(No Model.) 2 Sheets—Sheet 1.

A. W. BROWNE.

DENTAL ENGINE.

No. 460,687. Patented Oct. 6, 1891.

FIG. 1.

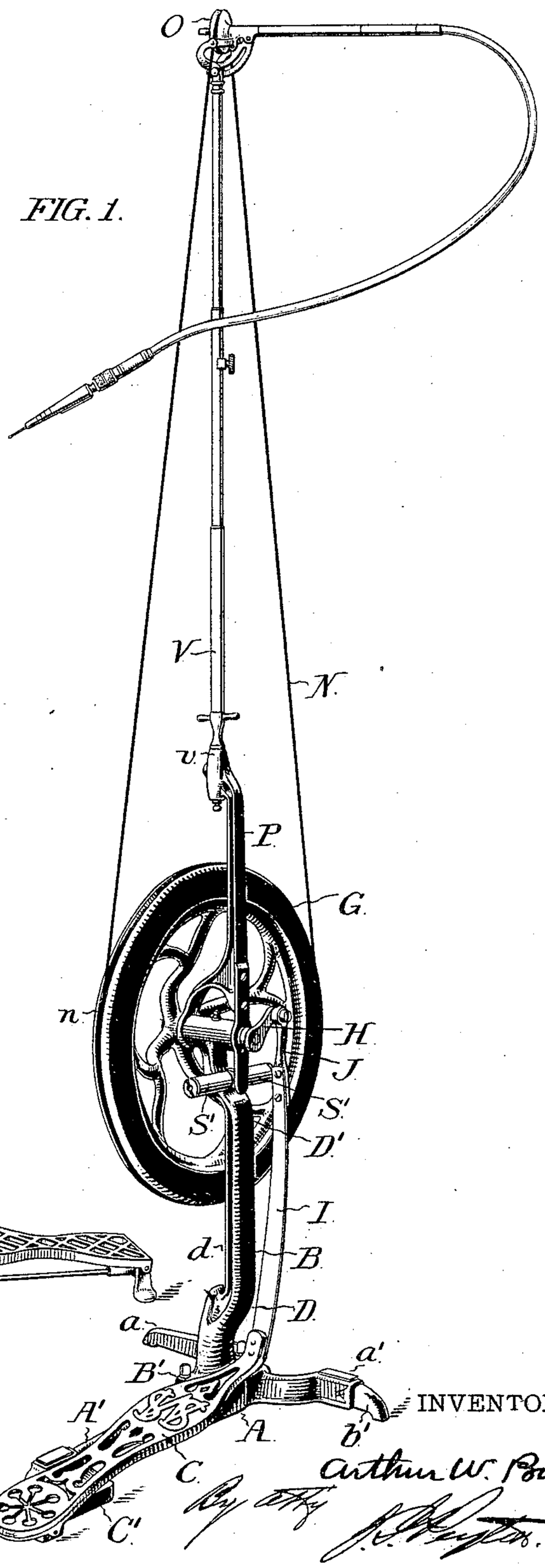

FIG. 9.

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INVENTOR

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(No Model.) 2 Sheets—Sheet 2.

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FIG. 10.

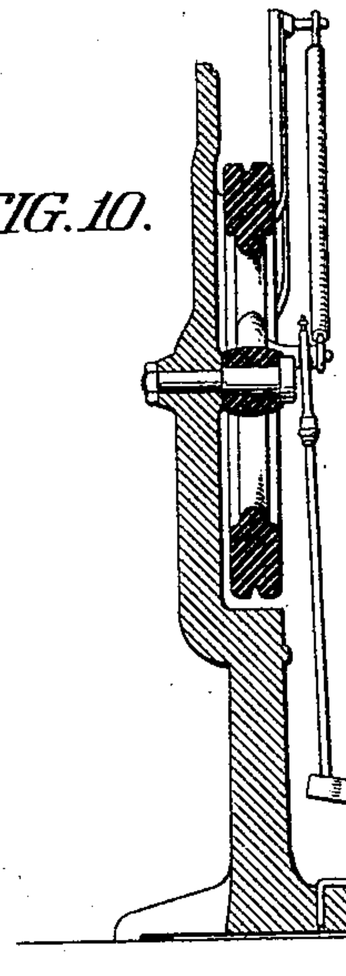


FIG. 2.

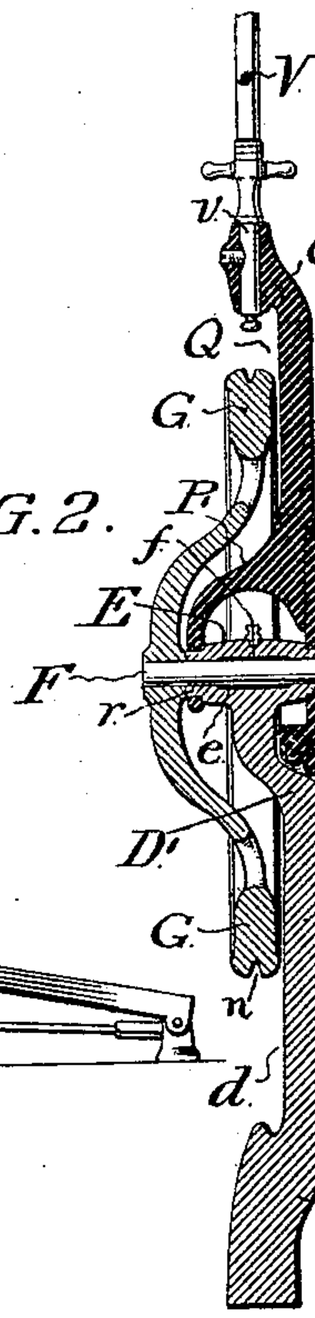


FIG. 3.

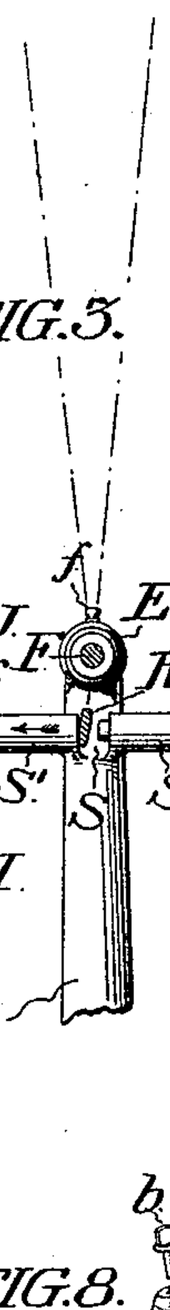


FIG. 4.

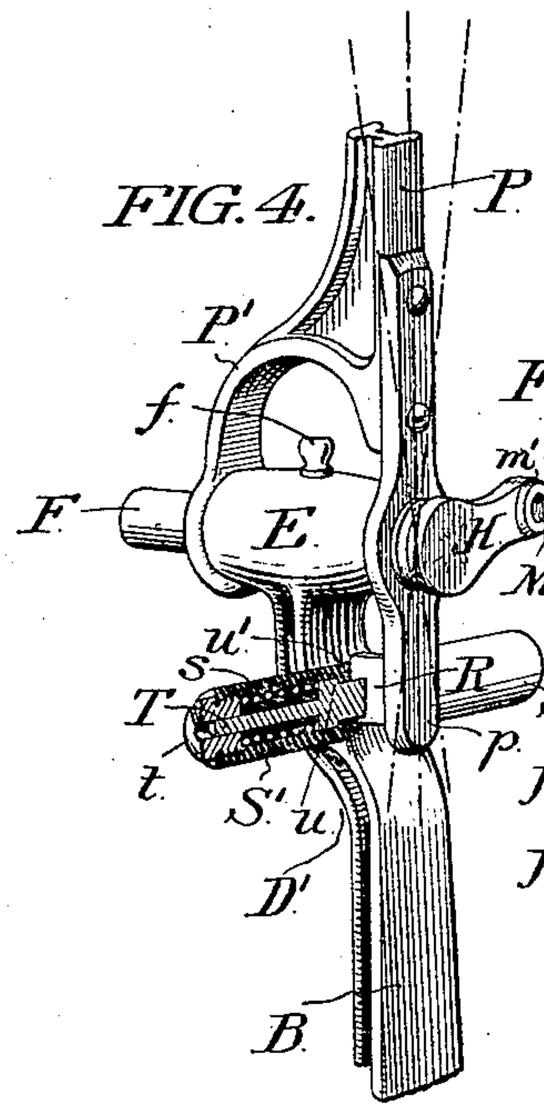


FIG. 5. FIG. 6.

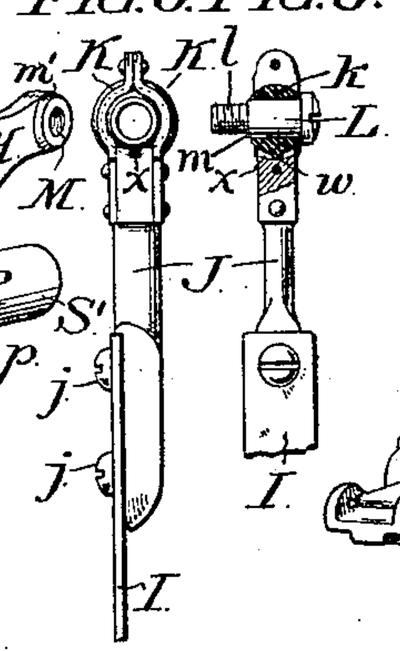


FIG. 8.

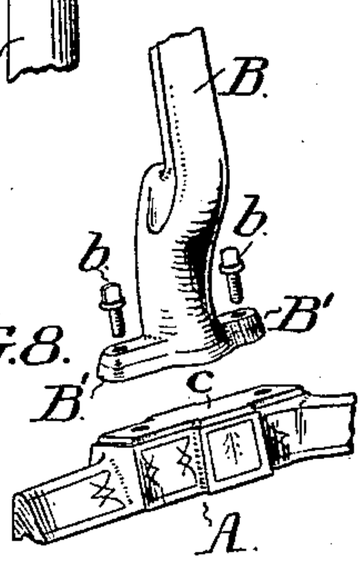
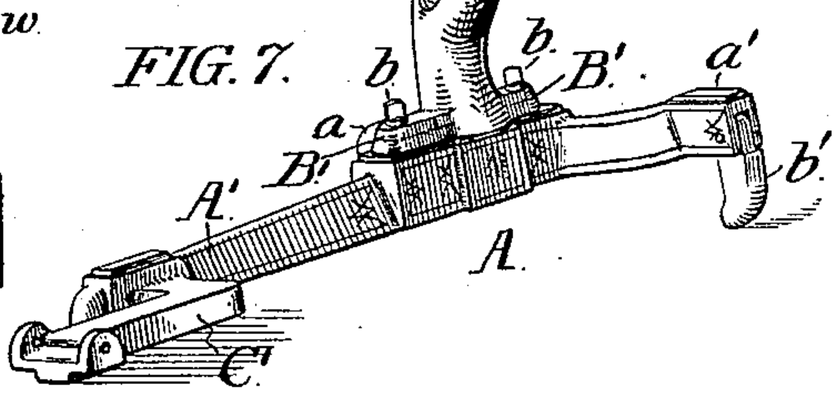


FIG. 7.



WITNESSES:

Geo. D. Heck.

Daniel W. Gillum

INVENTOR

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UNITED STATES PATENT OFFICE.

ARTHUR W. BROWNE, OF PRINCE'S BAY, NEW YORK, ASSIGNOR TO THE S. S. WHITE DENTAL MANUFACTURING COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

DENTAL ENGINE.

SPECIFICATION forming part of Letters Patent No. 460,687, dated October 6, 1891.

Application filed January 3, 1891. Serial No. 376,588. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR W. BROWNE, of Prince's Bay, Richmond county, State of New York, have invented certain new and useful Improvements in Dental Engines, of which the following is a specification.

My invention relates to certain improvements, as hereinafter claimed, in engines of the class in which driving-wheels operated by foot-power are employed to actuate endless cords through or by way of which to impart rotary motion to dental drills, &c.

In the accompanying drawings, which show a suitable embodiment of my improvements, Figure 1 is a view in perspective. Fig. 2 is a view, partly in elevation and partly in vertical central section, showing features of the frame, driven-pulley standard, driving-wheel, &c. Fig. 3 is an elevation, with parts in section, showing the upper portion of the frame and attachments thereof and with the driven-pulley standard indicated in different positions by dotted lines. Fig. 4 is a view in perspective, partly in section, showing portions of the frame and driven-pulley standard and their connections. Figs. 5 and 6 are views in elevation showing in part the treadle-actuated pitman and attachments thereof, parts being represented in section in Fig. 6; and Figs. 7 and 8 are views in perspective showing details of the frame. Figs. 9 and 10 show, respectively, a view in perspective and a view partly in elevation and partly in section of an engine of old and well-known construction, certain objectionable features of which are remedied by my improvements.

The engine-frame or supporting-stand is made in separable sections consisting of a suitable base A, having three arms or branches A′ *a a′*, and a side-recessed standard B, provided with lateral projections B′ B′ at its lower end by way of which to connect it with the base. Screw-bolts *b b*, passing through the frame-standard projections B′ B′ near their outer ends and engaging screw-holes in the base, serve to connect the two parts of the frame. The arms of the frame-base are provided with feet, one of which *b′* is pivoted so that it may be adjusted to incline the frame, and the engine-actuating foot-treadle C is pivoted at its heel to a side extension or bracket C′ of the main arm A′ of the frame-base, as usual. The projections B′ B′, engaged near their outer ends by the securing-bolts *b b*, are made prominent, so as to project a suitable distance in opposite directions from the frame-standard to locate the bolts far enough apart to insure a strong, snug-fitting, and unvarying connection between the standard and base when the former is fastened firmly down upon the nicely-finished level-surfaced rest or seat *c*, provided by the base. The side recess *d*, provided between the right and left or outward and inward lateral bends D D′ of the frame-standard, accommodates the driving-wheel, as in turn to be made apparent.

At its upper end the frame-standard B has a journal-bearing E, which overhangs or projects at its ends laterally to the frame-standard and in which turns the driving-shaft F, projecting at both ends therefrom. The driving-wheel G, fast on one end of this shaft, rotates at one side (the recessed side) of the frame-standard, and a crank H is provided at the other end of the shaft at the side of the standard opposite that next which the wheel is mounted. The crank is best formed with the driving-shaft and the driving-wheel keyed or otherwise suitably secured to the driving-shaft, so as to be detachable therefrom.

The usual spring-pitman I connects the toe of the actuating-treadle C with the cranked driving-shaft. Instead of a simple crank-pin connection between the driving-shaft and pitman I employ a ball-and-socket-joint connection, by preference constructed as follows: A pitman-tip or socket-carrier J is detachably connected, as by the screws *j j*, to the upper end of the spring-pitman I, and a divided ball-bearing or socket is formed by the straps K K, riveted to each other and to their carrier or tip of the pitman. As will readily be understood from inspection of Figs. 5 and 6, the ball *k*, being properly fitted in the curved concavo-convex opposite sections or straps of the socket, has accurate bearing therein when the straps are secured together and to the pitman-tip. The ball is formed with an opening constituting a bearing in which the crank-

pin L fits and turns. This crank-pin is provided with a screw-head and with threads *l* for screwing into a threaded socket M of the crank. A shoulder *m* on the crank-pin abuts against a boss *m'*, surrounding the threaded opening in the crank, and serves as a stop to insure proper engagement of the parts. To guard against unnecessary wear between the ball and its socket, movement of the ball about the crank-pin as an axis is prevented. A round stop-lug *w* on the ball engaging the socket-groove *x* serves to prevent turning or rocking of the ball otherwise than about an axis at a right angle to the crank-pin.

The driving-wheel is dished to cause it to project from its hub inward or toward the frame-standard, so that it rotates with its periphery close to this standard and within the recess thereof. An endless driving-cord N engages the peripheral groove *n* of the driving-wheel, which portion of the wheel is located in the plane of a line passing transversely through the driving-shaft about midway its length.

The bearing E for the driving-shaft is provided with an internal lubricant-chamber *e* between its ends. This chamber is formed by enlarging the bearing-opening, (see Fig. 2,) and oil is supplied by way of a communicating-duct intersecting the chamber at top and provided with a nipple or cup *f* for receiving the lubricant from an oil-can.

It will be seen that by way of the single duct and the central chamber about the driving-shaft oil may be supplied to the opposite ends of the bearing, in which ends the shaft is journaled, while between them it is surrounded by the oil in the chamber, the capacity of which is such as to supply lubricant for a long time without requiring replenishment thereof.

A sectional lengthwise adjustable standard, with the top of which the driven pulley O of a flexible shaft has supporting connection, as usual, is connected by its lower end or bottom section with the frame-standard in the following way: The lower section P of the driven-pulley standard is forked at bottom, one fork P' being provided by a lateral projection thereof, and the other *p* by a separately-formed and detachable arm suitably secured in place, as by screws. (See Figs. 1, 2, and 4.) A side recess Q of this standard-section accommodates the sidewise projection of the dished driving-wheel. This recess is provided between the bends or lateral projections P' and Q' of the standard-section at or near its lower and upper ends.

The forks P' *p* of the standard-section have bearings engaging oppositely-projecting journals or trunnions *r r*, formed by the ends of the sleeve of the projecting journal-bearing E at the upper end of the frame-standard, and in this way the pulley-carrying standard is adapted to rock.

In order to yieldingly maintain the pulley-carrying standard in its normal or upright position, limit its rocking movement, and restore it to its normal position when relieved of rocking pressure, I provide means as follows: The fork *p* is extended downward beneath its journal and has a laterally-projecting lug R, extending into a recess S of the frame-standard on the side thereof opposite that having the recess *d* for the driving-wheel. Stops S' S' on the frame-standard, and between which the lug R projects, serve to limit the movement of this lug, and, consequently, correspondingly restrain the rocking movement of the pulley-carrying standard. (See Fig. 3.) The stops S' S' are made hollow or in the form of tubes to constitute housings, each containing a spring *s*, Fig. 4, which springs are caused to act in opposition upon the lug R, with a tendency to maintain the pulley-carrying standard in its normal position. Each spring acts with its co-operating parts the same as the other, and detailed illustration of one set of these duplicate devices is deemed sufficient.

Within the housing formed by each stop S' the coiled spring *s* is confined between a perforated screw-cap *t* and the head of a plunger T. The plunger is adapted to reciprocate in the housing with its stem surrounded by the spring and working in the perforated screw-cap. A shoulder *u* of the plunger-head and an internal shoulder *u'* of the housing serve to limit movement of the plunger in the direction in which it is moved by the spring. The plungers, by abutting against the lug of the pulley-carrying standard, act as yielding stops, while the housings act as positive stops to limit the movement of this standard. By adjusting the screw-caps in or out the pressure exerted by the springs or either of them may be increased or diminished.

The upper telescoping portion V of the pulley-carrying standard is fitted in a socket *v* of the lower section P of this standard, in line with the grooved periphery of the driving-wheel, thus bringing the driven pulley O at the upper end of the standard into proper alignment with the driving-wheel.

From the above description it will be seen that the sections of the frame may readily be separated, and that in putting together the accurately-constructed and once properly-fitted parts, separation of which may have been required to facilitate storage, packing, and transportation, the making of repairs, &c., an accurate and unvarying adjustment of the frame-sections, regardless of the number of times they may have been separated, is provided for, resulting in securing the proper working positions relatively to each other of the pivot of the treadle-heel and the driving-shaft, parallelism of which parts is obviously essential to insure easy working. It will also be seen that in event of failure to attain exact parallelism of the driving-shaft with the axis of oscillation of the treadle the universal-joint connection between the pitman and driving-shaft crank will prevent injurious

binding or cramping of the parts and by the freedom of movement allowed insure easy running.

By locating the driving-wheel and the crank at opposite ends of the driving-shaft and at different sides of the frame and providing for free access to the driving-wheel the endless cord may quickly be applied to and removed from the wheel, as desired, and by providing the long bearing for the driving-shaft constituting the journal of the driving-wheel and dishing this wheel, so as locate its power-transmitting periphery in the plane of a line drawn midway the length of its journal, tendency of the journal to cant or tilt is effectually prevented and smooth easy running insured.

It will further be obvious that by mounting the driven-pulley standard so as to embrace and rock about the projecting frame-standard sleeve, in which is provided the bearing for the driving-shaft, a compact and strong construction is attained; that by housing the counterbalancing-springs for the driven-pulley standard and locating them as described they are protected, rendered highly efficient in action, and are out of the way, and that by my improvements the downwardly-extending arm or counterbalancing portion of the pulley-standard is inside the pitman and crank of the driving-shaft, flush, or nearly so, with the frame-standard, and entirely out of the way.

I claim as my invention—

1. The combination of the side-recessed frame provided with the projecting journal-bearing, the driving-shaft mounted in said journal-bearing and projecting at both ends therefrom, the exposed dished driving-wheel attached to one end of the driving-shaft, and the crank at the opposite end of the driving-shaft, substantially as and for the purpose set forth.

2. The combination of the frame, the projecting journal-bearing, the driving-shaft mounted in said journal-bearing and projecting at both ends therefrom, the exposed driving-wheel attached to one end of the driving-shaft, the crank at the opposite end of the driving-shaft, and the drive-pulley standard forked at its lower end and having both of its forks mounted to rock about the sleeve of the journal-bearing between the driving-wheel and crank-shaft, substantially as and for the purpose set forth.

3. The combination of the side-recessed frame provided with the projecting journal-bearing, the driving-shaft mounted in said journal-bearing and projecting at both ends therefrom, the exposed dished driving-wheel attached to one end of the driving-shaft, the crank at the opposite end of the driving-shaft, and the side-recessed driven-pulley standard mounted at its lower end to rock about the sleeve of the journal-bearing between the driving-wheel and crank-shaft, substantially as and for the purpose set forth.

4. The combination of the frame, the treadle, the driving-shaft, the crank thereof, the crank-pin, the pitman, the socket provided at the upper end of the pitman, and the ball engaging the pitman-socket and having the crank-pin bearing, substantially as and for the purpose set forth.

5. The combination of the crank-shaft, the crank-pin, the ball having a bearing for the crank-pin and provided with the stop-lug, and the pitman provided at its upper end with the socket and groove for receiving the ball and its stop-lug, substantially as and for the purpose set forth.

6. The combination of the frame provided with the stops and the driven-pulley standard mounted at its lower end to rock about the frame above said stops and provided with the downwardly-extending arm acting against the stops to limit rocking movement of the standard, substantially as and for the purpose set forth.

7. The combination of the frame provided with the stops, the spring-actuated plungers housed in said stops, and the driven-pulley standard mounted at its lower end to rock about the frame above said stops and provided with the downwardly-extending arm acted upon by said plungers, substantially as and for the purpose set forth.

In testimony whereof I have hereunto subscribed my name.

ARTHUR W. BROWNE.

Witnesses:
GEO. D. HECK,
DANIEL W. GILLUM.