J. H. BURPEE & E. T. HOSKINS.

MECHANICAL MOVEMENT.

APPLICATION FILED JAN. 22, 1909.

1,078,900. **Patented Nov. 18, 1913.**

Fig. 1.

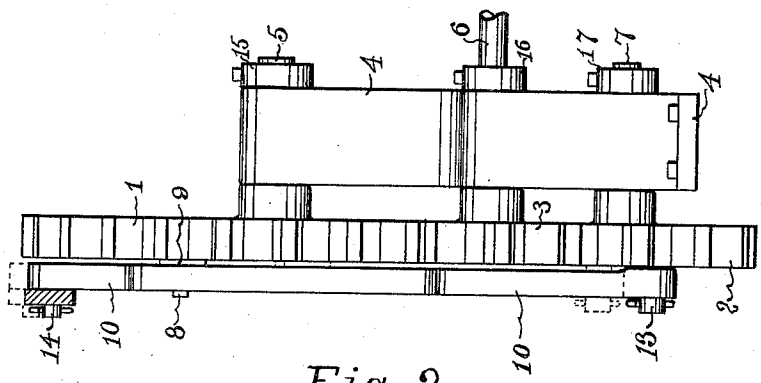
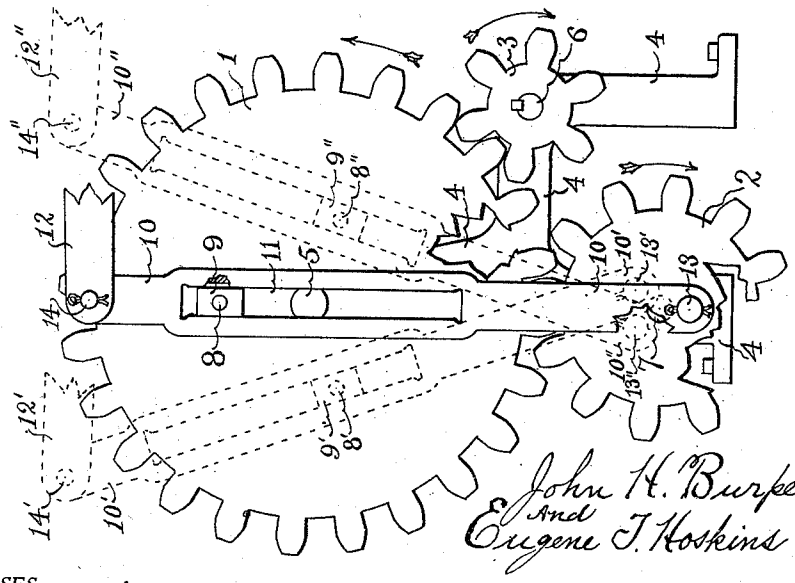


Fig. 2.



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MECHANICAL MOVEMENT.

1,078,900. Specification of Letters Patent. Patented Nov. 18, 1913.

Application filed January 22, 1909. Serial No. 473,772.

To all whom it may concern:

Be it known that we, JOHN H. BURPEE, a citizen of Canada, and EUGENE T. HOSKINS, a citizen of the United States, and both residents of Bellingham, in the county of Whatcom and State of Washington, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification.

Our invention relates to an improvement in mechanical movements and consists in a quick-return, slider-crank vibrating link having a synchronously movable fulcrum. It is designed to be used in general for any purpose requiring the conversion of rotary into reciprocal motion with a quick-return stroke, and is especially applicable where it is desired to have a nearly uniform and slow rate of movement through the working stroke, and a more rapid movement through the return stroke with a fairly quick change of direction of motion. More especially, it is designed to replace the so-called vibrating link used on certain kinds of upright, shingle-sawing machines.

Our invention is illustrated in the accompanying sheet of drawings in which similar numerals refer to similar parts throughout.

Figure 1 is a side elevation, and Fig. 2 a front elevation of our device.

More particularly: 4 is an h-form frame suited for attachment to other frame work or to the floor, and it furnishes bearings for the three parallel shafts 6, 5, and 7.

6 is a power shaft connected to a source of power not illustrated. Shaft 6 is journaled in frame 4 and has the driver, spur wheel 3 keyed to one end with the hub of said gear against one end of said journal and the set ring 16 against the other end of said journal. Spur gear 3 meshes with crank-disk gear 1 which is rigidly mounted on short shaft 5, said shaft being retained by aid of set ring 15 in a journal in frame 4. Crank-disk gear 2 meshes with gear 1 and is rigidly mounted on short shaft 7, said shaft being retained by aid of set ring 17 in a journal in frame 4. Gear 2 has a gear ratio with gear 1 of 2 to 1. Crank-disk gear 2 has a crank pin 13. Crank pin 13 is engaged with the lower end of vibrating link 10. The middle part of link 10 contains a longitudinal slot forming guides for the slide block 9. Slide block 9 is engaged with crank pin 8 in crank gear 1. The upper end of link 10 bears a pin 14 which is engaged with one end of the driving rod 12. The positions of the link 10 when at the extreme limits of its stroke are shown in dotted outlines at 10′ and 10″. When the gears revolve in the directions indicated by the arrows in Fig. 2 the slow, working stroke of driving rod 12 is from position 12″ to position 12′, and the quick-return stroke is from position 12′ to position 12″. It may be noted that when the working stroke is begun fulcrum crank pin 13 is in position 13″ and as it passes toward the right through an arc of about 30° the fulcrum of link 10 is moved horizontally toward the right with little change in its vertical position. At the same time crank pin 8 is moving upward causing a slight left-hand movement of rod 12. Then to this left-hand movement of rod 12 from position 12″ must be added the movement caused by the passing of fulcrum pin 13 toward the right. Therefore rod 12 makes a quicker start on the working stroke than if fulcrum pin 13 were fixed. As the motion continues, fulcrum pin 13 moves downward lowering the bar 10 and thus diminishing the length of the part of the bar above block 9 and increasing the length of the bar below block 9 as compared to what it would be if fulcrum pin 13 were stationary. Hence this part of the rotation of the fulcrum pin tends to diminish the rate of movement of rod 12 toward the left. As fulcrum pin 13 passes toward the left under center 7 this motion tends to carry the upper end of bar 10 toward the right. Hence the rotating fulcrum still causes the movement toward the left of rod 12 to be at a slower rate than if fulcrum 13 were stationary. Then as fulcrum pin 13 ascends on the left of center 7 the part of link 10 above block 9 is longer than if the fulcrum were stationary and thus the latter part of the left-hand movement of link 10 is more rapid than it would otherwise be. Thus it can be seen that the effect of the revolving fulcrum in the illustration given is to divide the time required by the working stroke in such a way that the change in direction of motion is quicker and the rate through the major portion of the stroke more uniform than with the fixed fulcrum as at present used. Since the fulcrum pin 13 makes two complete revolutions for each revolution of the crank pin 8, the return stroke is affected by it in a manner quite similar to the working stroke de-

scribed. With suitable proportions of parts the rate of motion through the major portion of the working and return strokes becomes practically uniform with our improvement.

The chief objection to the reciprocating link with fixed fulcrum as used on upright shingle-sawing machines is that its maximum rate of movement occurs in the central part of the stroke. At this time the saw is most fully engaged with the block and doing its maximum work. The result is that the time allowed for the whole stroke must be such that the saw is not overtaxed when the carriage is in the middle part of the stroke, hence during the parts of the stroke at both sides of the middle the saw does much less than its full ability. Therefore since our improvement gives minimum carriage speed during the time when the saw is doing its maximum work and also causes the change in direction of motion to occur in shorter time than with the older movement referred to, our device will either permit the use of a thinner saw or allow of running the carriage at a greater speed, thus saving waste of timber or increasing the cutting capacity of the machine.

The method of applying our invention here shown and described is simple and well suited for the purpose specified. However a number of variations readily follow by which a variety of effects on the stroke of the vibrating link can be obtained.

Therefore we claim:—

1. A mechanical movement comprising spaced long and short cranks, means for driving said cranks simultaneously and with the short crank operating two revolutions to one revolution of the long crank, a link pivoted to the short crank, and means slidably connecting said link with said long crank, whereby one end portion of said link will swing on and be directed by said long crank.

2. A mechanical movement comprising two gears in mesh, one of which gears has twice the number of teeth of the other, crank pins on said gears, means for driving said gears, and a link pivoted on the crank pin of the smaller gear and slidably and swingingly connected with the crank pin of the other gear, said crank pins being arranged to be in line with one another and with said link when the latter extends across the axes of said gears.

Signed at Bellingham, in the county of Whatcom and State of Washington this ninth day of January A. D. 1909.

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