to be driven.

Other objects and advantages will appear from the following detailed description when read in connection with the accompanying drawings, wherein:

Fig. 1 is a plan view of my improved frictional transmission mechanism suitably mounted upon framework and positioned alongside of a trackway for the log carriage which is to be reciprocated back and forth during operation of the machine.

Fig. 2 is a side view of the associated pulleys and drive mechanism incident to rotating the friction drive shafts in the desired opposite directions;

Fig. 3 is a side view showing the relationship between the two friction drives and the feed drum, and also the manually operated lever and its connections for applying the friction drives alternately to the feed drum;

Fig. 4 is an enlarged side elevation of the eccentric mountings for the friction drive shafts, and also showing the operating lever and its associated elements, including the coupling means between said lever and the friction drive applying eccentrics and also the lever self centering device;

Fig. 5 is a cross-sectional view taken on the line 5-5 of Fig. 4; and

Fig. 6 is a longitudinal sectional view of one of the arms of the coupling means between the operating lever and the friction drive applying eccentrics, and also showing the shock absorbing means associated therewith.

Referring now specifically to the drawings wherein like reference numerals designate corresponding parts in the several views, 10 represents a customary cable, winding upon a drum 11, said cable being connected at its opposite ends to a saw mill log carriage (not shown) for the purpose of reciprocating the carriage in a forward and backward direction toward and away from the saw in customary fashion in the manufacture of rough lumber. In the present embodiment of the invention a circular saw is used as indicated at 12, and furthermore 13 indicates the trackway upon which the log carriage is reciprocated.

The cable drum 11 is mounted upon and driven from a shaft 14 which is freely rotatable in fixed bearings 15 and 16 mounted on supporting beams 17 and 18 of a suitable base framework for the machine. This shaft 14 during operation of the machine is given alternate rotation in opposite directions to permit the cable drum 11 and its associated cable 10 to function properly in providing for the back-and-forth movements of the log carriage past the saw. In this connection, it is to be noted that the shaft 14 and the cable drum mounted thereon, receives this alternating rotative action from a driven feed drum 19 fixedly mounted upon said shaft as clearly shown in Fig. 1 of the drawing, the feed drum being controlled for operation by oppositely disposed

friction drives **20** and **21** to be placed alternately in peripheral engagement with the feed drum for driving the latter and associated cable drum in opposite rotative directions for the purposes intended and dependent upon which of the friction drives **20** and **21** is in contact with the driven feed drum **19**; it being further noted that the shafts **22** and **23** upon which the friction drives are mounted constantly rotate in opposite directions during operation of the machine, as will appear more fully hereinafter.

By reference to Fig. 1, it will be seen that the saw **12** is fixed upon a shaft **24** freely rotatable in fixed bearings **25** and **26** mounted upon the supporting base framework of the machine and indicated generally by reference numeral **27**, and it is this shaft **24** which constitutes the main drive shaft for the machine, said shaft carrying a pulley **28**, fixed thereon, which is driven by a belt **29**, operated from the usual power house (not shown). It will also be noted that shaft **24** has a pulley **30** rotatively associated therewith for driving an endless belt **31**, said pulley being driven in a clockwise direction by said drive shaft **24**. This belt **31** is in frictional engagement with pulleys **32** and **33** and in view of the fact that the upper flight of said belt passes beneath the pulley **32**, said pulley is driven in a counterclockwise direction while the pulley **33** is driven in a clockwise direction, as clearly indicated in Fig. 2 of the drawings.

The pulley **32** is fixedly mounted on shaft **22**, and the pulley **33** is likewise mounted on shaft **23**, which are the two shafts upon which the friction drives are fixedly mounted. Each of the friction drive shafts has at one end thereof a fixed bearing (these fixed bearings being indicated at **34** and **35**), while at the other end of each shaft and inwardly disposed with respect to its friction drive, is a double eccentric mounting for each shaft, the two double eccentric mountings being designated **36** and **37**.

The double eccentric mountings are illustrated in detail in Figs. 4 and 5 of the drawings, and it will be noted that each mounting comprises two concentrically arranged eccentrics, namely an outer eccentric **38**, and an inner eccentric **39**, and each mounting is preferably contained within a housing **40**, the cover plate for said housing being shown at **41**. The inner and outer eccentrics are separated one from the other by a ball bearing raceway **42** (preferably in two sections) press fitted between said eccentrics in grease sealed condition and held in place by lock rings **43**, as shown in Fig. 5.

Welded to one side of the inner eccentric, as shown for instance, at **44** in Fig. 5, is a plate-like member **45**, and to the opposite side of this plate-like member is fixedly attached a flange type ball bearing member **46**, which in turn surrounds the friction drive shaft **23**, as shown for instance in Fig. 5. The outer raceway section of this bearing member **46** has an integral circumferential flange **47** in facial contact with the plate-like member **45** and held in fixed relation thereto by cap screws **48**, while the inner raceway of said bearing has an integral outwardly projecting sleeve **49** surrounding friction drive shaft **23** with a close fit and fixedly secured thereto by set screw **50**. It will, of course, be understood that identical elements and arrangement of parts are likewise provided incident to the friction drive shaft **22**, as is obvious.

In the double eccentric arrangement as just set forth herein, the outer eccentrics **38** are merely used to provide a relatively fine adjustment for the friction drives in placing them in proper spaced inoperative positions relative to the peripheral face of the feed drum. In this connection, the outer peripheral face of the outer eccentric is provided with gear teeth **51**, which teeth are in mesh with a small pinion gear **52** journaled at the base of the housing **40**. This pinion gear **52** in each instance has integral therewith a hexagonal nut-like member **53** projecting outwardly beyond the face of each double eccentric housing cover plate **41**, and easily accessible for applying a wrench

thereto for rotating the pinion gear **52** either to the right or left incident to making the desired rotative adjustment of the outer eccentric member. Also this pinion gear may be freed for rotation or locked in adjusted position by cap screw **54**, which cap screw extends through the axis of said pinion gear and then threaded into the base of housing **40** for the purposes intended. The pinion gear **52** being in mesh with gear teeth **51** formed upon the outer face of the outer eccentric, it will of course be obvious that rotative adjustment of the pinion gear will correspondingly rotatably adjust the outer eccentric in either direction, which outer eccentric, when so adjusted, serving to move the friction drive shaft (and naturally its friction drive) either in a lateral direction toward or away from the feed drum **19**, depending upon the direction of rotation of the pinion gear. In this manner, each friction drive (**20** or **21**) may be moved and placed in proper adjusted inoperative spaced relationship with the peripheral face of the feed drum **19** to be ultimately driven in the manner as set forth herein. It may be well to note at this time that the outer eccentric in performing its fine adjusting function for the friction drives rotates in either direction about a fixed axis, and when so rotated creates a camming action in a lateral direction against the applying eccentric as rotatably mounted therein, and with the applying eccentric being indirectly connected to the friction drive shaft as herein set forth, this eccentric camming action will necessarily bring about lateral movement of both the inner eccentric and its friction drive shaft simultaneously in the same direction dependent upon the rotative adjusting movements of the outer eccentric in either direction.

As herein indicated, it is necessary to provide a coupling means between the applying eccentrics of both eccentric mountings, and this for the purpose of permitting said applying eccentrics to function simultaneously to serve the purposes for which they are employed in the transmission mechanism herein disclosed. Furthermore, in the present embodiment of the invention, it is desirable to provide a vertically arranged manually operated lever which is centrally located between the two double eccentric mountings and attached to the coupling means at a point intermediate its overall length. This manually operated lever is indicated at **55** in Figs. 3 and 4 and is pivotally mounted at **56** upon that part of the machine structure located between the two eccentric housings **40**. Furthermore, when this operating lever is in its neutral position as shown in Fig. 4, both friction drives **20** and **21**, through the rigid coupling means as provided, are held and maintained in inoperative spaced relationship with the peripheral surface of the feed drum, and therefore the log carriage is thus maintained in a stationary or rest position.

The coupling means between the two applying eccentrics is made up of two identically designed push rod sections generally indicated at **57** in the drawings, one section arranged on each side of the manually operated lever and each connecting said lever to one of the applying eccentrics for operating the same in applying and releasing its friction drive as the lever is rocked upon its pivotal connection alternately in opposite directions at the will of the operator and according to whether the log carriage is to be moved toward or away from the circular saw during a sawing operation. The detailed structure of each push rod section **57** is shown in Fig. 6, and comprises two parts screw-threadedly connected together for adjusting the length of the push rod section between its two connecting points. One of these parts is indicated at **58** and has one of its ends connected to the operating lever **55** by a universal ball and socket joint **59** as clearly shown in Fig. 6, the other end thereof being exteriorly threaded at **60** for screw-threaded relationship with an internally threaded portion **61** of the second part of said push rod section, which second part is spring loaded as clearly shown at the other end of said part. This spring

loaded end of the second part includes spiral springs 62 and 63 biased against spaced apart cups 64 arranged within an open ended central bore 65 of the second part, and with the ball end 66 of a connecting pin 67 also positioned within said bore and interposed between said spaced apart cups. The other end of said connecting pin 67 is attached to an upstanding arm 68 fixed to or integral with one of the plate-like members 45, as clearly shown in Figs. 5 and 6. Each spring loaded end of the two push rod sections, as will be obvious, serve as shock absorbing means when initially applying the friction drives, and in this connection it is to be noted that the several elements of the spring loaded means, including the ball 66, are assembled within the central bore 65 by being inserted through the open end of said bore, a longitudinal slot 69 being provided in the side of the bored end of the second push rod part to allow the ball end of the connecting pin 67 to have back and forth movement within the bore 65 against the spring biasing means 62-64 and 63-64 as contained in said bore 65.

Such being the set-up with respect to the two friction drive applying eccentrics, the following should be borne in mind for a clear understanding of the present friction transmission operation: the friction drives 20 and 21 are driven in opposite directions; the applying eccentrics are coupled together for operation simultaneously by the operating lever 55; also the applying eccentrics are oppositely disposed as shown in the drawings so that, when the operating lever is moved in one direction, one of the friction drives is placed in driving contact with the feed drum, while at the same time the other friction drive is moved and maintained out of driving relation with said feed drum, whereby the log-carriage is moved in say a forward direction toward the saw; and of course when the operating lever is moved in the opposite direction, the reverse friction drive action will be brought about, and with the other friction drive only in driving contact with the feed drum for moving the log-carriage in a backward direction away from the saw; and further when the operating lever is maintained in neutral position as shown in Fig. 4, both applying eccentrics are so positioned within their respective mountings as to maintain both friction drives out of contact with the driven feed drum, thus maintaining the log-carriage in a stationary position, as will be obvious.

It is a feature of the invention to provide a manually operated friction drive applying lever which will automatically seek its neutral or inoperative position, and this where the operator may remove his hands from the lever without fear of either friction drive being applied in driving relation with the driven feed drum. This is accomplished by providing a self centering device as shown in Fig. 4 and indicated generally at 70. Said device comprises an arm 71 pivotally mounted intermediate its over-all length, said arm having at one end a roller 72 bearing against a specially designed lower end edge surface of the operating lever, said roller being spring biased against such surface by a spring 73 interposed between the other end of the arm 71 and the machine base 27 for rocking said arm upon its pivotal mounting, which in the present instance is a ball bearing mounting.

The lower end edge of lever 55 is provided with two inclined surfaces 74 and 75, each inclined surface extending upwardly and inwardly from a side edge of said lever and both meeting at a central point between said side edges, thus providing a double reverse camming action incident to the spring biased roller 72 as it rolls upon these inclined surfaces during back and forth side-wise movements of the operating lever when applying the friction drives to the driven drum, it being noted that the roller is forcibly directed in an upward direction against either of these inclined surfaces according to the direction the lever is moved by hand, but, of course, when the operator's hands are removed from the lever, such upward force is sufficient to bodily move the lever upon

its pivot 56 to a neutral position and where the spring biased roller seeks and maintains a holding force against said oppositely disposed inclined surfaces at the centrally located meeting point between said surfaces, and to thus maintain the lever in its desired neutral position. In this connection, when the lever 55 is moved by manual pressure to the left as seen in Fig. 4, the spring biased roller 72 will ride upon inclined surface 74, and when said lever is likewise moved to the right as seen in said Fig. 4, the said roller will ride upon inclined surface 75, although when the lever is left free (as by removing the hands of the operator from said lever) the roller will naturally seek a position with respect to the inclined surfaces midway between the side edges of the lever (or at the centrally located meeting point of said upwardly inclined surfaces), thus moving the lever 55 to neutral position under the spring pressure force as provided, which position is maintained when the operator's hands are removed from said lever.

While the invention has been disclosed in connection with a specific embodiment thereof, it will be understood that this is by way of example rather than limitation and that the scope of the invention is to be defined by the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a machine for driving a saw mill carriage or the like, comprising a driven feed drum, a pair of friction drives arranged to peripherally engage said feed drum, the friction drives being fixedly mounted upon parallel shafts constantly rotating in opposite directions relative to each other during operation of the machine, an eccentric journal mounting surrounding each friction drive shaft and including an applying eccentric adapted to act upon its associated shaft to move said shaft in a lateral direction for placing its friction drive into or out of driving relation with the feed drum during rotation of said applying eccentric in the required direction, the applying eccentric of one mounting being oppositely disposed with respect to the applying eccentric of the other mounting and thus serving, when both applying eccentrics are rotated in the same direction, to laterally move one friction drive toward the peripheral face of the feed drum while at the same time laterally moving the other friction drive to inoperative position in a direction away from said feed drum, said oppositely disposed applying eccentrics being coupled together by means requiring rotation of said applying eccentrics simultaneously in the same direction, whereby when said applying eccentrics are oscillated back and forth said friction drives are alternately placed in peripheral engagement with the feed drum for intermittently rotating said feed drum in opposite directions incident to moving a log carriage toward and away from the saw during a log sawing operation.

2. In a machine for driving a saw mill carriage or the like, comprising a driven feed drum, a pair of friction drives arranged to peripherally engage said feed drum, the friction drives being fixedly mounted upon parallel shafts constantly rotating in opposite directions relative to each other during operation of the machine, means for normally maintaining both friction drives in spaced inoperative relation with respect to the peripheral face of said feed drum, an eccentric journal mounting surrounding each friction drive shaft and including an applying eccentric adapted to act upon its associated shaft to move said shaft in a lateral direction for placing its friction drive into or out of driving relation with the feed drum during rotation of said applying eccentric in the required direction, the applying eccentric of one mounting being oppositely disposed with respect to the applying eccentric of the other mounting and thus serving, when both applying eccentrics are rotated in the same direction, to laterally move one friction drive toward the peripheral face of the feed drum while at the same time laterally

7 moving the other friction drive to inoperative position in a direction away from said feed drum, said oppositely disposed applying eccentrics being coupled together by means requiring rotation of said applying eccentrics simultaneously in the same direction, whereby when said applying eccentrics are oscillated back and forth said friction drives are alternately placed in peripheral engagement with the feed drum for intermittently rotating said feed drum in opposite directions incident to moving a log carriage toward and away from the saw during a log sawing operation.

3. In a machine for driving a saw mill carriage or the like, comprising a driven feed drum, a pair of friction drives arranged to peripherally engage said feed drum, the friction drives being fixedly mounted upon parallel shafts constantly rotating in opposite directions relative to each other during operation of the machine, an eccentric journal mounting surrounding each friction drive shaft and including an applying eccentric adapted to act upon its associated shaft to move said shaft in a lateral direction for placing its friction drive into or out of driving relation with the feed drum during rotation of said applying eccentric in the required direction, the applying eccentric of one mounting being oppositely disposed with respect to the applying eccentric of the other mounting and thus serving, when both applying eccentrics are rotated in the same direction, to laterally move one friction drive toward the peripheral face of the feed drum while at the same time laterally moving the other friction drive to inoperative position in a direction away from said feed drum, coupling means extending between the two applying eccentrics and tying them together for rotation simultaneously in either direction as said coupling means is reciprocated back and forth at the will of the operator, said coupling means including a pivotally mounted manually operated lever and two push rod sections pivotally attached to said lever at points above its pivotal mounting, said lever being centrally located between the eccentric mountings and each push rod section extending from said lever in a direction toward an eccentric mounting and to a position where the free end of said push rod is pivotally attached to an upstanding arm rigidly fixed to one of the applying eccentrics, whereby upon rocking movement of the operating lever upon its pivot toward or away from each eccentric mounting at the will of the operator said push rod sections are moved longitudinally back and forth to simultaneously rotate the applying eccentrics in the desired direction for placing the friction drives alternately in peripheral engagement with the feed drum and to thereby intermittently drive said feed drum in opposite directions incident to moving a log carriage toward or away from the saw during a log sawing operation.

4. The subject-matter of claim 3 wherein each push rod coupling section comprises two parts screw-threadedly connected together for adjusting the length of said section between its pivotal connecting points.

5. The subject-matter of claim 3 wherein each push rod coupling section has contained within it a shock absorbing means for the purposes intended.

6. The combination as set forth in claim 3 wherein the pivotal connection between each push rod coupling section and an applying eccentric includes shock absorbing elements on each side of said pivotal connection.

7. The combination as set forth in claim 3 wherein the pivotal connection between each push rod coupling section and an applying eccentric includes shock absorbing elements on each side of said pivotal connection, and wherein all of the shock absorbing elements including the pivotal connection may be assembled through the open end of a bore formed within said push rod section.

8. The combination as set forth in claim 3 wherein the lower end edge of the vertically disposed operating lever, as located below the pivotal mounting for said lever is provided with two upwardly inclined surfaces extending from the side edges of said lever and meeting at a central

depressed point intermediate said side edges, and with a roller spring biased in an upward direction against either one of said upwardly inclined surfaces with sufficient force to move the operating lever to a central neutral position and with the roller finally contacting said surfaces at said central depressed point for maintaining said lever in such neutral position when the operator's hands are removed from the lever.

9. The combination as set forth in claim 3 wherein is provided a self centering device for the manually operated lever and including an upwardly spring biased roller contacting inclined surfaces upon the lower end edge of the operating lever incident to forcibly placing said lever in neutral position centrally located between the eccentric mountings.

10. In a machine for driving a saw mill carriage or the like, comprising a driven feed drum, a pair of friction drives arranged to peripherally engage said feed drum, said friction drives being fixedly mounted upon parallel shafts constantly rotating in opposite directions relative to each other during operation of the machine, an eccentric journal mounting surrounding each friction drive shaft and including an inner friction drive applying eccentric and an outer adjusting eccentric rotatably arranged upon a fixed support, said inner applying eccentric adapted to act upon its associated shaft to move said shaft in a lateral direction for placing its friction drive into or out of driving relation with respect to the feed drum during rotation of said applying eccentric in the required direction, and said outer eccentric adapted for fine adjustment within its fixed support and around said inner applying eccentric for moving said applying eccentric laterally in either direction to thereby position its friction drive in the desired spaced inoperative relation with respect to the peripheral face of the feed drum, the applying eccentric of one mounting being oppositely disposed with respect to the applying eccentric of the other mounting and thus serving when both applying eccentrics are rotated in the same direction to laterally move one friction drive from its adjusted spaced inoperative position toward the peripheral face of the feed drum while at the same time laterally moving the other friction drive to an inoperative position in a direction away from said feed drum, said oppositely disposed applying eccentrics being coupled together by means requiring rotation of said applying eccentrics simultaneously in the same direction, whereby when said applying eccentrics are oscillated back and forth said friction drives are alternately placed in peripheral engagement with the feed drum for intermittently rotating said feed drum in opposite directions incident to moving a log carriage toward and away from the saw during a log sawing operation.

11. The combination as set forth in claim 10 wherein the outer adjusting eccentric is provided with gear teeth in mesh with a manually rotatable pinion carried by the support for said outer eccentric and adapted for fine rotative adjustment of said outer eccentric.

12. The combination as set forth in claim 10 wherein the outer adjusting eccentric is provided with gear teeth in mesh with a manually rotatable pinion carried by the fixed support for said outer eccentric and adapted for fine rotative adjustment of said outer eccentric, and including means for locking said pinion from rotation when proper adjustment has been made.

13. The combination as set forth in claim 10 and wherein a ball bearing raceway is press fitted between the inner and outer eccentrics of each eccentric journal mounting for the friction drive shafts.

References Cited in the file of this patent

UNITED STATES PATENTS

725,417	Delaney	Apr. 14, 1903
999,027	Hansen	July 25, 1911
2,410,965	Dimick	Nov. 12, 1946
2,542,740	Washburn	Feb. 20, 1951