B. D. STEVENS.

VARIABLE SPEED DEVICE.

APPLICATION FILED SEPT. 24, 1906.

955,920. **Patented Apr. 26, 1910.**

2 SHEETS—SHEET 1.

Fig. 1.

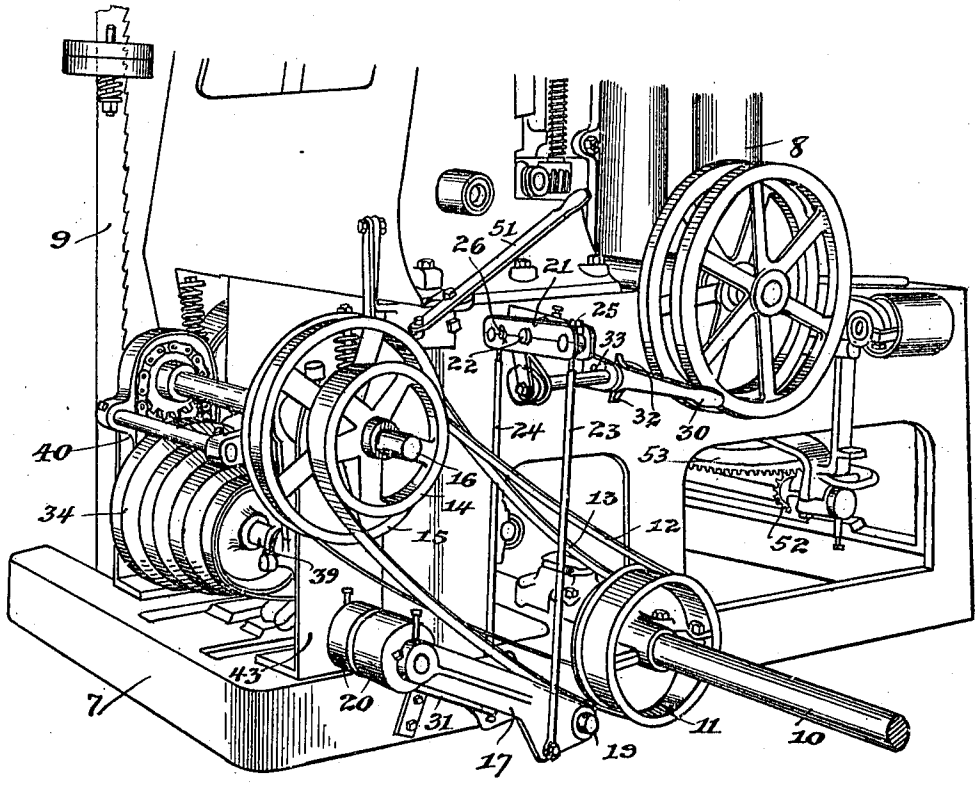
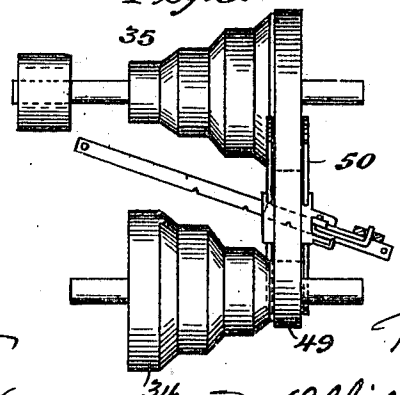


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 2.

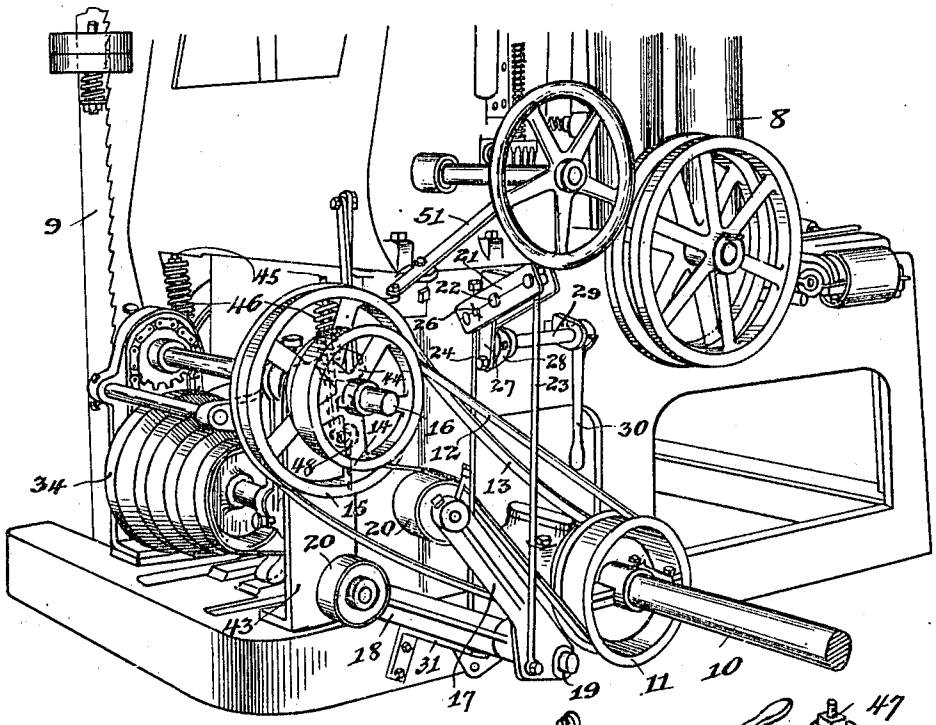


Fig. 6.

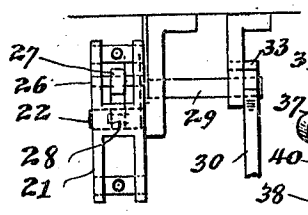


Fig. 4.

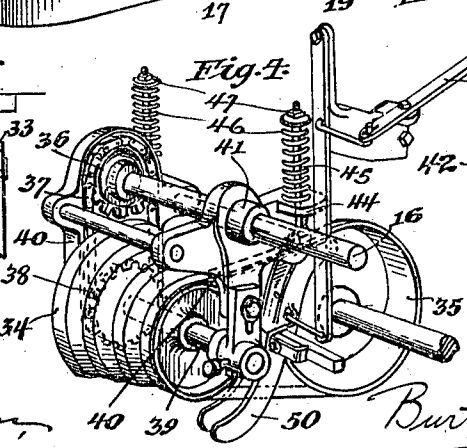
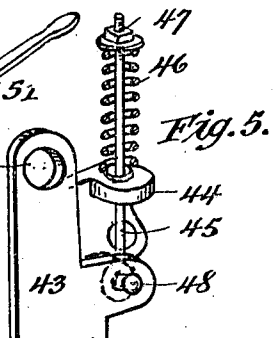


Fig. 5.



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UNITED STATES PATENT OFFICE.

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VARIABLE-SPEED DEVICE.

955,920. Specification of Letters Patent. Patented Apr. 26, 1910.

Application filed September 24, 1906. Serial No. 335,906.

To all whom it may concern:

Be it known that I, BURT D. STEVENS, a citizen of the United States, residing at Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Variable-Speed Devices, of which the following is a specification.

This invention relates to certain improvements in a variable speed device and as an exemplification of one of the uses thereof, I have shown in the accompanying drawings, and will herein describe the same, as related to and used in connection with a band resawing machine.

My invention embraces a two-speed drive controlled by a single shifter in such manner that the high or low speed belts may be thrown into or out of action by the placing of a controlling lever in one of three positions; also, the association with such primary variable speed mechanism of a secondary mechanism comprising two stepped cones reversely arranged and having a single belt, one of the cones being secured upon a swinging frame and driven from the countershaft of the two-speed or primary mechanism, a shifter being employed for moving the single belt from one step to the next, the swinging frame being yieldingly mounted to permit the belt to be shifted.

In the accompanying drawings, Figures 1 and 2 are perspective views of a portion of a band resawing machine to which my improvements are applied, the latter figure showing one of the belts of the primary two-speed drive in driving position; Fig. 3 is a plan of the reversely arranged cones, the belt thereon and the belt shifter; Fig. 4 is a perspective view of the swinging frame in which one of said cones is carried and showing also the mechanism for operating the belt shifter; Fig. 5 is a detail view of the spring means for yieldingly supporting the swinging frame; and Fig. 6 is a detail view of a mechanism for controlling the belt tighteners of the primary driving mechanism.

As my improvements are shown associated with a band resawing machine the operative parts thereof are shown as mounted upon the base of the frame-work, 7, of such machine, whereas 8 represents the feed rolls. I have shown my driving mechanism arranged for driving said feed rolls, the power for driving the same, as well as the saw, 9, being taken from the main power shaft, 10. On this shaft is mounted the double pulley, 11, over which are carried the belts, 12—13, of the two-speed primary roll driving mechanism. These belts are carried over the pulleys 14—15 which are of different diameters and both mounted upon the driving shaft, 16, of the secondary. The driving faces of the double pulley, 11, are of different diameters, and, the pulleys, 14—15, being of different diameters, it is obvious that two different speeds are derived from the primary driving mechanism. The pulleys are so proportioned that they afford a greater range of variation of speed than the variation of the secondary mechanism.

For the purpose of controlling the primary driving mechanism, I employ belt tightening devices of novel construction and combination. These belt tighteners—marked 17—18—are pivotally mounted upon a stud, 19, and each of them carries at its extremity a roller, 20. The arms, 17—18, are connected to a pivoted evener or walking beam, 21, pivoted at 22, by means of the rods, 23—24. These rods at their upper ends pass freely through the ends of the evener and are provided with heads or jam nuts, 25. I prefer to use jam nuts threaded upon the ends of the rods and capable of adjustment so as to compensate for the slack of the belt. The walking beam is connected, at 26, by a link, 27, to an eccentric, 28, on the rock-shaft 29, to which is fixed a lever, 30. Stop 31 is provided on which the arms, 17—18, rest when out of action. When the lever 30 is in the position shown in Fig. 1 of the drawing, both belts are slack and the tighteners rest on the stop; when the lever is turned down, as shown in Fig. 2, the arm, 17 is raised and the belt, 12, is tightened, the arm, 18, resting on the stop, 31. When the lever 30 is raised slightly so that the link, 27, passes out of the line of the center of the shaft, 29, the arm, 17, will drop, bringing the lever to the horizontal position and throwing both the belts out of action. When the lever is moved to an upright position, the arm, 18, will be raised and the belt, 13, tightened. These belts are controlled by

this simple mechanism and thrown into and out of action by means of a single lever. Stops, 32, are provided on the lever, 30, engaging the stop pin, 33, when the lever is placed in the vertical position, either up or down, thus arresting the swinging of the link, 27, at a point when it is off center.

In order to multiply the variable speeds of the primary driving devices, I have introduced a secondary variable speed device which consists of two stepped cones, 34—35, shown in plan in Fig. 3. The cone, 34, is driven from the primary driving device by means of a sprocket, 36, on shaft, 16, a sprocket chain, 37, and sprocket, 38, on the shaft 39 which carries cone 34. This cone and its shaft are carried in a swinging bearing, consisting of the arms provided with shaft bearings in their lower ends which are sleeved at their upper ends over the bushing, 41, constituting the bearing for the shaft, 16, these bushings being journaled in apertures, 42, in the stand, 43, of the main frame, 7. The swinging arms, 40, are provided with lugs, 44, apertured for the passage of rods, 45, and springs, 46, are confined in and bear against said lugs by the nut, 47, on the end of the rod. The lower end of the rod is secured to a lug, 48, on the frame member or stand, 43. The cones, 34—35, are each provided with four steps and are reversely arranged, and on them is intended to work a single belt, 49. This belt can be shifted from one position to another on these steps by means of a belt shifter 50, which is of ordinary construction, and controlled by the lever, 51. The shifter, 50, is double ended, thus catching both sides or strands of the belt. It will be observed that the steps are connected by cone surfaces which enables the belt to more readily climb from one step to the next. One of the cones being mounted for bodily movement or swing, the belt can be readily shifted because of its tendency to climb on the conical face and because also of the yielding mounting of the cone itself which permits both ends of the belt to be shifted simultaneously and without any liability of injury to the belt or danger to the operator. From the shaft of the cone, 35, the power is transmitted to the driving gears, 52—53, of the feed rolls, 8.

It will be understood that in the driving of the feed rolls of a band resawing machine, as well as in many other cases, it is desirable to attain a number of speeds, and it is further desirable to change the speed without stopping the operation of the machinery. As an illustration of the desirability of this feature, I may state that in the operation of a band re-sawing machine it is frequently found that in resawing lumber it is necessary to reduce the speed when the saw encounters knots that might tend, at the high rate of speed, to force the saw from the wheels. In such cases my improvement enables the operator to change the speed instantly and without stopping the machine. It is further desirable to provide for a considerable reduction of speed in such cases and this is done in the primary speed changing mechanism. It is further desirable, however, to be able to employ various rates of speed depending upon the character of work which is being done. Thus in resawing lumber it is customary to employ the high speed of the primary mechanism and to vary the speed for different lots of material by shifting the belt on the cones of the secondary; and it is still further desirable when running at the high speed of the primary and with any of the speeds given by the secondary to instantly change, as before mentioned, to the low speed. By the combination of these two speed varying mechanisms, I obtain varying speeds in due progression and am able to multiply the speed given by any one of the cones of the secondary by shifting from the low to the high speed member. Thus with the combination described, eight different speeds are obtained.

While I have described my invention as applied to a band resawing machine, it will be understood that it may be applied to other machines and in such cases that the arrangement and mounting of the parts will be varied. The means for controlling the belt tighteners are novel in themselves and may be employed in other situations.

I claim:

1. The combination of primary and secondary variable speed mechanisms in series relation, one of which comprises a pair of reversely-arranged cones or stepped pulleys adapted for belt drive, the working faces of each of said cones or stepped pulleys being connected by cone sections, a spring-pressed swinging frame in which one of said cones or pulleys is rotatably mounted, and a belt-shifter adapted to transfer said belt from one pair of working faces to another, substantially as described.

2. The combination of primary and secondary variable speed mechanisms in series relation, one of said mechanisms comprising a pair of reversely-arranged cones or stepped pulleys adapted for belt drive and a swinging bearing in which one of said cones or pulleys is rotatably mounted, a shaft of the other variable speed mechanism being concentric with the pivotal axis of said swinging bearing, and means to drive one of said cones or pulleys from said shaft, or vice versa, substantially as described.

3. The combination of primary and secondary variable speed mechanisms, one comprising a series of pairs of pulleys, a belt for each pair, and means to tighten one of said belts at a time into operative relation

with its pulleys, the other comprising a pair of reversely-arranged cones or stepped pulleys the working faces of which are connected by cone-sections, a spring-pressed swinging bearing in which one of said cones or stepped pulleys is rotatably mounted, and a belt coöperating with said pair of cones or stepped pulleys, substantially as described.

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