

No. 658,004.

Patented Sept. 18, 1900.

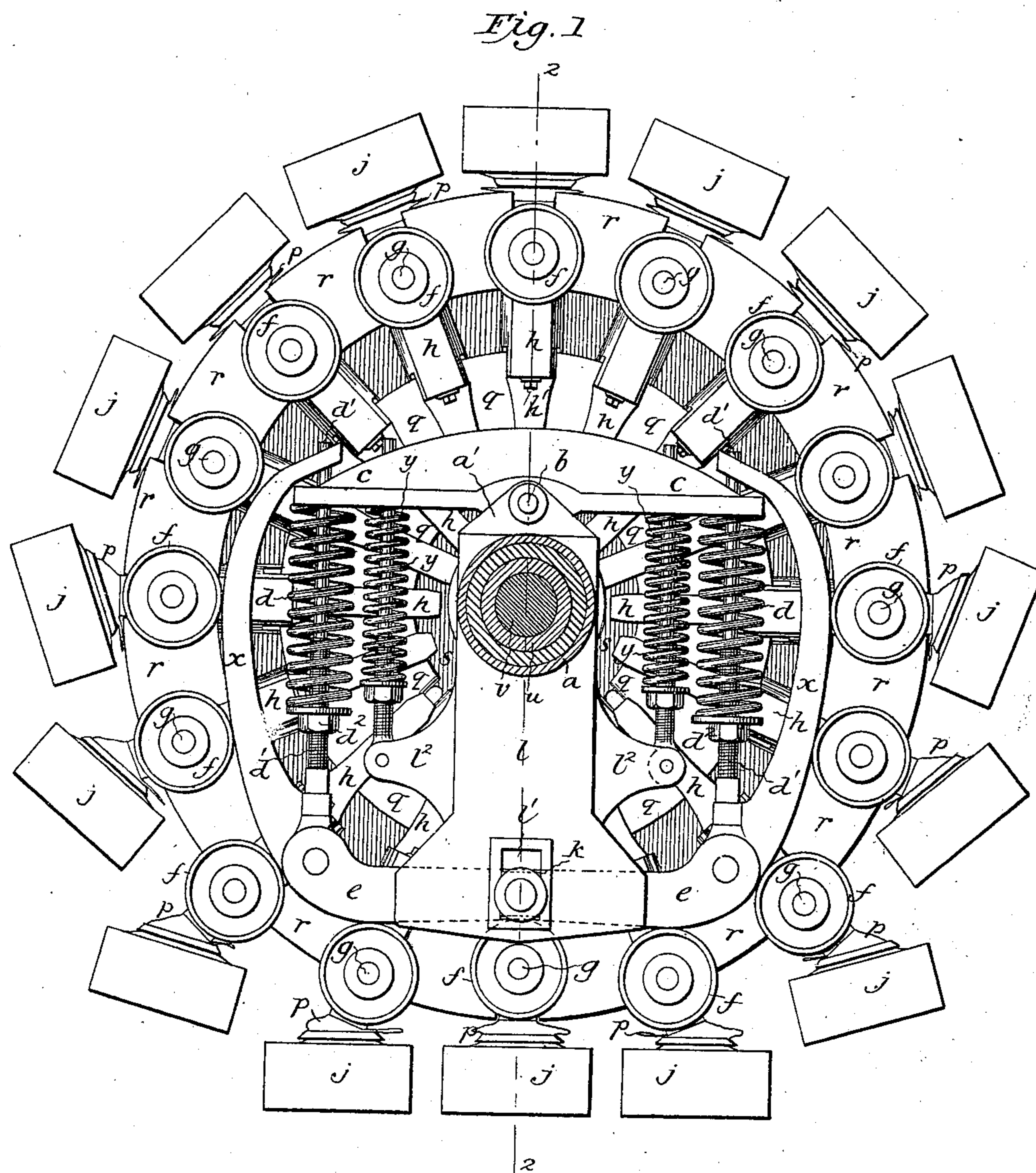
B. J. DIPLOCK.

WHEEL

(Application filed Feb. 7, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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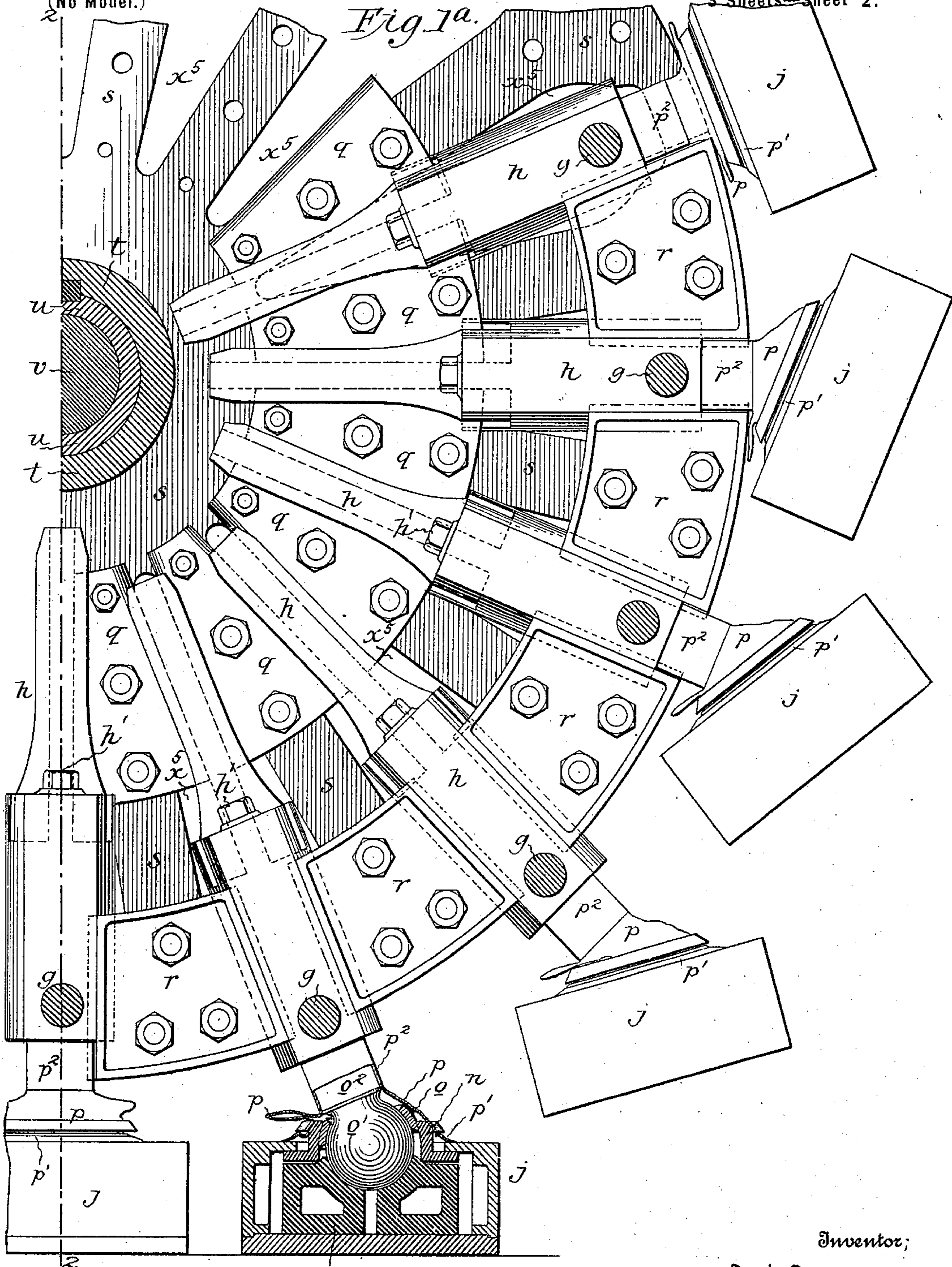
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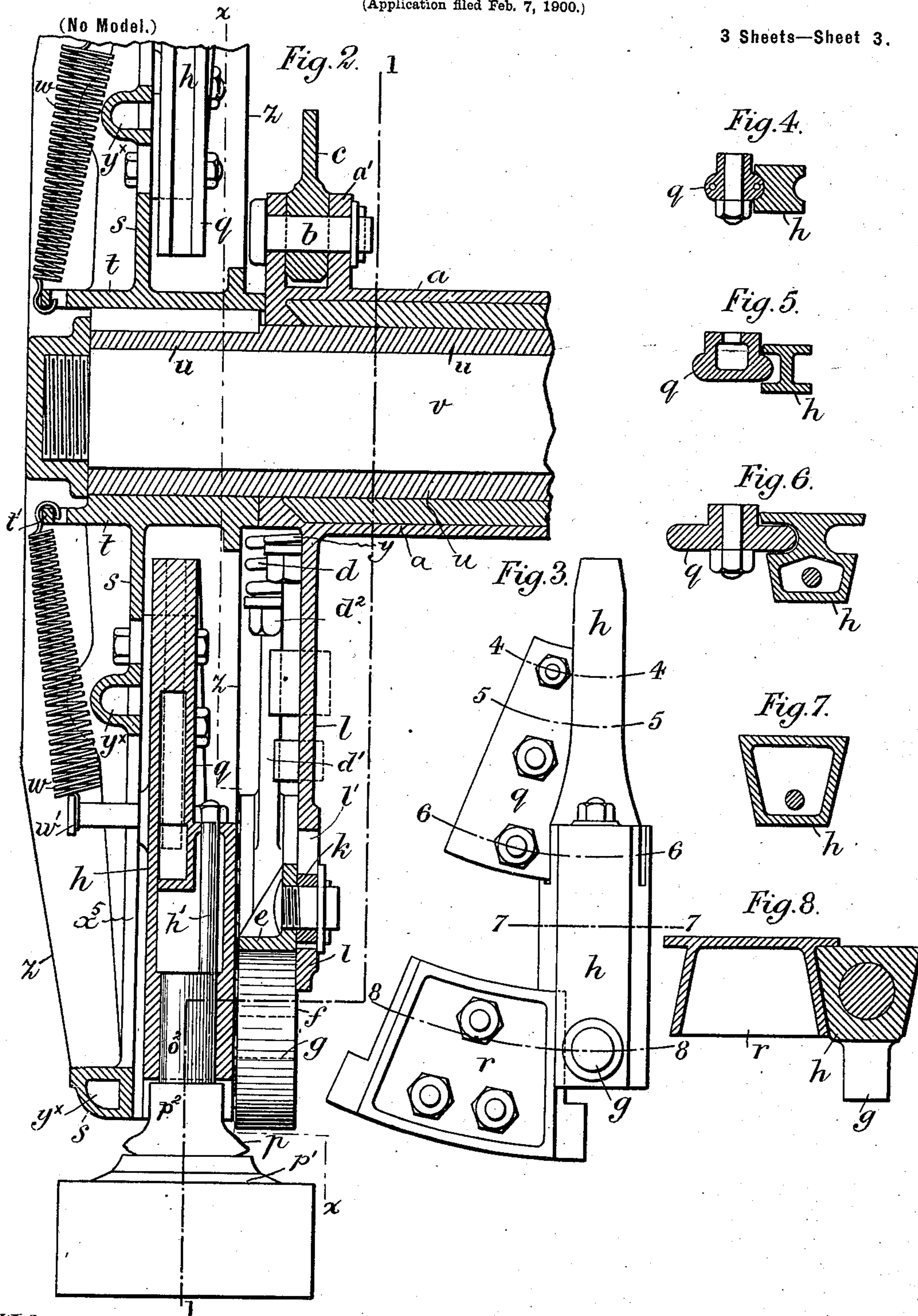
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# UNITED STATES PATENT OFFICE.

BRAMAH J. DIPLOCK, OF LONDON, ENGLAND.

## WHEEL.

SPECIFICATION forming part of Letters Patent No. 658,004, dated September 18, 1900.

Application filed February 7, 1900. Serial No. 4,344. (No model.)

*To all whom it may concern:*

Be it known that I, BRAMAH JOSEPH DIPLOCK, engineer, a subject of the Queen of Great Britain, residing at 53 Ashley Gardens, Westminster, London, in the county of Middlesex, England, have invented a certain new and useful Wheel, of which the following is a specification.

According to this invention the vehicle as it moves places feet on the ground. These feet support rollers on which rails on the vehicle run. The feet consist of hollow cylinders of any-shaped cross-section, having inside them blocks free to move in any radial direction, but prevented from moving in an axial direction by the cylinder ends. The blocks are connected by ball-and-socket or other universal joints to the ends of spokes free to slide in radial guides in a disk keyed to or run loose on the axle of the vehicle, so that the spokes with the feet at their ends revolve with the disk. The rollers are pivoted to these spokes, and the latter are normally drawn inward by springs, so that the feet are normally held in contact with the edge of the disk; but the rollers are forced outward by guides or inclines as they come to the leading end of the rail, and the feet are thus brought successively into contact with the ground. The rails are preferably not rigidly attached to the vehicle; but each consists of a lever pivoted to a block which is free to rise and fall, and also pivoted to the lower ends of two vertical rods whose upper ends are pivoted to the ends of a horizontal lever pivoted at its middle to the axle-box or other part of the vehicle. Springs are provided, so that the rods can rise and fall relatively to the horizontal lever. Springs are also preferably provided tending to keep the lever in a horizontal position. The lever forming the rail rests on one or more of the rollers, and any inequalities of the ground are compensated for by the movements of the rail about its pivots. The guides or inclines for the rollers are pivoted to the ends of the lever forming the rail and to the vertical rods, so that they adjust themselves to the varying positions of the levers.

Figure 1 is a vertical section on the line 1 1, Fig. 2, showing the wheel of a traction-engine constructed according to this invention. Fig.

1<sup>a</sup> shows a vertical section, on an enlarged scale, on the line *x x* of Fig. 2. Fig. 2 is a vertical section on the line 2 2, Fig. 1. Fig. 3 is a side elevation of one of the spokes *h* with two out of its four guides. Figs. 4 to 8 are local sections on the lines 4 4 to 8 8, Fig. 3.

*a* is an axle-box or sleeve forming part of the body of the engine. It is provided with an upward extension *a'* and is hung by the pivot *b* to the middle of the horizontal lever *c*, whose ends are supported by springs *d*, the center rods *d'* of which are pivoted at their lower ends to the horizontal rail *e*, which therefore supports the whole weight of the engine. As shown, the lower ends of the springs *d* rest on nuts *d''* on the rods above their lower pivoted ends. The rail *e* rests on rollers *f*, free to turn on pivots *g*, fixed to spokes *h*, which are connected by ball-and-socket joints to feet *j*.

Pivoted to the center of the rail *e* is a block *k*, free to move up and down in a slot *l'* in the plate *l*, which is made in one piece with a sleeve or axle-box *a* and depends therefrom.

Each foot consists of a hollow cylindrical box *j*, having inside it a block *m* free to move in it. Above the block is an inverted cup *n*, also free to move in the box *j* and having within it a second cup *o*, containing a ball *o'* at the extremity of a bar *o''*, passing up through the spoke and bolted thereto, as shown at *h'*, thus forming a double ball-and-socket joint, which gives more play than a single one.

*p* is a cover of leather or other flexible material to prevent the entrance of dirt into the joint. *p'* is a corrugated sheet-metal cover for the same purpose. The upper end of the cover *p* is fixed to the sleeve *p''*, which is free to turn on the spoke.

The spokes *h* work between guides *q* and *r*, bolted to the disk or wheel *s*, formed in one piece with the boss *t*, which latter is keyed to the sleeve *u* on the shaft *v*. The disk or wheel *s* is a thin disk with portions cut away, as shown by dotted lines in Fig. 1<sup>a</sup>, opposite the spokes. The form of the guides *q* and *r* is clearly shown in the drawings. The details are clearly indicated in Figs. 3 to 8, inclusive, which figures also clearly indicate the form of the spokes. Springs *w* (see Fig. 2) are provided, which tend to draw the spokes *h* inward until the tops of the feet *j* bear against

the edge of the disk or wheel *s*, as shown in the upper part of Fig. 1. The springs *w* are attached to studs *w'* on the spokes, projecting through the cut-away portions *x*<sup>5</sup> of the disk, and to projections *t'* of the boss *t*.

*x* are guides fixed to the center rods of the springs *d*. When the sleeve *u* is driven in the usual way, the disk *s* and feet *j* revolve with it, and the rollers *f*, coming against the guides *x*, are forced outward.

*z* are sheet-iron casings to exclude dirt, and *y*<sup>x</sup> are circular oil-channels which may be connected by suitable ducts to the guides *q* and *r*.

In Fig. 1 one of the rollers *f* on the right-hand side of the wheel is just out of contact with the guide *x*. The next roller is in contact, but has not been materially forced outward, while the others have gone outward to a greater or less extent. This outward movement of the rollers and spokes frees the tops of the feet *j*, and the latter now turn by their own weight on the ball-and-socket joints, as shown in Fig. 1, so that they come flat onto the ground.

*y* are springs whose center rods are pivoted to arms *l*<sup>2</sup> of the plate *l* and bear on the under side of the lever *c* and tend to keep it in a horizontal position.

What I claim is—

1. The combination of a vehicle-body, an oscillating rail pivoted to it, feet carried by it, means for placing the feet successively on the ground and rollers pivoted to the feet and supporting the rail.

2. The combination of a vehicle-body, an axle and a rail carried by it, a disk pivoted on the axle, guides on the disk, spokes working in the guides, feet pivoted to the spokes, means for placing the feet successively on the ground and rollers pivoted to the feet and supporting the rail.

3. In a foot for supporting a vehicle, the combination of a box, a block free to move inside the box, a spoke and a universal joint connecting the spoke to the block.

4. In a foot for supporting a vehicle, the combination of a box, a block having a spherical recess in its top free to move inside the box, an inverted cup resting on the block and also free to move in the box, a second cup inside the first, a spoke and a ball on the end of the spoke fitting inside the recess and the inner cup.

5. The combination of a vehicle-body, a lever pivoted to the body and supporting it, a rail, spring connections between the lever and rail, feet carried by the body, means for placing the feet successively on the ground and rollers pivoted to the feet and supporting the rail.

6. The combination of a vehicle-body, a lever pivoted to the body and supporting it, a rail, spring connections between the lever and rail, a disk pivoted to the body, guides on the disk, spokes working in the guides, springs

tending to draw the spokes inward, feet pivoted to the spokes, rollers pivoted to the spokes and means for forcing the rollers outward as the feet approach the ground and guiding them beneath the rail.

7. The combination of a vehicle-body, a lever pivoted to the body and supporting it, a guide fixed to the body, a rail, a pivot at the middle of the rail working in the guide, spring connections between the lever and rail, feet carried by the body, means for placing the feet successively on the ground and rollers pivoted to the feet and supporting the rail.

8. The combination of a vehicle-body, a lever pivoted to the body and supporting it, a guide fixed to the body, a rail, a pivot at the middle of the rail working in the guide, spring connections between the lever and rail, a disk pivoted to the body, guides on the disk, spokes working in the guides, springs tending to draw the spokes inward, feet pivoted to the spokes, rollers pivoted to the spokes and means for forcing the rollers outward as the feet approach the ground and guiding them beneath the rail.

9. The combination of a vehicle-body, a lever pivoted to the body and supporting it, a rail, spring connections between the lever and rail, a disk pivoted to the body, guides on the disk, spokes working in the guides, springs tending to draw the spokes inward, universal joints at the ends of the spokes, feet carried by the joints, rollers pivoted to the spokes and means for forcing the rollers outward as the feet approach the ground and guiding them beneath the rail.

10. The combination of a vehicle-body, a lever pivoted to the body and supporting it, a guide fixed to the body, a rail, a pivot at the middle of the rail working in the guide, spring connections between the lever and rail, a disk pivoted to the body, guides on the disk, spokes working in the guides, springs tending to draw the spokes inward, universal joints at the ends of the spokes, feet carried by the joints, rollers pivoted to the spokes and means for forcing the rollers outward as the feet approach the ground and guiding them beneath the rail.

11. The combination of a vehicle-body, a lever pivoted to the body and supporting it, a rail, spring connections between the lever and rail, feet carried by the body, means for placing the feet successively on the ground, rollers pivoted to the feet and supporting the rail, and spring connections between the body and the lever.

12. The combination of a vehicle-body, a lever pivoted to the body and supporting it, a rail, spring connections between the lever and rail, a disk pivoted to the body, guides on the disk, spokes working in the guides, springs tending to draw the spokes inward, feet pivoted to the spokes, rollers pivoted to the spokes, means for forcing the rollers outward as the feet approach the ground and

guiding them beneath the rail, and spring connections between the body and the lever.

13. The combination of a vehicle-body, a lever pivoted to the body and supporting it, 5 a guide fixed to the body, a rail, a pivot at the middle of the rail working in the guide, spring connections between the lever and rail, feet carried by the body, means for placing the feet successively on the ground, rollers pivoted to the feet and supporting the rail, and spring connections between the body 10 and the lever.

14. The combination of a vehicle-body, a lever pivoted to the body and supporting it, 15 a guide fixed to the body, a rail, a pivot at the middle of the rail working in the guide, spring connections between the lever and rail, a disk pivoted to the body, guides on the disk, spokes working in the guides, springs 20 tending to draw the spokes inward, feet pivoted to the spokes, rollers pivoted to the spokes, means for forcing the rollers outward as the feet approach the ground and guiding them beneath the rail, and spring connections 25 between the body and the lever.

15. The combination of a vehicle-body, a lever pivoted to the body and supporting it, a rail, spring connections between the lever

and rail, a disk pivoted to the body, guides on the disk, spokes working in the guides, 30 springs tending to draw the spokes inward, universal joints at the ends of the spokes, feet carried by the joints, rollers pivoted to the spokes, means for forcing the rollers outward as the feet approach the ground and 35 guiding them beneath the rail, and spring connections between the body and the lever.

16. The combination of a vehicle-body, a lever pivoted to the body and supporting it, a guide fixed to the body, a rail, a pivot at 40 the middle of the rail working in the guide, spring connections between the lever and rail, a disk pivoted to the body, guides on the disk, spokes working in the guides, springs 45 tending to draw the spokes inward, universal joints at the ends of the spokes, feet carried by the joints, rollers pivoted to the spokes, means for forcing the rollers outward as the feet approach the ground and guiding them 50 beneath the rail, and spring connections between the body and the lever.

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Witnesses:

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