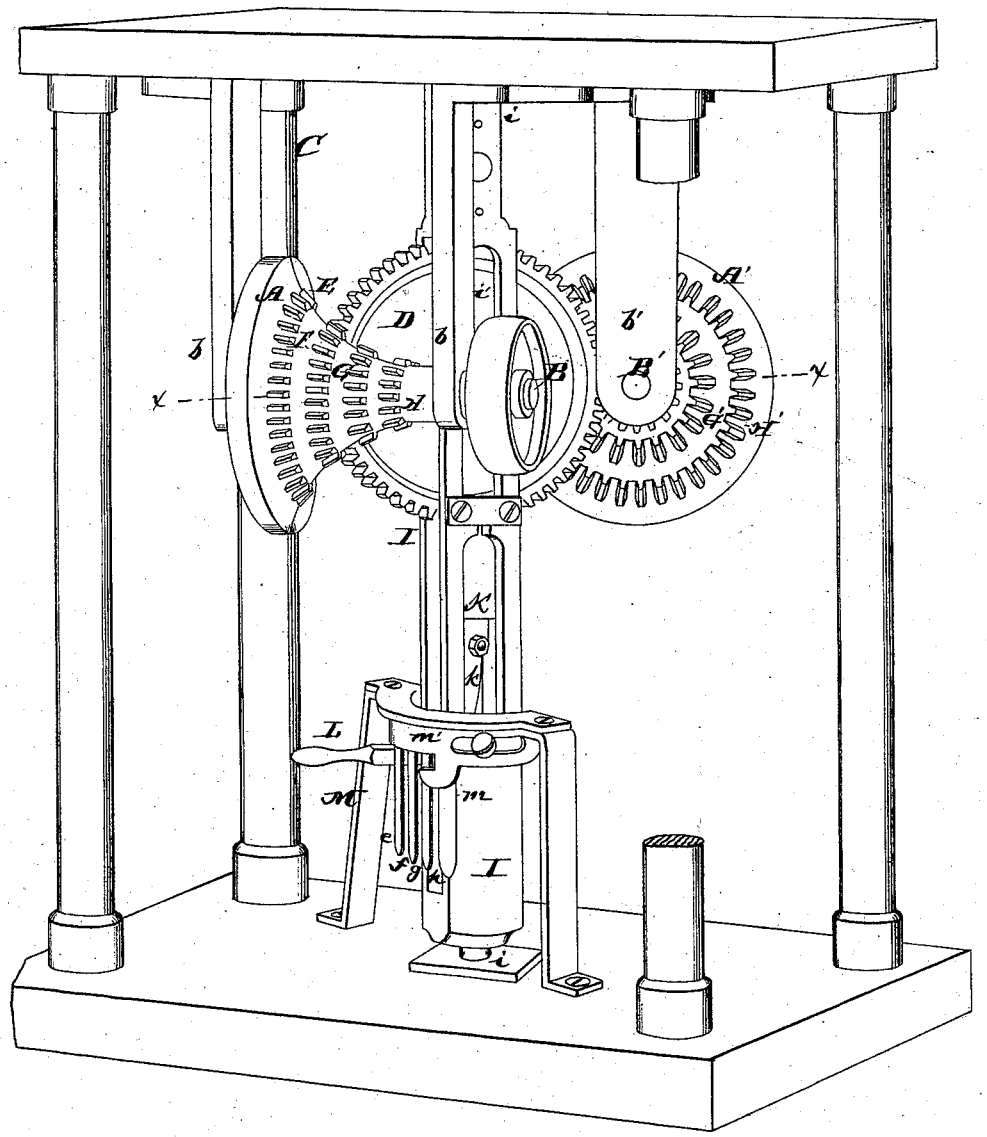
2 Sheets—Sheet 1.

A. F. HARVEY.

MECHANICAL MOVEMENT.

No. 191,961. Patented June 12, 1877.

FIG. 1.



ATTEST:

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INVENTOR.

Augustus F. Harvey.
By Chas. D. Moody.
Atty:

2 Sheets—Sheet 2.

A. F. HARVEY.

MECHANICAL MOVEMENT.

No. 191,961. Patented June 12, 1877.

FIG. 2.

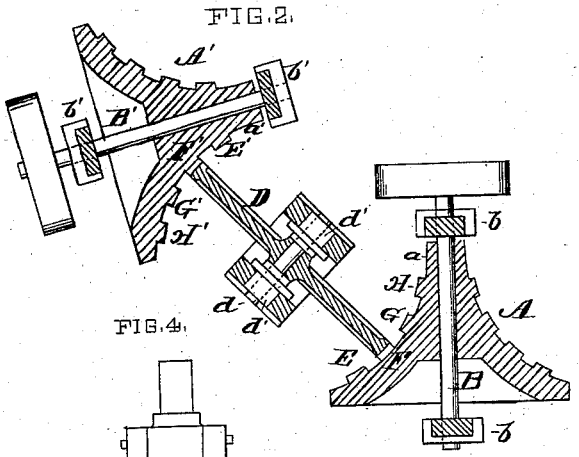


FIG. 3.

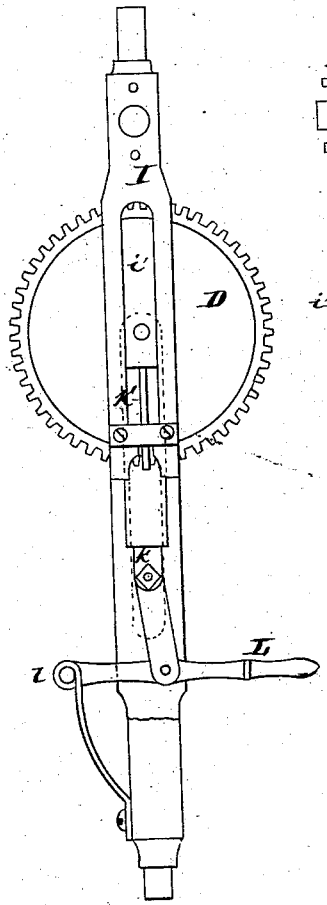


FIG. 4.

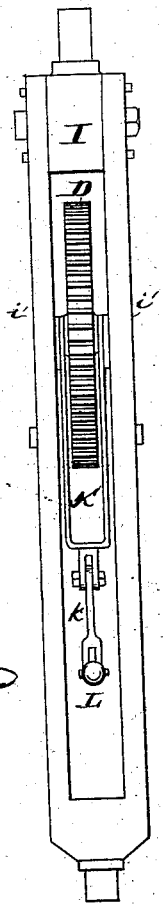


FIG. 5

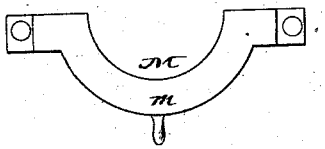


FIG. 6.

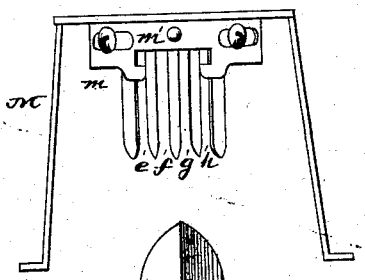


FIG. 7.

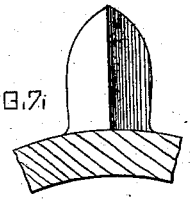
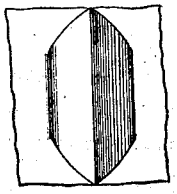


FIG. 8.



ATTEST.

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Paul Bakewell

INVENTOR.

Augustus F. Harvey.
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atty.

UNITED STATES PATENT OFFICE.

AUGUSTUS F. HARVEY, OF KIRKWOOD, MISSOURI.

IMPROVEMENT IN MECHANICAL MOVEMENTS.

Specification forming part of Letters Patent No. **191,961**, dated June 12, 1877; application filed May 17, 1877.

To all whom it may concern:

Be it known that I, AUGUSTUS F. HARVEY, a resident of Kirkwood, Missouri, have made a new and useful Improvement in Mechanical Movements, of which the following is a full, clear, and exact description, reference being had to the annexed drawing, making part of this specification, in which—

Figure 1 shows the improvement in perspective; Fig. 2, a section taken on the line *x x* of Fig. 1, being a central longitudinal section through the conical pulleys and the intermediate wheel; Fig. 3, a side elevation of the wheel used in transmitting the motion from one pulley to the other, showing, also, the post that supports the wheel, and the mechanism for raising and lowering the wheel thereon; Fig. 4, an edge elevation of the parts shown in Fig. 3; Figs. 5 and 6, details, being, respectively, a plan and elevation of the device used in locking the intermediate wheel at any desired adjustment with the cone-pulleys; and Figs. 7 and 8, respectively, an edge and top view of one of the teeth of the pulleys.

Similar letters refer to similar parts.

The aim of the present invention is to provide means for readily effecting changes in the speed of machinery.

Referring to the drawing, A A′ represent two similar pulleys, fastened, respectively, to the shafts B B′, which in turn may, respectively, be regarded as a driving and a driven shaft of any ordinary mechanism wherein rotary motion is used. The pulleys in outline are conical. The face, however, of the pulleys, or the side corresponding to the lateral surface of the cone, is concave; the curvature, as shown in the edges *a a′*, Fig. 2, of a central longitudinal section of the pulley, being circular. The pulleys may be large enough for the arcs *a a′* to be full quadrants, or any desired portion thereof, according to the range in the speed-rates it is intended to provide for. The shafts B B′ are in the same plane, and are suitably supported in bearings *b b′* in a frame, C, and they, as well as the pulleys, are arranged relatively to each other in such manner that the edges *a a′* become opposite arcs of the same circle, as shown in Fig. 2. D represents a wheel whose diameter corresponds to that of the circle inclosed by the pulleys A A′. Its shaft *d* is in the same plane as the shafts B B′, and it is arranged so that its longitudinal axis bisects the angle inclosed by the axes of the shafts B B′ when the latter are extended so as to intersect. The wheel is arranged centrally between the pulleys, and it is hung so that it can be turned to bring it into engagement with the pulleys at E E′, respectively, or at F F′, as shown, or at G G′, H H′, or any preferred points. To this end the bearings *d′ d′* of the shaft *d* are in a post, I, that, being stepped in suitable sockets *i i*, can oscillate.

The operation of the invention as thus far described is as follows: Let the wheel D be in engagement with the driving-pulley A at the point of its largest diameter, E, and with the driven pulley A′ at E′, or the point of its smallest diameter, and let it be desired to diminish the speed of the pulley A′; the wheel, by suitably turning its bearings *d′ d′*, is changed so as to bring it into engagement with the driving-pulley at a point thereon, F, where the pulley is of smaller diameter, and with the driven pulley at a point, F′, where this pulley is of larger diameter, as shown. This, as is obvious, diminishes the speed of the driven pulley. If a further diminution in speed is desired the engagement is made at the points G G′, and so on.

To readily and practically effect the engagement and disengagement of the wheel D in making the above-described changes, provision is made for moving it slightly in a direction at right angles to the plane of the shafts B B′. The bearings *d′ d′* are made to slide in grooves *i′ i′* in the post I, and, preferably, as follows: a forked rod, K, connected at its upper end with the bearings *d′ d′*, extends downward, and, through an intermediate link, *k*, is pivoted to a lever, L, that in turn is pivoted to a bearing, *l*, on the post I. By means of the lever L the wheel D can be raised and lowered upon the post I, and thereby made to effect the desired engagement and disengagement with the pulleys A A′. For instance, let the wheel be engaged at the points F F′, as shown. To change it to the points G G′ the wheel is lowered on the post I, then turned properly to beneath the objective points G G′, when it is raised again. To readily deter-

mine the proper position of the wheel D in making these changes, and also to hold it in place after it is changed, the device M, shown in Figs. 1, 5, and 6, is preferably used. This part M consists of a guide, *m*, and a lock, *m'*. The guide is a series of bars suitably supported above and arranged so as to form a series of spaces, *e f g h*, that correspond, respectively, with the various positions the wheel D is in in its various changes between the pulleys, and into which the lever L is received accordingly; that is, when the wheel is engaging with the pulleys at E E', the lever is in the space *e*, as shown in Fig. 1. To change the wheel to F F' the lever is withdrawn from the space *e*, then moved opposite the space *f*, (and in so doing turning the post I and wheel D,) and inserted therein; and similarly to the other spaces *g* and *h*, as it is desired to change the wheel. When the lever is raised to the upper end of the spaces the lock *m'* is, by moving it properly to one side or the other, as the lever may be located, made to hold it up, and thereby keep the wheel in engagement.

The pulleys A A' and wheel D may be made to operate by friction. I preferably, however, provide them with teeth to operate as a system of gear-wheels—that is, the pulleys have different sets of teeth at, say, the points E E', F F', G G', and H H', and the wheel D is a spur-wheel engaging therewith. The various series of teeth, E E', F F', G G', H H', are suitably arranged for the wheel D to engage with either one of them. The form of tooth preferred is shown in Figs. 7 and 8. When the pulleys and wheel are made with teeth the pitch-lines of the various series E E', F F', G G', H H' cross the arcs *a a'*.

I claim—

1. The herein-described mechanism for effecting changes in the speed of machinery, consisting of the concave pulleys A A' and the wheel D, substantially as described.

2. In combination with the pulleys A A', the wheel D, having movable bearings *d' d'*, for the purpose of moving the wheel into and out of the plane of the shafts of the pulleys, substantially as described.

3. The combination of the pulleys A A', wheel D, and post I, substantially as described.

4. The combination of the pulleys A A', the wheel D having the movable bearings *d' d'*, and the post I, substantially as described.

5. The combination of the wheel D, post I, rod K *k*, and lever L, substantially as described.

6. The combination of the guide *m*, lever L, post I, rod K *k*, and wheel D, substantially as described.

7. The combination of the lever L, guide *m*, and lock *m'*, substantially as described.

AUG. F. HARVEY.

Witnesses:

CHAS. D. MOODY,

FREDK. LEAR.