

(No Model.)

J. E. HOWARD & W. W. STALL.

SPEED ATTACHMENT FOR TRICYCLES.

No. 249,622.

Patented Nov. 15, 1881.

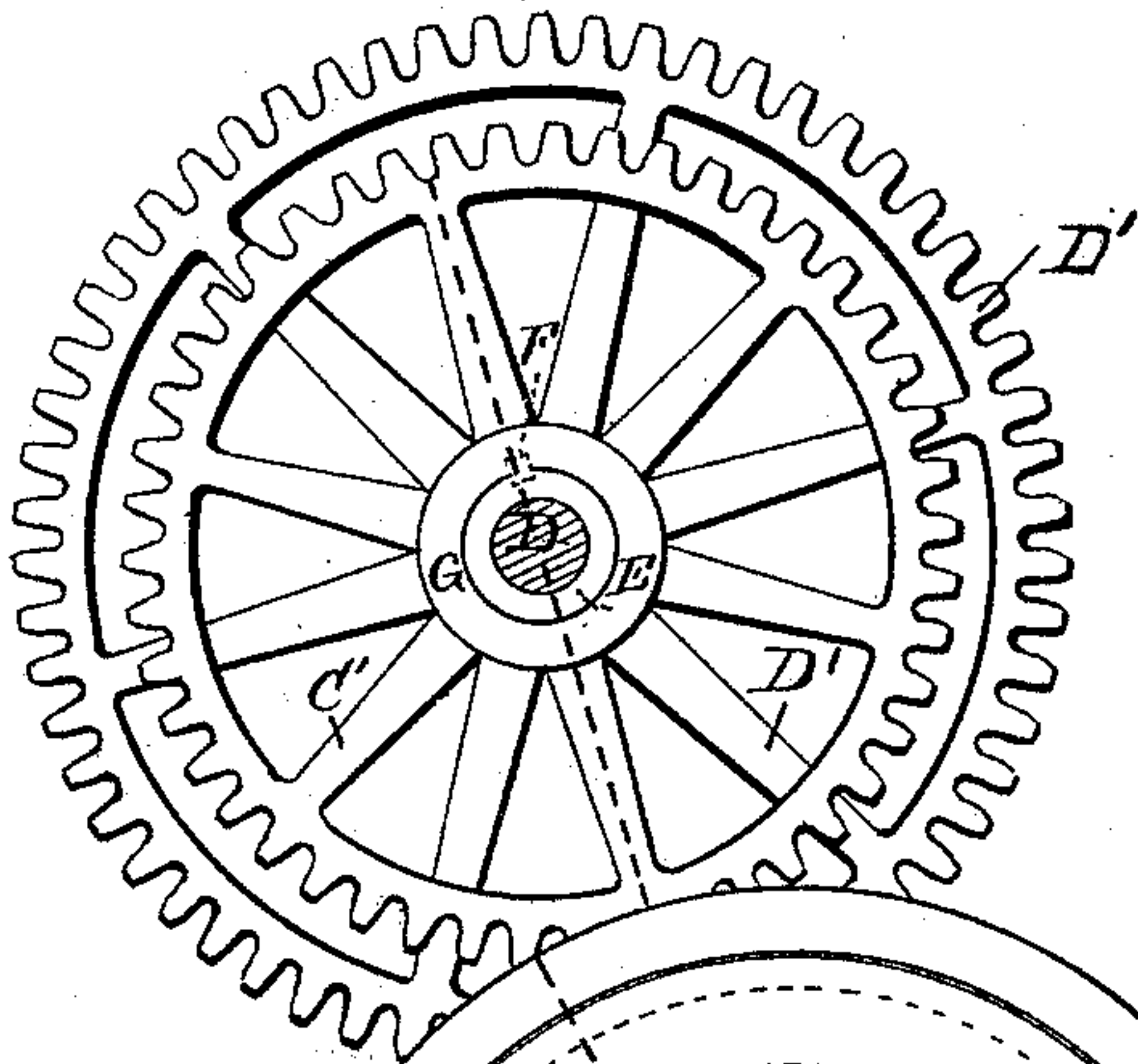


Fig. 1.

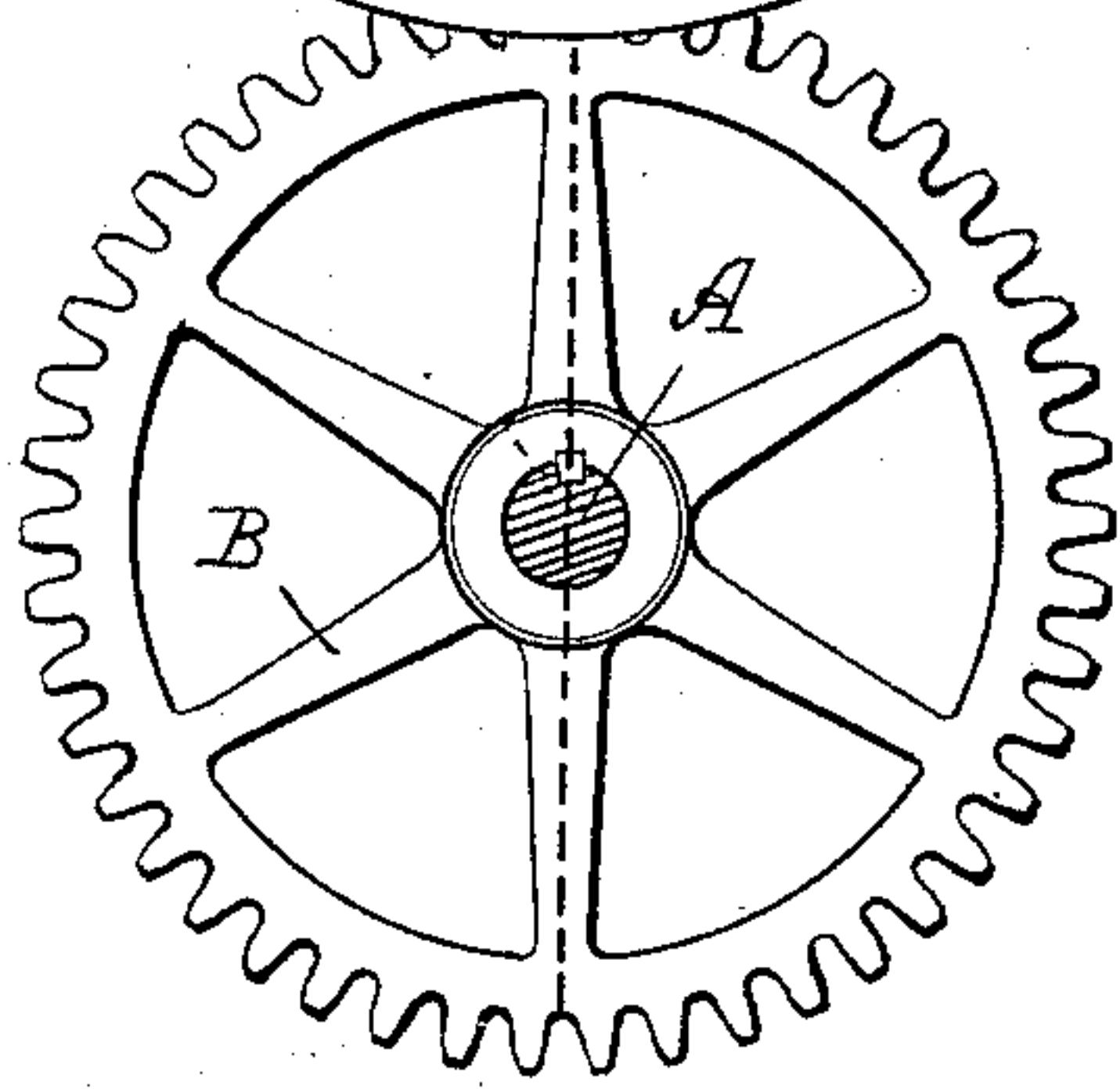
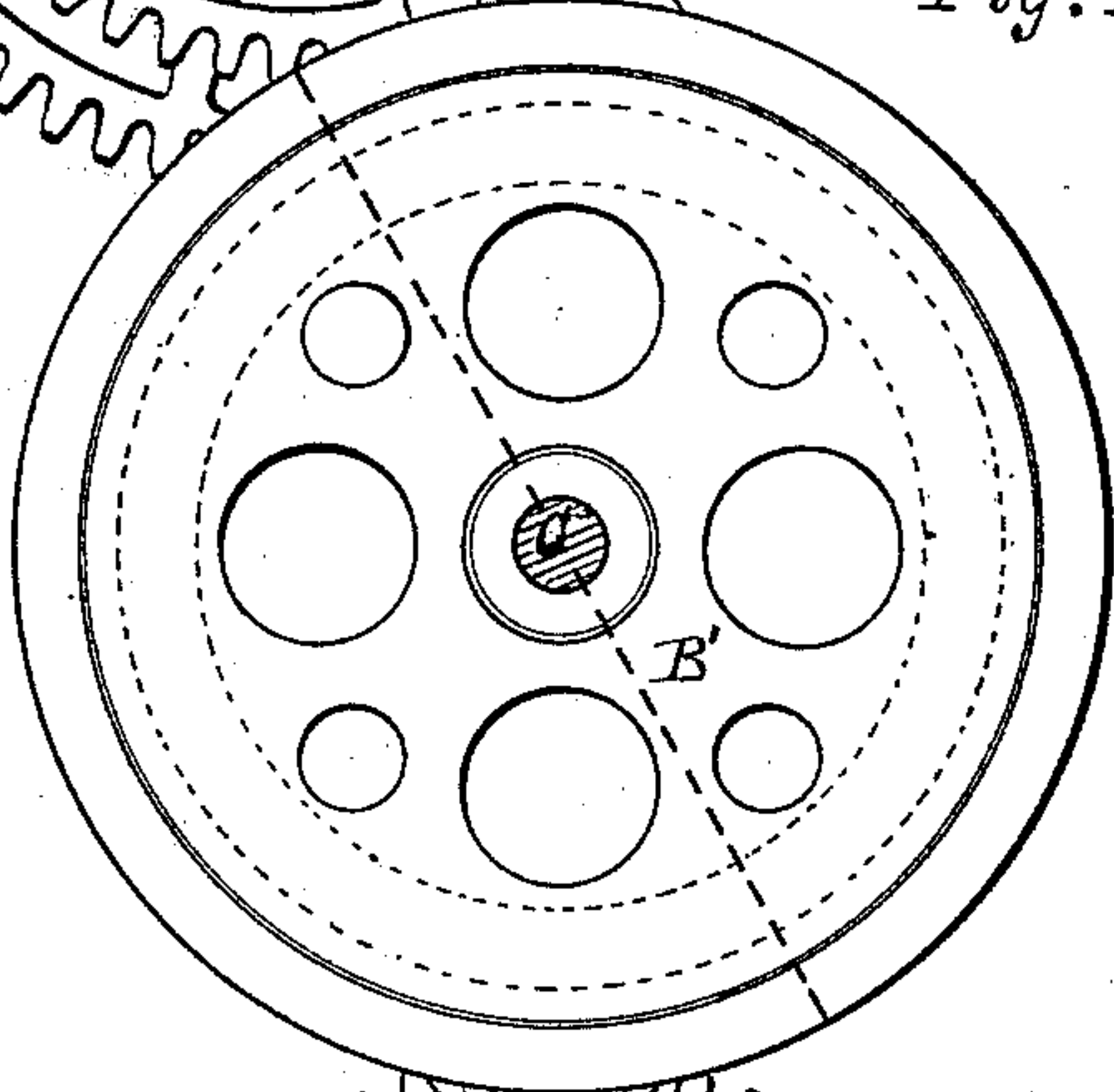


Fig. 3.

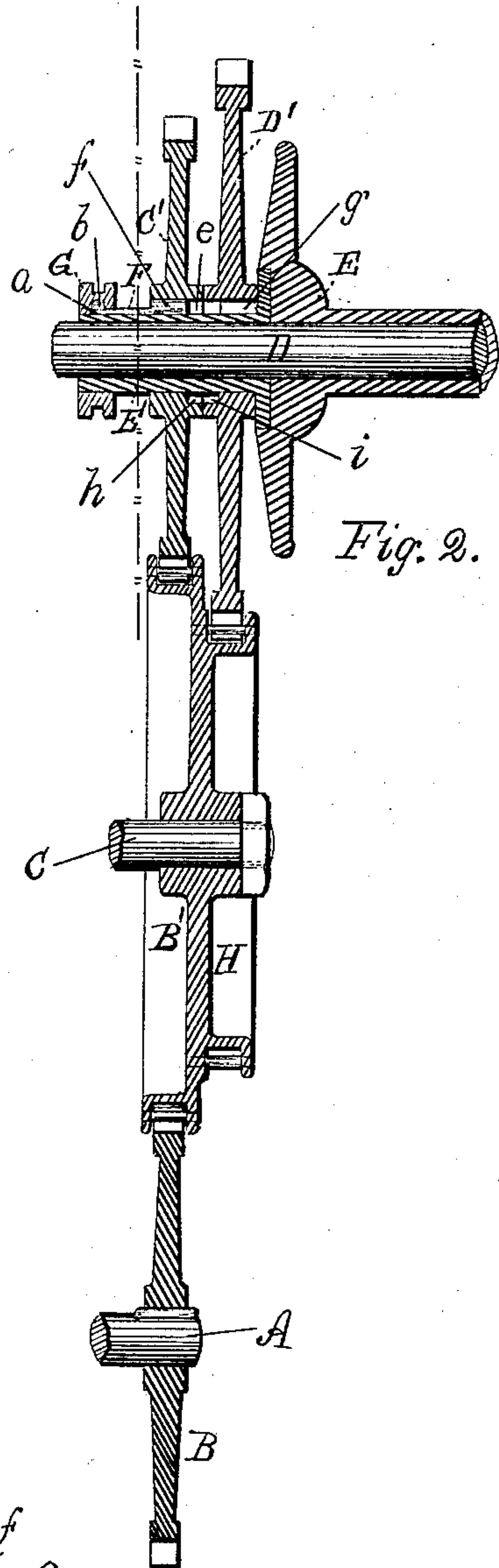
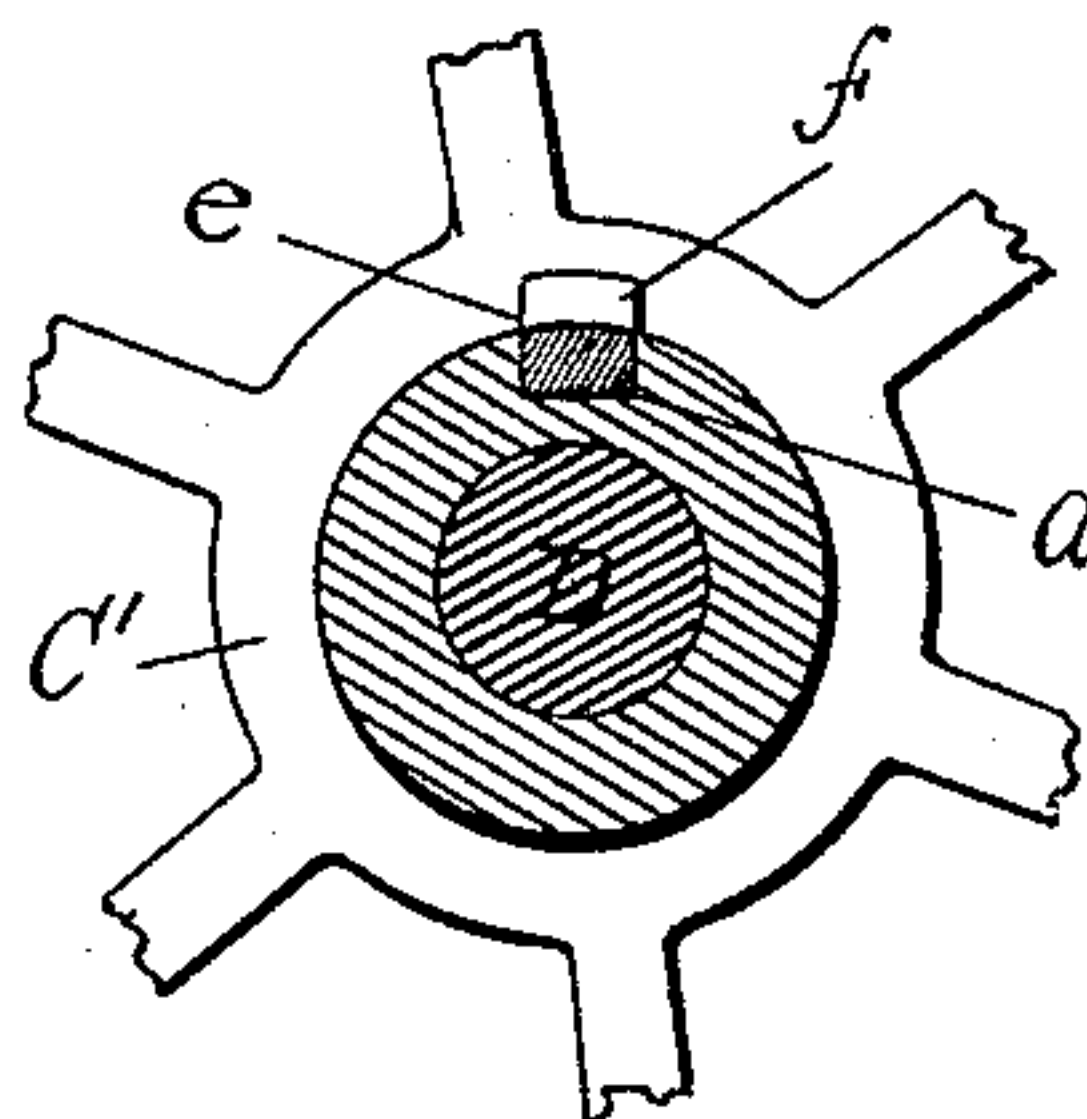


Fig. 2.

Witnesses.

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# UNITED STATES PATENT OFFICE.

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## SPEED ATTACHMENT FOR TRICYCLES.

SPECIFICATION forming part of Letters Patent No. 249,622, dated November 15, 1881.

Application filed June 11, 1881. (No model.)

*To all whom it may concern:*

Be it known that we, JAMES E. HOWARD and WILLIAM W. STALL, citizens of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Speed Attachments for Tricycles; and we do hereby 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 letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to mechanism for varying the speed of tricycles; and it consists in the construction and combination of devices and parts hereinafter set forth and claimed.

The drawings accompanying this specification represent, in Figure 1, an elevation of the speed device embodying our invention; Fig. 2, a vertical longitudinal section, while Fig. 3 is a cross-section, showing the spline and loose sleeve.

In these drawings, A represents a portion of the pedal-shaft of a tricycle; B, a spur-gear affixed to and rotating with it; B', a spur-gear placed over and engaging the gear B and pivoted upon a stud, C, projecting laterally from a suitable part of the frame of the machine.

C' is a spur-gear disposed above and engaging the gear B' and surrounding the shaft D, which receives motion from the main driving-wheels, the hub of one of such wheels being shown at E.

The above arrangement of parts is similar to the driving mechanism generally employed in tricycles, with the exception that the gear C', in lieu of being secured to and rotating with the hub E, as heretofore, loosely encompasses a sleeve, which, in turn, loosely surrounds the end of the shaft D, and is connected with the gear by a suitable clutch, as hereinafter explained.

In Fig. 2 of the drawings I have shown one method of carrying out the principle of our invention, and which consists as follows: To the outside of the hub E, I secure in any proper manner one end of a sleeve or tube, E', this sleeve loosely encompassing the outer end of

the shaft D and having a longitudinal groove, *a*, a sliding plate or spline, F, being disposed within this groove, and the outer face of such spline being flush, or practically so, with the periphery of the sleeve.

An ear, *b*, is erected upon the outer end of the spline F, and this ear is grasped by a notch, *c*, formed in the bore of an annular disk or head, G, which surrounds and is capable of sliding longitudinally upon the outer end of the tube E'. A shipper-rod is to be pivoted to the machine-frame and connected with the spline F, by which such spline may be forced in one or the other direction longitudinally of the shaft D. The spline F, with its feather *f*, and the head G, with a suitable shipper-rod, constitutes one class of clutch to engage either of the gears C' D' with the shaft D or disengage them therefrom. This form of clutch, however, may be varied to a wide extent without essentially departing from my invention.

The gear C' loosely surrounds the sleeve E', and has a groove, *e*, formed in the bore of its hub to receive a feather, *f*, formed upon the inner end of the spline F, the length of this feather being considerably less than that of said groove, for purposes to be explained.

D' in the drawings represents a spur-gear loosely encompassing the sleeve E', and, like the gear C', having a groove, *g*, in its bore capable of receiving the feather *f* before named, and being also of less length than said feather.

H in the drawings represents a spur-gear affixed to or making part of the gear B' and engaging the gear D'.

In operation of the tricycle the sleeve E' rotates at all times with the wheel-hub E. If the rider desires to exert an increased power over the machine, he seizes the shipper-rod and throws the spline F inward to its fullest extent, by which movement the feather *f* is removed from the groove of the lesser gear C' and forced into the groove of the larger gear D' to such sleeve, and transmitting the power of the gear B to the said gear D', and through the latter to the sleeve E' and the main driving-wheels, by the agency of the intermediate portion, H, of the intermediate gear or idler, B' H. If the rider desires to drive his machine at increased speed at the expense of power, he reverses the



movement of the shipper-rod and forces the spline F outward to its fullest extent, the result being that the feather *f* is removed from the groove of the gear D' and transferred to that of the gear C', and the latter gear becomes locked to and drives the sleeve E' and the driving-wheels of the machine through the gears B B', while the gear D' travels idly about the sleeve. If the rider wishes to allow his machine to run free, he seizes the shipper and forces the feather *f* to a position intermediate between C' and D', a concentric rabbet, *h* or *i*, being formed in the contiguous ends of the hubs of the said gears to constitute an annular groove to receive the feather *f* and permit the main wheels and the shaft D to rotate without effect upon the said gears C' and D' and the gears B', H, and B.

The number of the gears H D' may be increased, if desired; but in practice one of each will undoubtedly be found sufficient.

The relative positions of the gears B, C', and D' may be reversed from that shown in Fig. 2 of the drawings—that is, the gears C' and D', with the sleeve E' and spline F, may be attached to the pedal-shaft A, and the gear B secured to the hub E. So, also, with respect to the two gears C' D', *per se*, they may be arranged upon opposite sides of the pedal-shaft, and in place of the compound idlers B' H single idlers may be employed to transmit the power of the gears C' D' to the gear B when secured to the hub E.

In lieu of the intermediate or idler gear or gears B' H a chain may be employed to transmit motion from the gear B to the gears C' D'. Or, again, the two gears C' D' may be attached one to each axle of the main driving-wheels of the machine in lieu of being arranged closely together upon the outside of one of said wheels, as shown in Fig. 2 of the drawings. Or, still further, in lieu of the differential gears C' D'

and B' H with main driving-wheels of equal diameter, under the arrangement shown in Fig. 2, the said gears may be of equal size, while the wheels may be of different diameters and the motive power of the pedal-shaft transmitted to one or the other of said wheels, thereby obtaining differential speed or power.

Having thus explained the nature, purposes, and advantages of our invention, we claim and desire to secure by Letters Patent of the United States—

1. Spline F, provided with ear *b*, and feather *f*, in combination with pulley G, which receives said ear, the wheels C' and D', grooved to receive said feather, and the shaft D, said spline receiving longitudinal movement on said shaft by means of said pulley, substantially as set forth.

2. Shaft D and longitudinally-grooved sleeve E turning therewith, in combination with longitudinally-movable spline F, having external feather, *f*, and two wheels of different sizes, having their hubs internally grooved to receive said feather for the purpose of varying the operation of the machine by shifting said feather from one wheel to the other, substantially as set forth.

3. In combination with the movable spline F, having feather *f*, and the axle with which it turns, the wheels C' D', having internal grooves to receive said feather, and recesses *h i* to allow said feather, when shifted into an intermediate position, to rotate without communicating motion to either of said wheels.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES E. HOWARD.  
W. W. STALL.

Witnesses:

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F. G. SIMPSON.