No. 622,160. Patented Mar. 28, 1899.

W. P. NORTON.

FRICTION DRIVING DEVICE FOR SHAPING OR OTHER MACHINES.

(Application filed Dec. 20, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

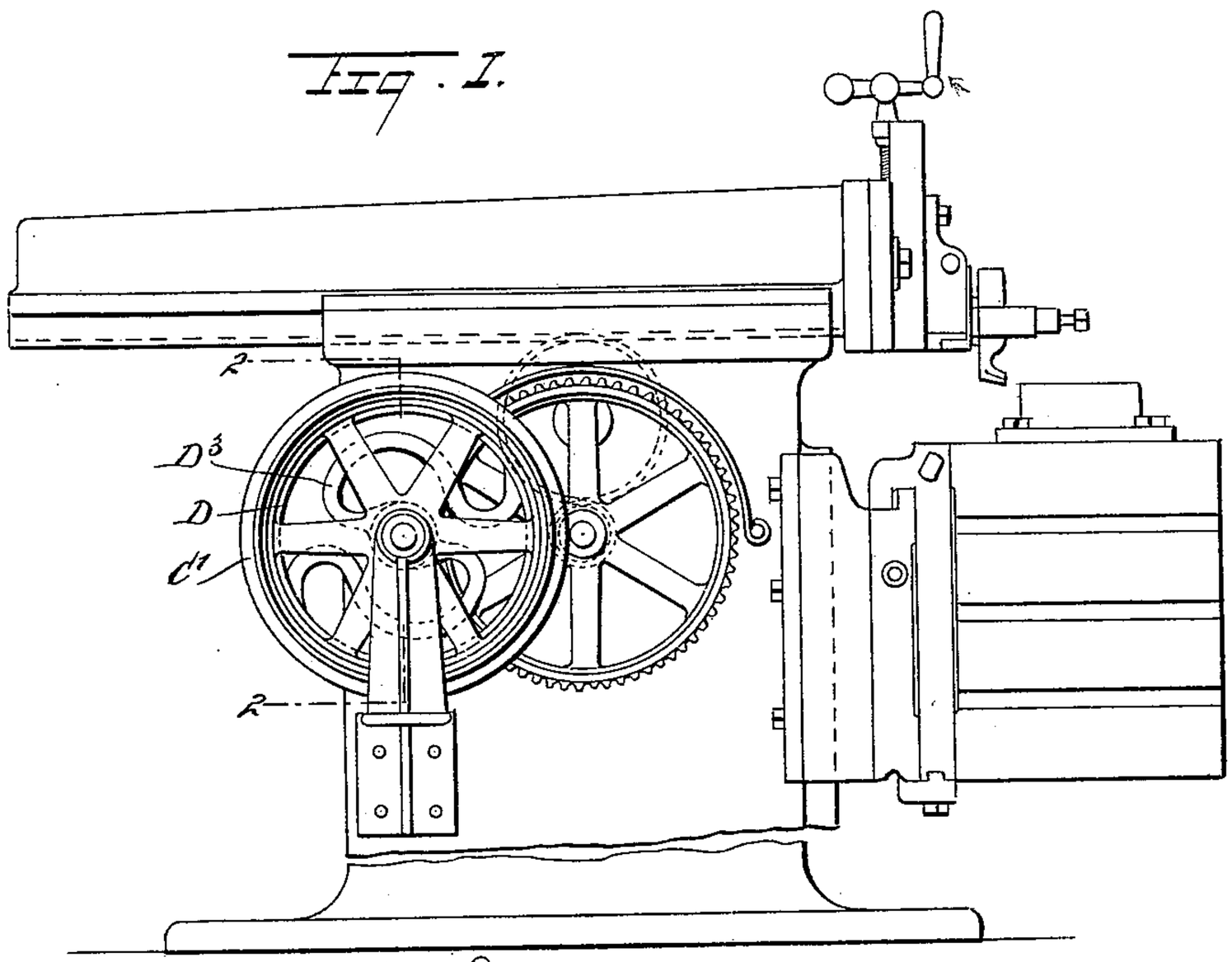

Fig. 2.

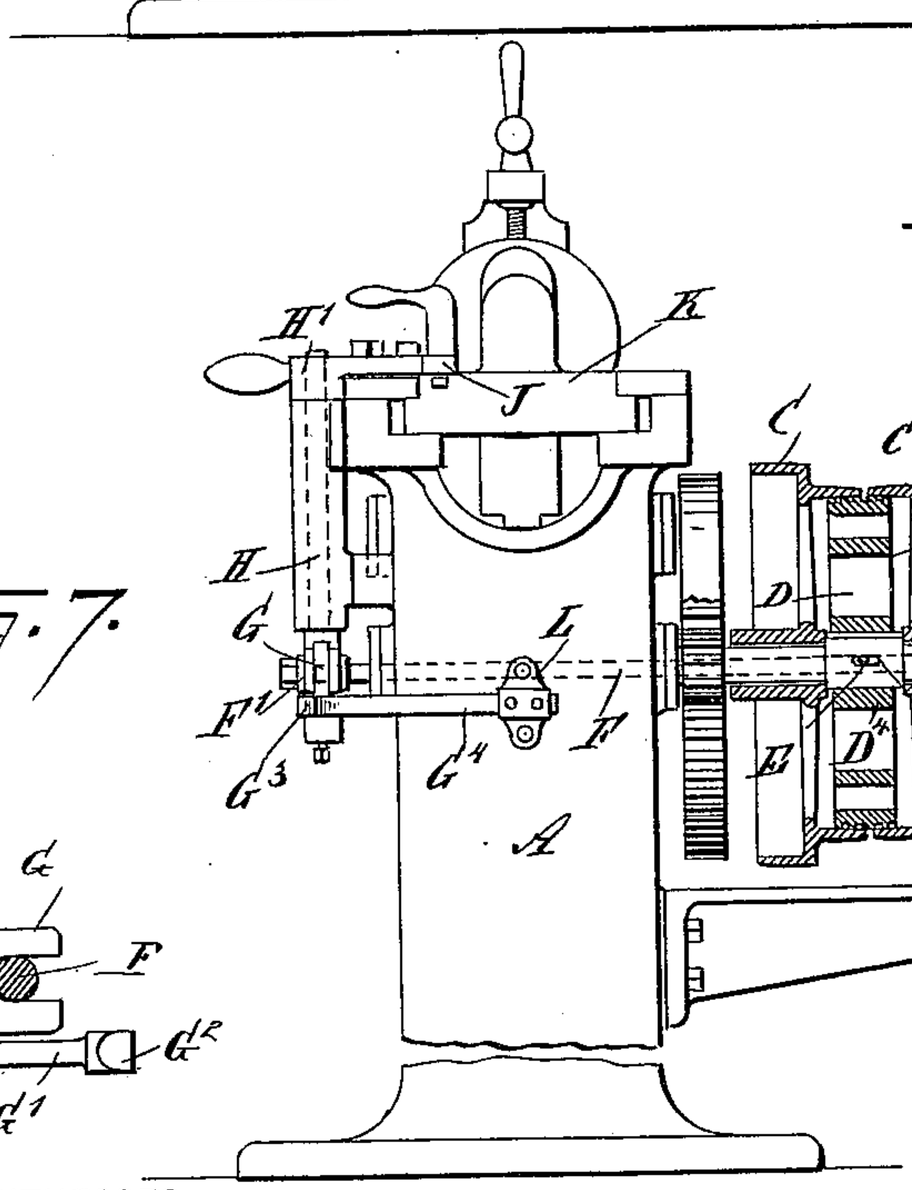

Fig. 7.

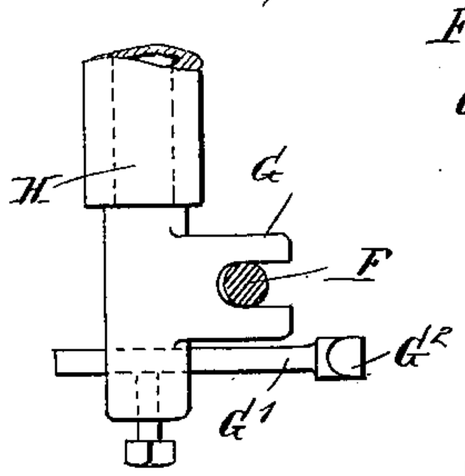

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Fig. 3.

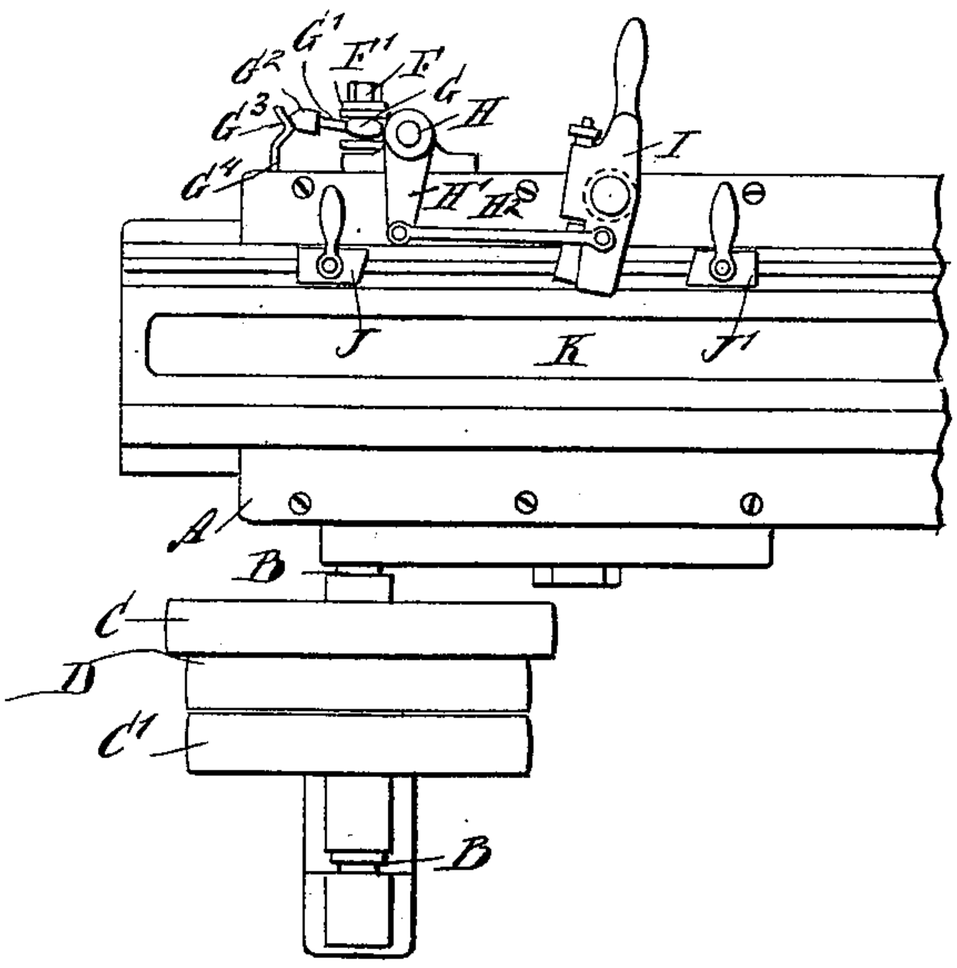


Fig. 4.

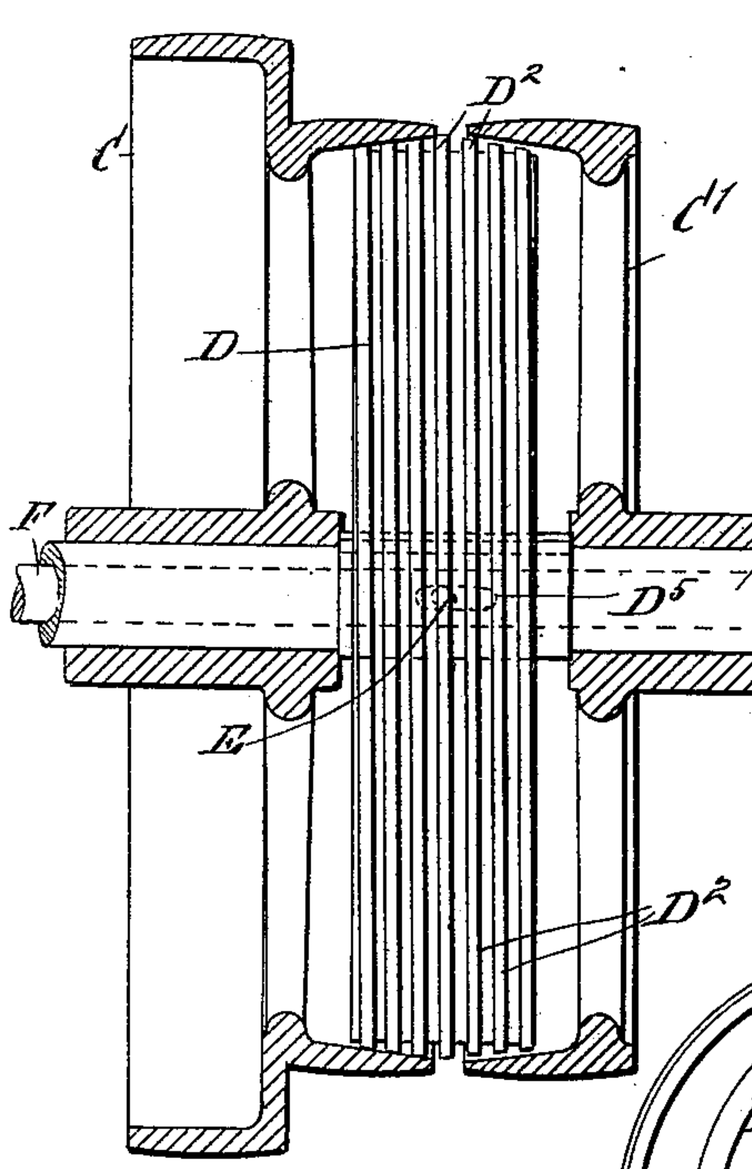
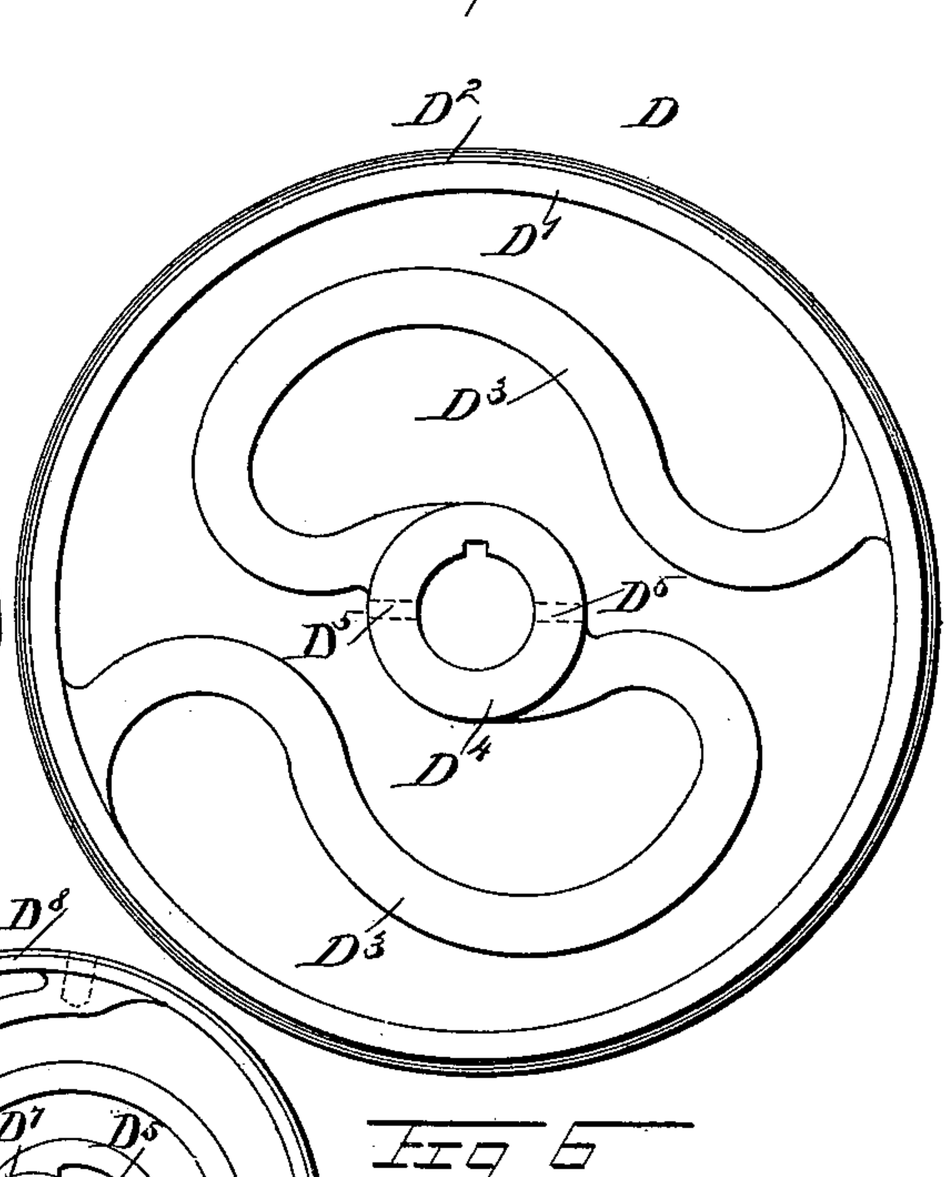


Fig. 5.



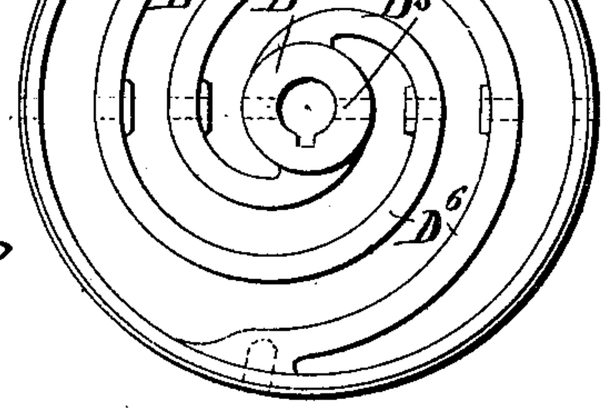


Fig 6

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WENDELL P. NORTON, OF TORRINGTON, CONNECTICUT.

FRICTION DRIVING DEVICE FOR SHAPING OR OTHER MACHINES.

SPECIFICATION forming part of Letters Patent No. 622,160, dated March 28, 1899.

Application filed December 20, 1897. Serial No. 662,565. (No model.)

To all whom it may concern:

Be it known that I, WENDELL PHILLIPS NORTON, of Torrington, in the county of Litchfield and State of Connecticut, have invented a new and Improved Friction Driving Device for Shaping or other Machines, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved friction driving device for shaping, planing, and other machines requiring a reciprocating movement of the head, bed-plate, bed, or the like, the device being arranged in such a manner as to insure rotation of the driving-shaft in either direction without shock or jar when changing from one motion to another and without danger of injury to the working parts.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improvement as applied on a shaping-machine. Fig. 2 is a rear end elevation of the same, with part in section, on the line 2 2 of Fig. 1. Fig. 3 is a plan view of part of the improvement. Fig. 4 is an enlarged cross-section of the improvement. Fig. 5 is a face view of the friction-pulley. Fig. 6 is a like view of a modified form of the same, and Fig. 7 is an enlarged side elevation of the tension device for the shaping-rod.

The improvement, as shown in the drawings, is applied to a shaping-machine mounted on a suitably-constructed frame A, in which is journaled a hollow driving-shaft B, connected in the usual manner with the head of the machine to impart a reciprocating motion thereto. On the shaft B are mounted to rotate loosely the driving-pulleys C C′, connected by belt with suitable machinery for imparting rotary motion to the said pulleys, but in opposite directions. On the shaft B, between the pulleys C C′, is secured a friction-pulley D, formed on the peripheral surface of its rim D′ with threads or ridges D^2, adapted to be alternately moved in frictional contact with the inner faces of the rims of the driving-pulleys C C′, it being understood that the said friction-pulley D is for this purpose shifted longitudinally on the shaft B, a suitable key and keyway being provided for this purpose. Thus when the pulley D is in frictional contact at a portion of its ridges with the inner surface of the rim of the pulley C then the shaft B is rotated in one direction, and when the said pulley D is shifted to the right and moved out of contact with the pulley C and into contact with the other pulley C′ then the shaft B is rotated in the opposite direction.

As shown in Fig. 4, the peripheral surface of the rim D′ at the ridges D^2 is formed with a double bevel, one of which engages the correspondingly-beveled inner surface of the rim of the pulley C and the other is adapted to engage the correspondingly-beveled inner surface of the rim of the pulley C′; also, as shown in said figure, the ridges are formed in the shape of a spiral; but such construction is not absolutely necessary. By the arrangement described a suitable lubricant can be introduced on the peripheral surface of the friction-pulley D to prevent cutting of the said surface in the rims of the pulleys C C′, as is so frequently the case with friction driving devices as heretofore constructed. At the same time, however, surplus lubricant is permitted to escape from the contacting surfaces into the grooves between adjacent ridges to prevent the lubricant from causing the contacting surfaces to slip excessively upon one another.

In order to prevent a sudden shock when clamping between the friction-pulley and the contact-rim at any particular point in the peripheral surfaces, I provide spring-arms D^3 for connecting the hub D^4 of the friction-pulley D with the rim D′ to allow the rim to yield laterally and insure a uniform contacting of the peripheral surface of the rim with the inner surfaces of the pulleys C C′. This also gives the hub a yielding motion within the rim, by which arrangement considerable shock and jar is prevented, especially when

shifting the pulley D from contact with one driving-pulley C or C′ into contact with the other.

The spring-arms D^3 can be made of any desired form, according to the requirements of the machine on which the device is applied, the greatest utility being obtained when the arms D^3 are of such shape and cross-section as to give the greatest amount of elasticity consistent with the strength required to operate the machine. Thus for heavy work I prefer the construction of the arms shown in Fig. 5, the arms being an integral part of the hub and rim, the cross-section of each arm being preferably rectangular, as indicated in Fig. 2, to permit the arms to yield longitudinally when the rim D′ is moved into contact with the rim of the corresponding driving-pulley C or C′.

For light work I prefer to make the arms D^6 in spiral form, as illustrated in Fig. 6, with the integral joints of the arms D^6 and the hub D^7 and rim D^8 preferably in the same diametrical plane.

In the hub D^4 or D^7 of the friction-pulley D is formed an elongated slot D^5, engaged by a transverse pin E, held on a shaft F, fitted to slide in the driving-shaft B and serving to move the pin E alternately in contact with the end walls of the slot to shift the friction-pulley D from one driving-pulley to the other. One outer end of this shaft or rod F is formed with an annular groove F′, engaged by a fork G, secured or held on the lower end of a vertically-disposed shaft H, journaled in suitable bearings on one side of the frame A. On the upper end of this shaft H is secured an arm H′, connected by a link H^2 with a shifting head I, adapted to be alternately engaged by stops J J′, adjustably held on a head or bed K, reciprocated by the mechanism connected with the shaft B, as previously mentioned and as is well known. On the fork G is secured a rod G′, having a V-shaped head G^2, adapted to be engaged by the correspondingly-formed end G^3 of a spring G^4, secured in a bearing L, attached to the frame A, as plainly indicated in Fig. 2. (See also Figs. 3 and 7.) Now by the arrangement described the shaft F is always held in either of its two positions at the right or at the left, according to which driving-pulley C or C′ is engaged by the friction-pulley D. The spring G^4 is adjustably held in the bearing L to regulate the pressure of the end G^3 on the head G^2 and hold the pulley D with the desired force in frictional contact with either of the pulleys C or C′.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A friction driving device, provided with a pulley formed in its peripheral surface with ridges adapted to move in frictional contact with the inner surfaces of the rims of the driving-pulleys, the said pulley having spring-arms connecting the rim and hub and arranged to yield laterally and longitudinally, for the purpose set forth.

2. A friction driving device, comprising two driving-pulleys mounted to rotate loosely in opposite directions, a friction-pulley between the said driving-pulleys and adapted to be moved into frictional contact with the inner surfaces of the rims of the said pulleys, and spring-arms connecting the rim of the friction-pulley with the hub and adapted to yield laterally and longitudinally, whereby a uniform contacting of the peripheral surface of the rim with the inner surfaces of the pulleys is insured, and shock and jar is prevented, substantially as specified.

3. A friction driving device, comprising two driving-pulleys mounted to rotate loosely in opposite directions and having the inner surfaces of their rims beveled in opposite directions, a friction-pulley between the said driving-pulleys and formed in its peripheral surface with encircling ridges adapted to move in frictional contact with the inner surfaces of the rims of the said driving-pulleys, the grooves between the said ridges being adapted to receive surplus lubricant and the peripheral surface of the ridges being beveled in opposite directions from the center of the pulley to the sides, spring-arms connecting the rim of the friction-pulley with its hub and adapted to yield laterally and longitudinally, and means for shifting the friction-pulley, substantially as shown and described.

4. A friction driving device, comprising two pulleys mounted to rotate loosely in opposite directions, a friction-pulley between the said driving-pulleys, and formed in its peripheral surface with ridges adapted to move in frictional contact with the inner surfaces of the rims of the said pulleys, the grooves between the said ridges being adapted to receive surplus lubricant, and yielding arms or spokes for integrally connecting the rim of the friction-pulley with its hub, substantially as shown and described.

5. A friction driving device, comprising two pulleys mounted to rotate loosely in opposite directions, a friction-pulley between the said driving-pulleys, and formed in its peripheral surface with ridges adapted to move in frictional contact with the inner surfaces of the rims of the said pulleys, the grooves between the said ridges being adapted to receive surplus lubricant, a rod having connection with the hub of the said friction-pulley for shifting the latter, a shifting fork for engaging the said rod, a V-shaped head supported by the said fork, and an adjustable spring having a V-shaped end adapted to engage the said head, substantially as shown and described.

6. A friction driving device, provided with a friction-pulley, a rod connected with the hub of the friction-pulley for shifting the latter, a shifting fork for engaging the said rod, a V-shaped head adjustably carried by the

said fork, a plate-spring having a V-shaped end adapted to engage the said head, a bearing or keeper in which the other end of said spring is adjustably held, a vertically-disposed shaft carrying the said fork at its lower end, an arm on the upper end of said shaft, and a shifting head connected by a link with the said arm, substantially as shown and described.

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Witnesses:
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JOHN A. BAGRIE.