

(No Model.)

L. T. PYOTT.  
VARIABLE SPEED MECHANISM.

No. 571,395.

Patented Nov. 17, 1896.

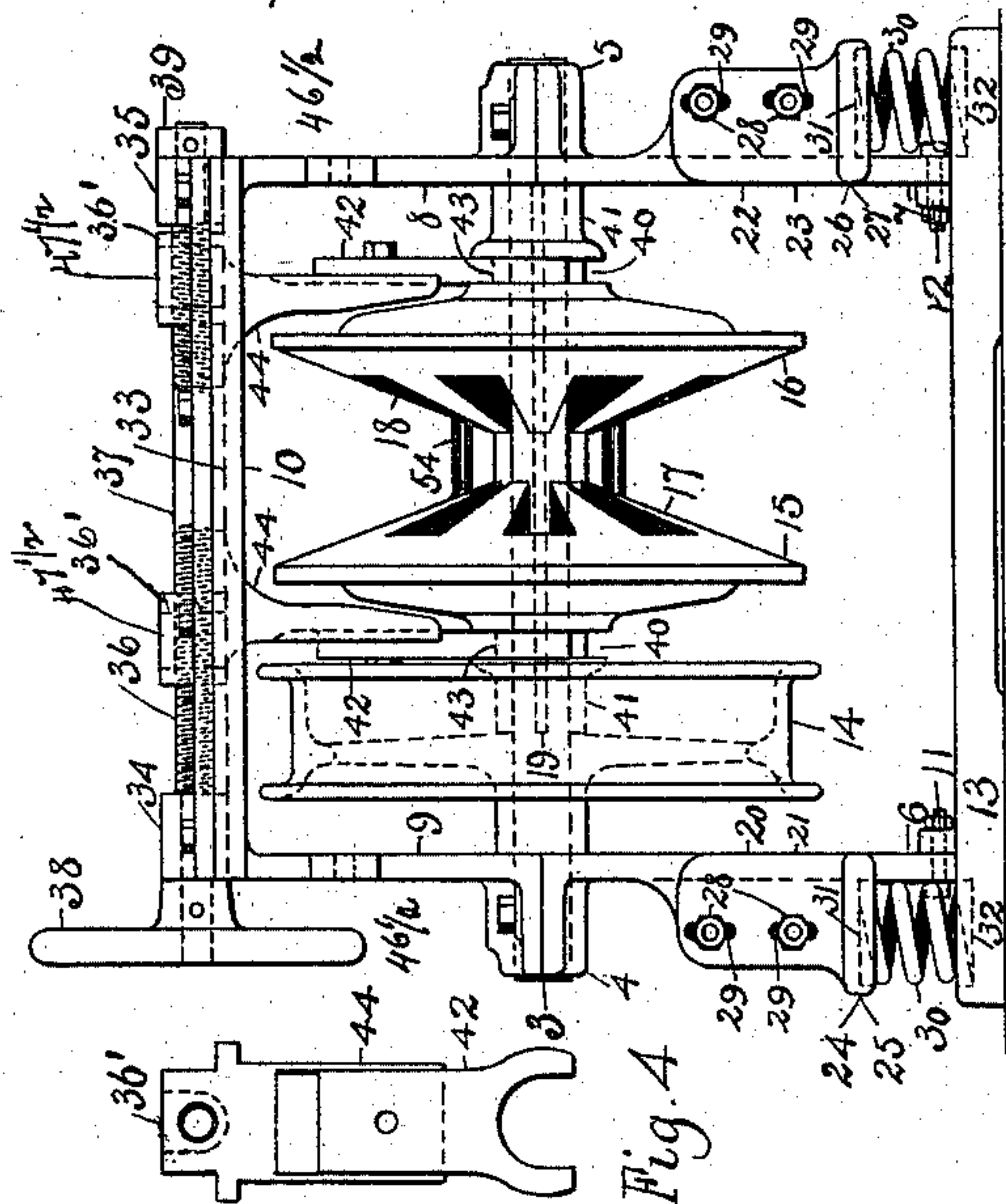


Fig. 2

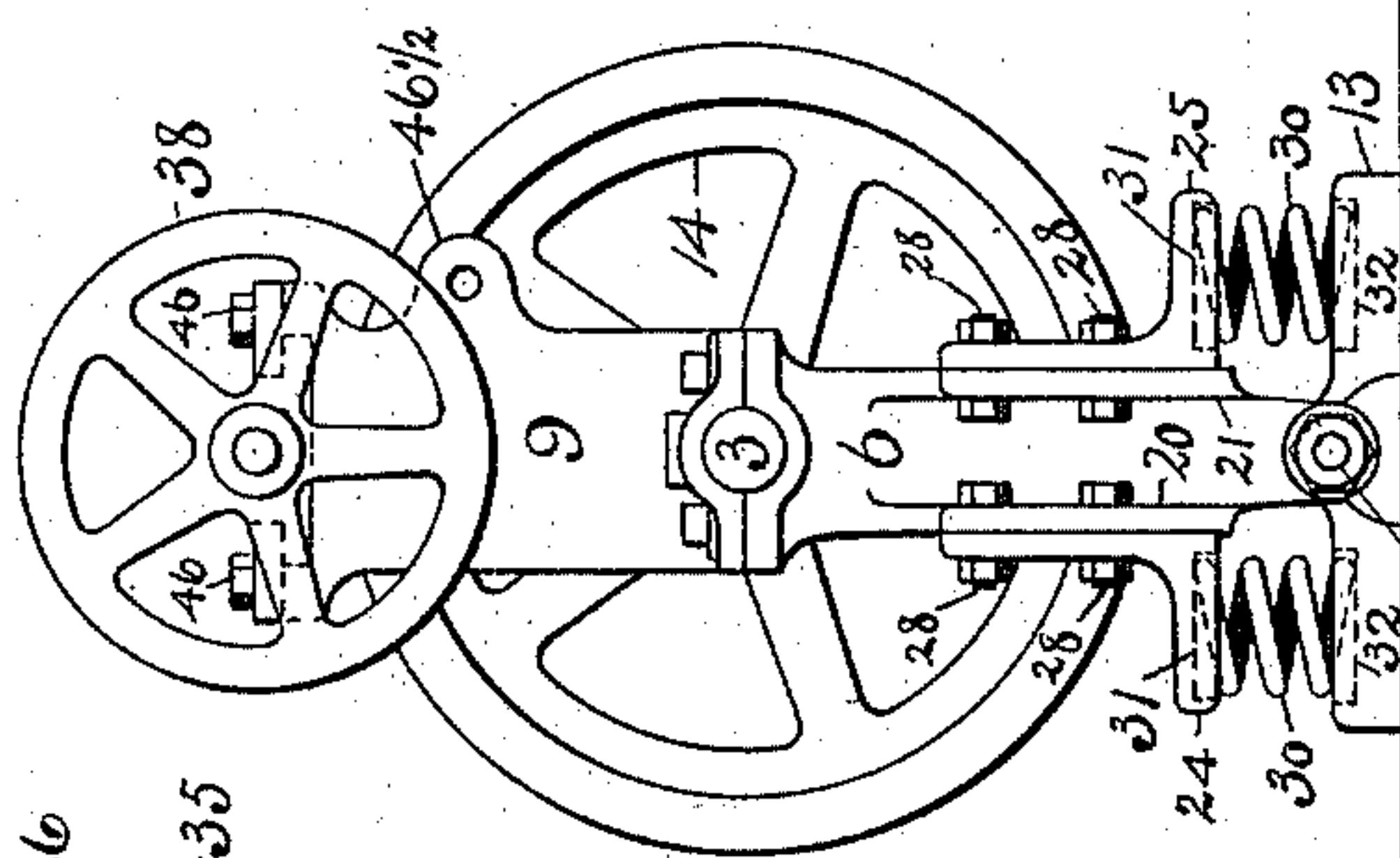


Fig. 3

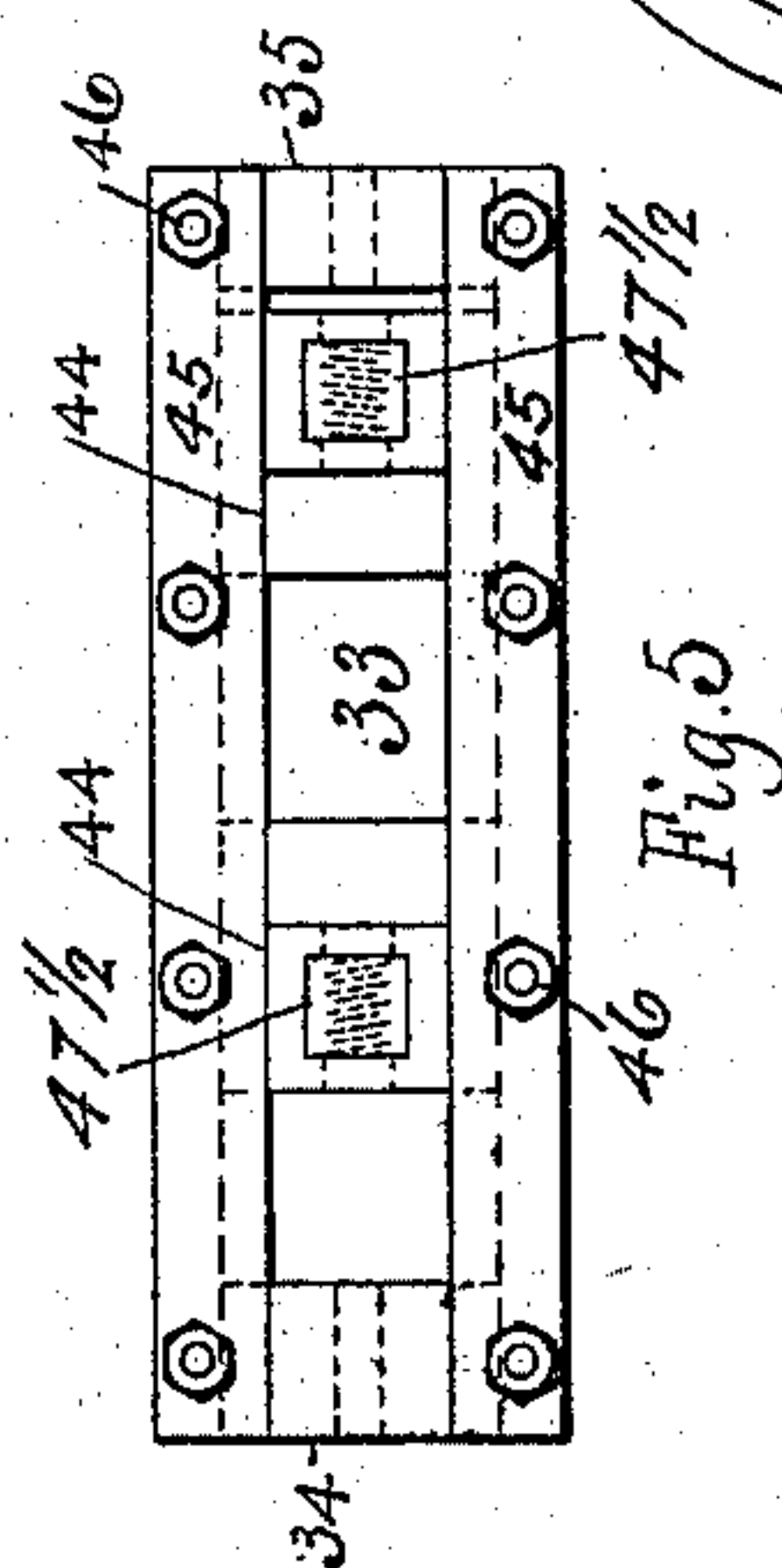


Fig. 5

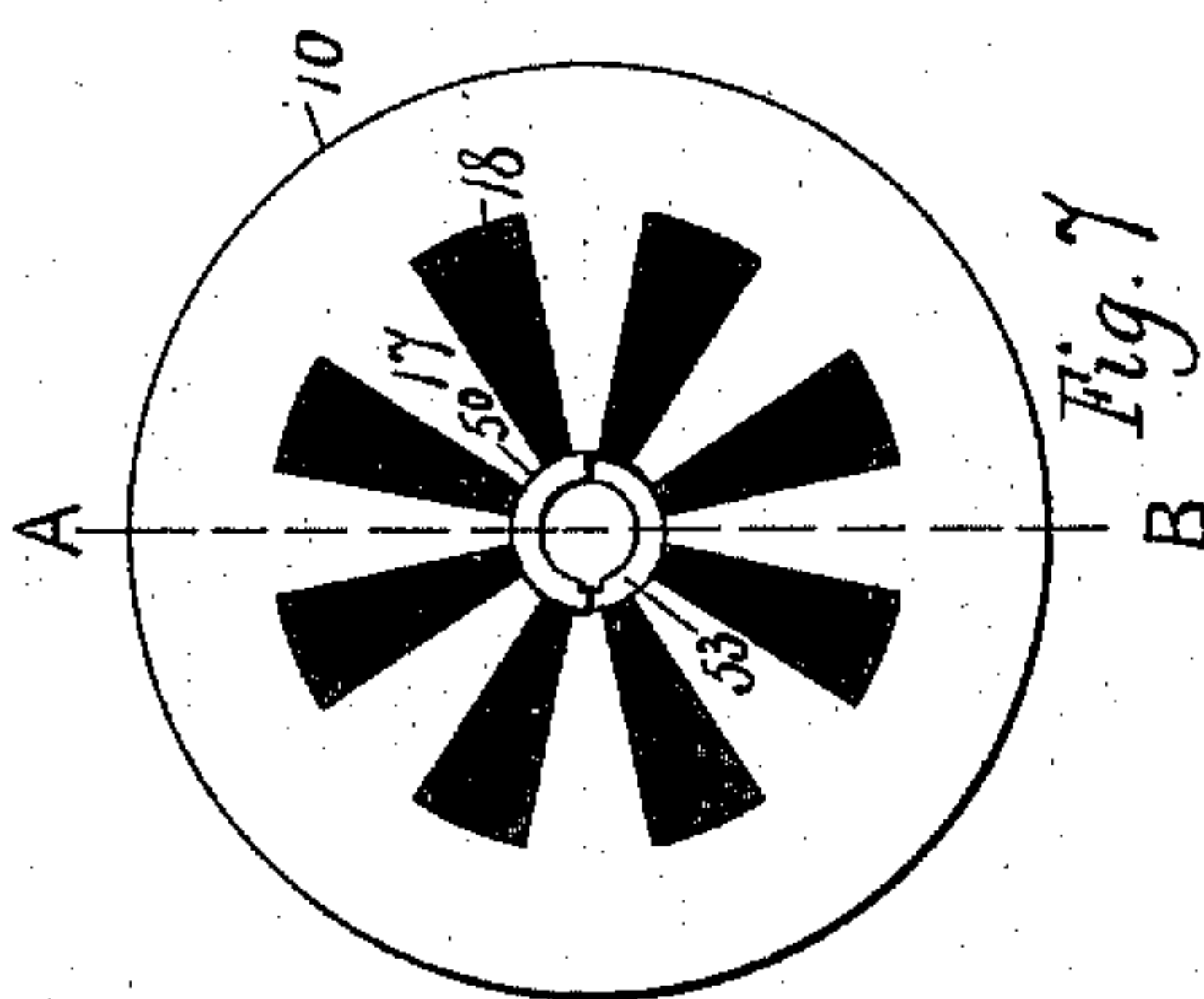


Fig. 7

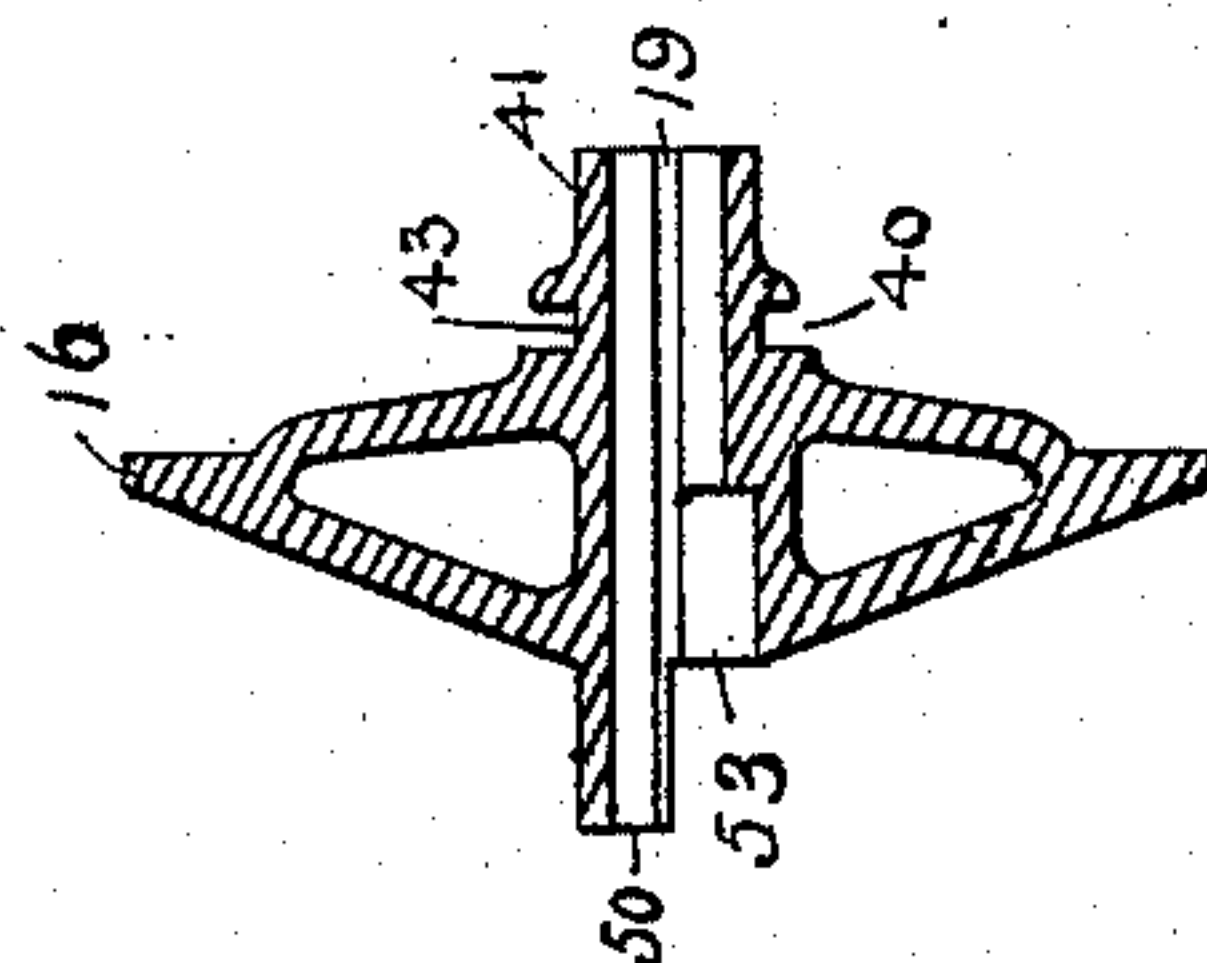


Fig. 6

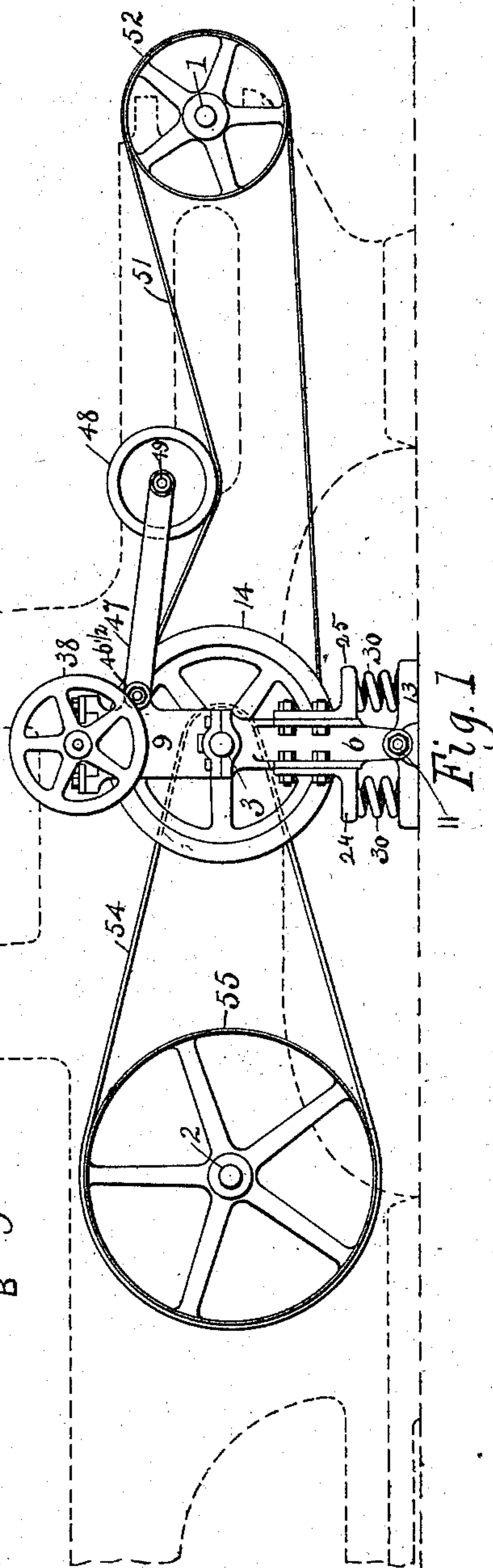


Fig. 7

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# UNITED STATES PATENT OFFICE.

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## VARIABLE-SPEED MECHANISM.

SPECIFICATION forming part of Letters Patent No. 571,395, dated November 17, 1896.

Application filed December 12, 1895. Serial No. 571,894. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS T. PYOTT, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Variable-Speed Mechanisms; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements for varying the speed in the driving mechanism of power-driven machinery where it is essential, for economical and more perfect results, to change the speed according to the varying conditions of work, as in wood-planing machines, as well as in numerous other machines. It is essential that the mechanism shall be convenient for the attendant to handle and to quickly reach and as quickly operate, and that the variations may be very slight between the extremes of slow and fast. It is also very desirable to so construct the mechanism that it can readily be applied and adapted to machines already constructed and in use, thereby enabling its advantages to be secured by those now having an equipment of machinery. I have represented my mechanism as resting upon the floor whereon the machine rests and is secured, but it is as readily adapted to be secured overhead, to the ceiling, if the machine to which it is attached better favors such an arrangement, such as hoisting machinery. I attain these objects by the mechanism illustrated in the following drawings, in which—

Figure 1 is a partial side elevation of a wood-planing machine, showing the relative placing of my mechanism. Fig. 2 is an elevation of my mechanism, looking from the driving end of the machine. Fig. 3 is an end elevation of Fig. 2. Fig. 4 is a side view of one of the cone shifting forks. Fig. 5 is a plan of the top of the frame. Fig. 6 is a section of one of the interlocking cones on line A B, Fig. 7. Fig. 7 is a front elevation of one of the interlocking cones.

Similar figures of reference refer to similar parts throughout the several views.

By referring to Fig. 1 it will be understood that 1 is the driving-shaft, and 2 is the driven shaft, of the machine, and interposed between these shafts is shaft 3 of my mechanism. The shaft 3 is carried in bearings 4 5, formed in the framing, which is composed of standards 6 7 and an upper part 8 9 10, which is secured to the upper end of 6 7, 9 joining 6 and 8 joining 7, 8 and 9 being connected by the cross-piece 10, the whole arrangement of 6 7 8 9 10 forming a swinging frame, it being pivoted at 11 12 to a foundation-plate 13, secured to the floor, as shown in the illustrations, or to ceiling-timbers, if more desirable or advantageous. Thus it will be seen the frame carrying the shaft 3 can swing sidewise and allow the shaft 3 to approach either the shafts 1 or 2. Upon the shaft 3, between the frames 6 7 8 9, are a flanged pulley 14 and two interlocking cone-pulleys 15 16, they being duplicates, but so arranged on the shaft 3 as to allow a finger 17 and a space 18 to come opposite. A spline 19, let into the shaft 3, carries the cones when the shaft revolves, but permits them to approach and recede from each other to vary the diameter of the surface where the belt comes in contact with the beveled face of the cones, the variation of speed in the machine in illustration being from thirty to one hundred feet per minute.

At the lower or pivot end of frames 6 7 are seats 20 21 22 23, to which are attached brackets 24 25 26 27 by bolts 28. The holes 29, through which the bolts 28 pass in brackets 24 25 26 27, are slotted to enable the brackets to be adjusted perpendicularly to regulate the pressure and tension of the springs 30, upon which the brackets 24 25 26 27 rest and into which the springs are preferably pocketed 31. At the opposite end from the brackets 24 25 26 27 the springs 30 preferably rest in pockets 32, formed in the base-plate 13. The upper end 10 of the frame has formed in it a seat 33, in which are secured bearings 34 35, for the right-and-left-hand-threaded screw 36, the screw being a blank at its central part 37 and having a hand-wheel 38 at its outer end and a collar 39 at its inner end beyond the bearing 35. The interlocking cones 17 18



have each a groove 40 formed in their outer hubs 41, into each of which is introduced a forked shifting arm 42, embracing but not wholly surrounding the seat 43 in the groove 40. The forked shifting arms 42 reach upward and are secured to traversing arms 44. These arms rest in the seat 33, and are formed to be fitted into and be guided thereby and have a pocket 36' formed in their upper ends, wherein is placed a nut 47½, tapped out, one right and one left hand thread, to be entered by the corresponding thread of the screw 36. The traversing arms 44 are held into the seat 33 by guide-plates 45, secured to frame 10 by bolts 46. At the back of the frame-pieces 8 9 and near the top thereof are lugs 46½, to which is secured the tightener-frame 47, to which at its back end is secured the tightener-pulley 48, so attached as to be free to revolve on the shaft 49. The interlocking cone-pulleys 17 18 have an inner hub 50, which enters a seat 53 in the opposite cone and passes only half-way around the shaft 3. Thus the two semi-hubs slide upon each other, while always in contact one with the other to assist the interlocking fingers to revolve the cone in unison.

A slack belt 51 passes over the pulley 52 on the driving-shaft 1 and the flanged pulley 14 on the shaft 3.

A belt 54 passes over the cones 17 18 on the shaft 3 and over a pulley 55 on the driven shaft 2.

The operation of my mechanism is as follows: The pulleys 52 14 always maintain a constant relative speed, they being run by a loose belt 51, on which freely rides the tightener 48 to secure the requisite adhesion to the pulley-surfaces. The tightener can be lifted off the belt to stop the shafts 2 and 3 and the machine, if desired. The cone-pulleys 17 18 run the same number of revolutions as the flange-pulley 14 and a belt connects them, it having edge contact on the cones, but face contact on the pulley 55, over which it passes. The normal position of the framework 6 7 8 9 is perpendicular and its position is secured by the springs 30. As shown in Fig. 1, the belt 54 is in contact at the smaller diameter of the cones 17 18 and is running the pulley 55 slow, and it being desired to increase the speed of the pulley 55 the operator by turning the hand-wheel 38 will cause the screw 36 to move the nuts 47½ toward each other by means of the right and left handed threads. The nuts carry the traversing arms 44 and also the attached shifting forks 42 and the cones 17 18, and the belt 54 is forced to run upon a larger diameter of the face of the cones 17 18, but, the belt 54 being tight and of fixed length, this necessarily shortens the center or distances apart of the shafts 3 2, to accommodate which the frame 7 8 9 10 yields or swings sidewise, the springs 30 under brackets 24 26 being compressed and those under brackets 25 27 expanding to a corresponding degree. The distance center to center of the shafts 1 3 has been in-

creased also, but this has been accommodated by the long compensating belt 51 becoming straighter upon its upper side and elevating the tightener-pulley 48. A reverse of the operation described will decrease the speed of the pulley 55.

I have described quite minutely the mechanism as I have now adapted it to accomplish the desired purposes, but in so doing I do not confine myself to the exact mechanism as set forth, as, having read my specification, a mechanic skilled in the art might make modifications which would still be within my invention.

I claim as my invention—

1. The combination in a power-driven machine of an attached driving-shaft and a driving-pulley, an attached driven shaft and a driven pulley, and an interposed shaft, swingingly supported in a structure detached from the machine, and having a pulley belted from the driving-shaft pulley and a pair of interlocking cone-pulleys belted to the driven-shaft pulley, substantially as described and set forth.

2. In a variable-speed mechanism an intermediate shaft between the driving and driven shafts of a machine, an independent frame for the intermediate shaft pivotally attached to an independent base-plate, multiple springs seated upon the base-plate, and adjustable brackets attached to the shaft-frame and seated upon the springs, substantially as described and set forth.

3. In variable-speed mechanism a shaft interposed between the driving and driven shafts of the machine and belted thereto, a frame for the interposed shaft, adjacent to the machine, but unattached thereto and independent thereof, a base-plate to carry the shaft-frame, pivotal attachments for the shaft-frame to the base-plate, yielding mechanism between the base-plate and the shaft-frame to maintain the shaft-frame in normal position when not forced therefrom, and an upper part to the shaft-frame being removably attached to the lower parts, and connecting across from side to side above the pulleys on the interposed shaft, substantially as described and set forth.

4. In variable-speed mechanism, an intermediate shaft supported in a swinging frame pivotally attached to a base-plate at one end, means to support the frame in its normal position, a pulley on the shaft coupled to the machine, a pair of interlocking cone-pulleys on the shaft coupled to the machine, an outer hub for each cone-pulley having a groove therein, a shifting fork entering each groove and means for causing the shifting forks to approach and recede from each other at the will of the operator, substantially as described and set forth.

5. In variable-speed mechanism, an interposed shaft, a pivotally suspended and yielding frame, having divided journal-bearings therein for the shaft, a seat in the upper cross-



framing, a bearing at each end thereof, and a screw seated therein having right and left hand threads, and means for moving the screw and adjusting its attachments resting in the seats aforesaid substantially as described and set forth.

6. In a variable-speed mechanism, an interposed shaft yieldingly suspended, a pulley thereon, a pair of interlocking cone-pulleys thereon, a framework above the pulleys having a guide therein, traversing arms guided therein and extending downward, forked shifting arms attached thereto and engaging the interlocking cones, a nut inserted into the upper end of each traversing arm, and means to move the traversing arms toward and from each other, substantially as described and set forth.

7. In mechanism for changeable speed, interlocking cones therefor each having a semidiametral hub extending from the interlocking face thereof, and a semidiametral recess for the insertion of the hub of the opposite cone, substantially as described and set forth.

8. In a variable-speed mechanism, an interposed shaft and a framework therefor pivotally carried, lugs upon the framework and attached thereto a radially-yielding arm carrying a shaft and a tightener-pulley at its outer end, and means for operative attachment to a machine substantially as described and set forth.

9. In a variable-speed mechanism, an interposed shaft between the driving and driven shaft, a pivotally-supported and yielding framework therefor, means to maintain the framework in normal position, a shaft, a pulley, and a pair of interlocking cone-pulleys, means to adjust the interlocking cone-pulleys laterally, between the frames, for the purpose of changing the diametral contact of the belt running in connection therewith and means to operatively connect the pulleys to a machine, substantially as described and set forth.

10. In changeable-speed mechanism, a driving and a driven shaft for the machine, pulleys on each of the aforesaid shafts, an interposed shaft carried upon a pivotally-yielding frame, said frame being independent of the machine and unattached thereto save by belt contact, a pulley on the interposed shaft having a belt running to the pulley on the driving-shaft, a tightener-pulley attached to and swinging from the pivotal frame, a pair of interlocking cone-pulleys on the interposed shaft, means to move them on the shaft to increase or decrease the diametral contact of the belt thereto connected, and a belt from the interlocking cone-pulleys to the pulley upon the driven shaft of the machine, substantially as described and set forth.

11. In changeable-speed mechanism, a driving-shaft and pulley, a driven shaft and pulley, an independent interposed shaft, a pulley and a pair of interlocking cone-pulleys thereon, a swinging frame for the interposed shaft independent of the machine, pivotally carried, to permit the approach of the interposed shaft either toward the driven shaft and from the driving-shaft, or vice versa, a tightener-pulley, its journal and arms swingingly attached to the interposed-shaft frame, to permit the tightening-pulley to lie upon the upper side of a compensating belt from the driving-shaft pulley to the interposed-shaft pulley, the belt being slack and kept in operative contact by the tightener-pulley when the swinging frame of the interposed shaft approaches or recedes from the driving-shaft, and a belt from the interlocking cone-pulleys to the driven-shaft pulley, substantially as described and set forth.

In testimony whereof I affix my signature in presence of two witnesses.

LOUIS T. PYOTT.

Witnesses:

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R. C. WRIGHT.