

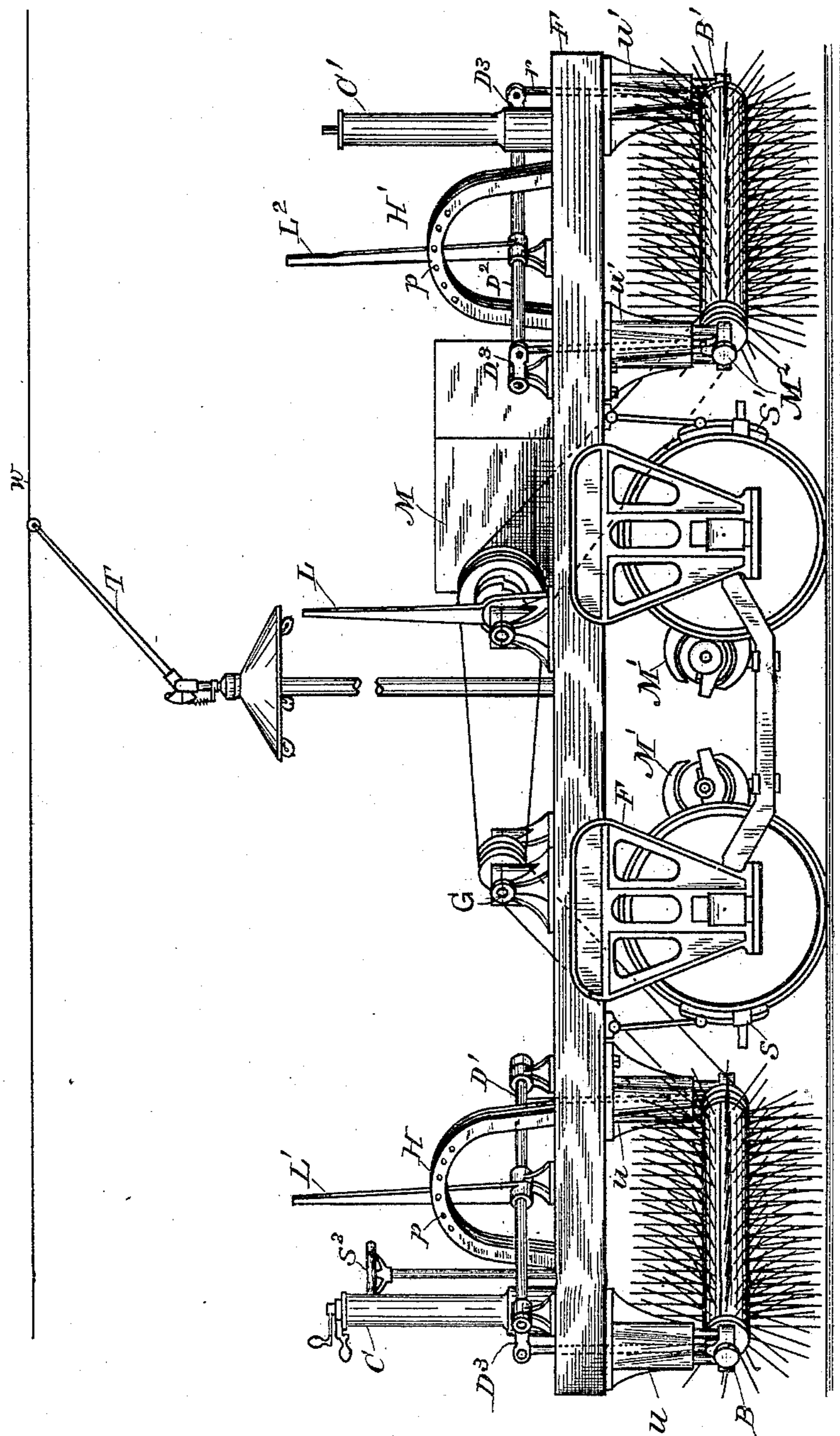
(No Model.)

3 Sheets—Sheet 1

I. F. BAKER & R. BOOTH.  
SNOW SWEEPER.

No. 444,871.

Patented Jan. 20, 1891.



WITNESSES:

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**INVENTOR**

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(No Model.)

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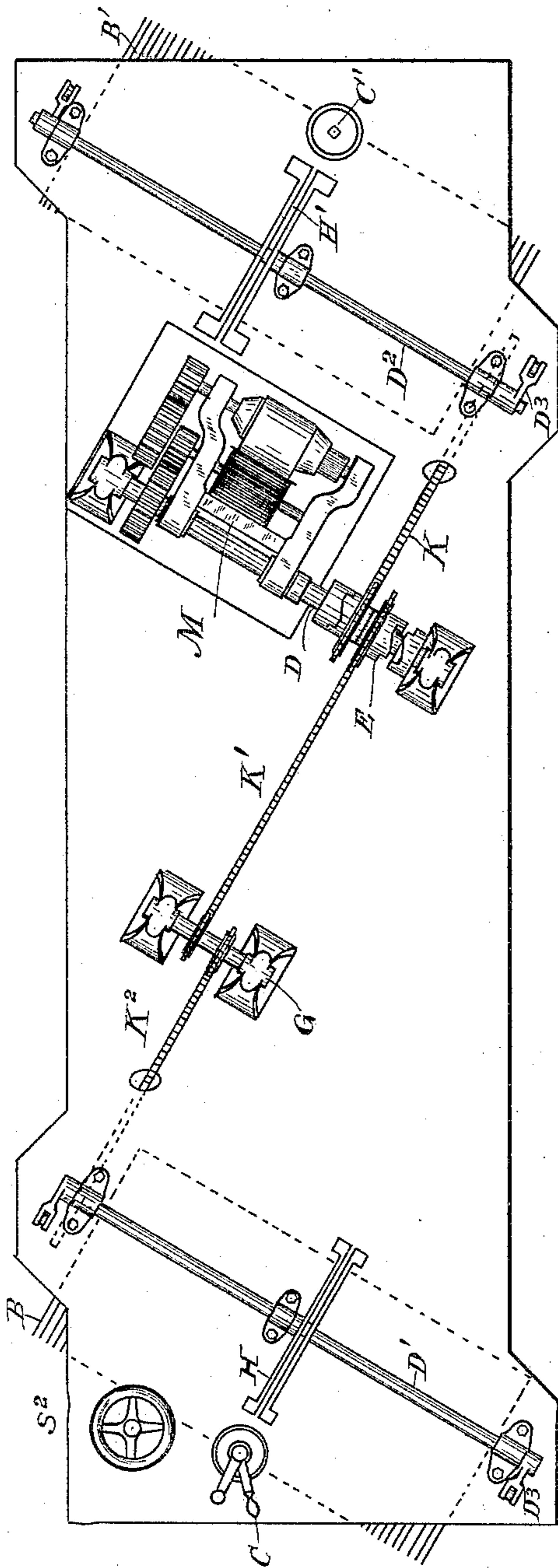


Fig. 2.

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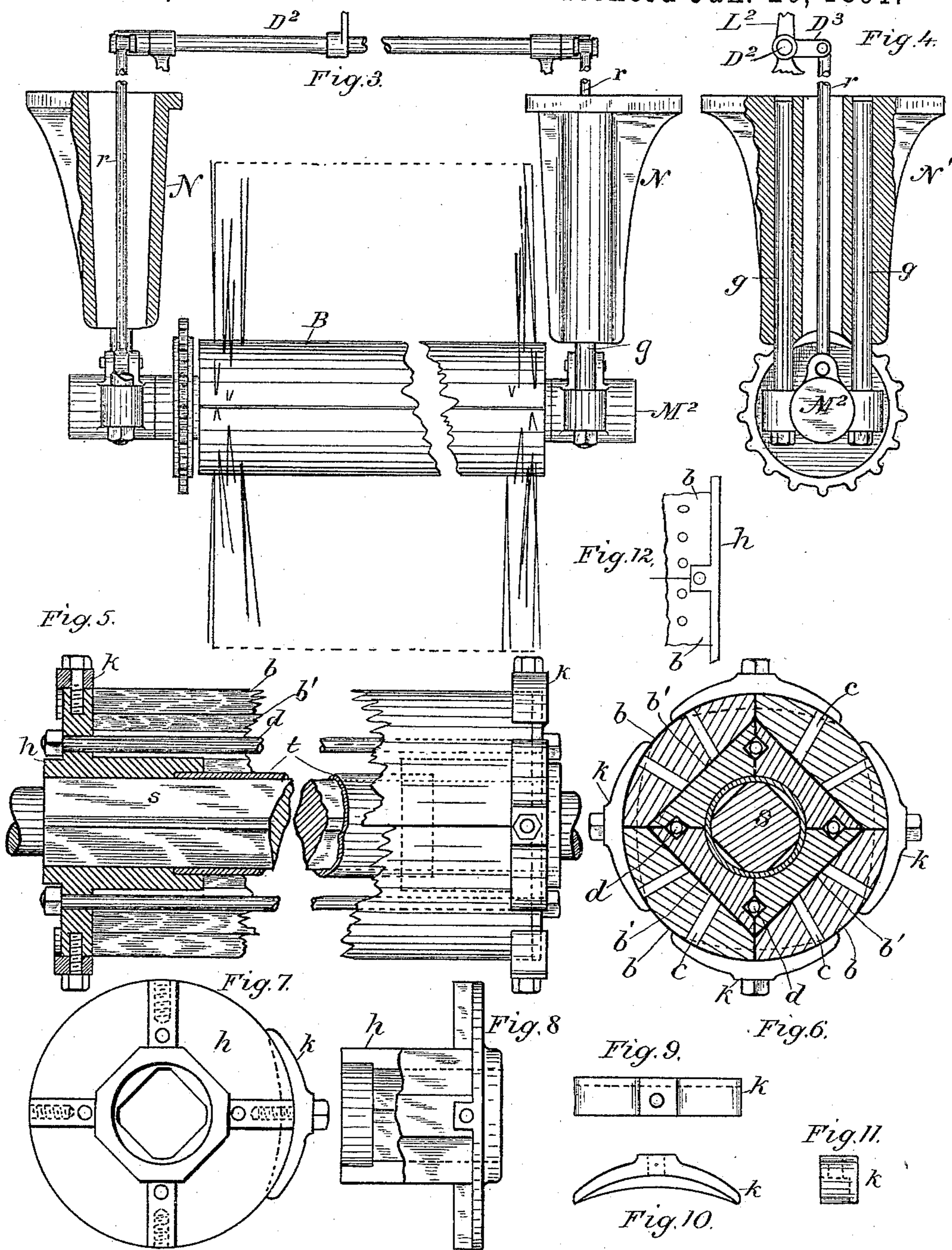
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I. F. BAKER & R. BOOTH.  
SNOW SWEEPER.

No. 444,871.

Patented Jan. 20, 1891.



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# UNITED STATES PATENT OFFICE.

ISAAC F. BAKER, OF LYNN, AND ROBERT BOOTH, OF MALDEN, MASSACHUSETTS, ASSIGNORS TO THE THOMSON-HOUSTON ELECTRIC COMPANY, OF CONNECTICUT.

## SNOW-SWEEPER.

SPECIFICATION forming part of Letters Patent No. 444,871, dated January 20, 1891.

Application filed January 29, 1890. Serial No. 338,441. (No model.)

*To all whom it may concern:*

Be it known that we, ISAAC F. BAKER and ROBERT BOOTH, both subjects of the Queen of Great Britain, and residents of Lynn, in the county of Essex and State of Massachusetts, and Malden, county of Middlesex and State of Massachusetts, respectively, have invented certain new and useful Snow-Sweepers, of which the following is a specification.

10 This invention relates to rotary sweepers for use in clearing streets and roadways—such as surface railways—from snow or dirt, but is more particularly applicable to snow-sweepers for railways, and especially street-railways in which the cars or vehicles are propelled by a self-carried motor, as an electric motor supplied from an outside source through a line-conductor, as now well understood in the art.

20 The object of the invention is to secure an effective apparatus for clearing the tracks of accumulations of snow, and the apparatus is so constructed that deposits of considerable amount can be dealt with, and its capacity for clearing the tracks of such accumulations is far superior to that of apparatus drawn by horses or mules.

A further object of the invention is to secure entire independence of the power for propelling the car along the street and the power for operating the snow broom or brush—that is, rotating it—both of these separate and distinct power mechanisms being wholly under the control of the engineer or drivers, one or more.

Our invention consists in the organization and combinations of apparatus hereinafter described, and specified in the claims.

40 The invention consists in the manner of supporting the brushes for rotation, the manner of rotating them, and in the general arrangement of the car-truck, motor, and controlling mechanism, as hereinafter described.

In the accompanying drawings, Figure 1 is a side view illustrating the snow-sweeper car-truck and the attendant mechanism fashioned after the manner of the invention. Fig. 2 is a plan of the same, illustrating the relative arrangement of the brooms and the

driving mechanism therefor. Figs. 3 and 4 show the bearings for the snow broom or brush and the manner of raising and lowering the same relatively to the track. Fig. 5 is a longitudinal section through the snow-broom shaft, showing the construction of the same. Fig. 6 is a transverse section through the same shaft, and likewise illustrates the construction. Figs. 7, 8, 9, 10, 11, and 12 show details of the snow-broom.

In Fig. 1, F is the supporting frame or platform for the mechanism and may be mounted like the sill or truck of a car and in any suitable way so as to be supported or carried by the car-wheels above the same. I prefer to support the mechanism on a car sill or platform.

M' M' indicate the usual propelling electric motors underneath the car and geared or connected to the axle in any usual or proper manner. The whole structure should be very solidly and substantially made, so that it will stand great strains and accomplish the heavy work for which it is intended without danger of breakdowns or accidents occurring.

At each end of the car and mounted on supports depending from the frame F are rotary snow-brooms B B', as shown, arranged transversely above the track and at an angle, so that the snow is swept off to one side of the track by the rapid rotation of the broom, this rotation being produced by an electric motor M, of any suitable description, mounted upon the top of the car-truck, connection being made by gearing, belts, or chains to the shafts of the snow-brooms B B'. In the drawings a chain is shown, as this is preferred on account of its effectiveness and positive action.

Current-controlling arrangements of any suitable description for the motors M' M' are indicated at C C', one of the handles shown being used for reversing the connections and the other interposing more or less resistance in the circuit through the motors M' M' to regulate their speed and power. Brakes SS', operated by the brake-wheel S<sup>3</sup>, control the stopping of the car, as usual. The motor M for driving the snow-brooms is mounted in the platform or frame F, as seen in Fig. 2, and its

armature-shaft is placed parallel to the shaft of the snow-brooms B B'. The speed is reduced to the required amount by suitable gearing, (shown in Fig. 2,) and at the end of the shaft D two spur-wheels of the same size drive link-chain belts K K'. The chain K leads directly through a hole in the car-floor to the shaft of the snow-broom B' and rotates it. The chain K' leads to a small counter-shaft G, placed relatively to the snow-broom B as is the motor M to the snow-broom B'—that is, parallel thereto. A reduction or increase of the speed may be made at this counter-shaft if desired. The chain belt K<sup>2</sup> leads through a hole in the car-floor to the shaft of the snow-broom B for its rotation. I have shown a counter-shaft as an intermediate mechanism between the motor M and brush B, whereby the speed may be reduced or increased so as to differ from that of brush B', driven from the same motor; but it will be obvious that any other mechanism suitable for producing such difference of speed might be employed.

The shaft D of the motor M is provided with a suitable clutch E, Fig. 2, operated by the lever L, Fig. 1, whereby either one or the other of the snow-brooms B B' may be revolved at will. The motor M is preferably housed or boxed in securely, as indicated in Fig. 1, to protect it from flying snow, from rain, &c., while it is still accessible, and is also provided with any suitable or usual electric-controlling devices, whereby its speed or power may be governed independently of the propelling-motors M'.

Such a snow-broom can be used upon electric railways operated either upon an overhead or conduit system of current delivery or distribution; but as the overhead system is the one at present in extensive use the truck is shown as arranged to take current from an overhead wire *w*, Fig. 1, by the usual form of trolley T.

D' D<sup>2</sup> are rock-shafts suitably mounted, from which depend the hangers in which the broom-shafts revolve. The suspension is from arms D<sup>3</sup>, extending from the rock-shafts, so that by turning the shafts the brooms may be raised. Actuating-levers L' L<sup>2</sup> are attached to the rock-shafts and work in suitable segmental guides H H' above the platform, in which guides or segments they can be locked by means of pins *p p'*. The hangers for the broom-shaft have the usual or proper shaft-bearings or journal-boxes M<sup>2</sup>, and are provided with suspension-rods *r*, which are pivoted to the journal-box heads and extend upward for attachment to the rock-shaft arms D<sup>3</sup>, from which they are pivotally suspended. Guides N N' depend from the sill and are engaged by guide-rods *g*, connected to the hangers, as shown. These suspending and guiding devices extend down below the sill or platform as short a distance as practicable, so as to be kept as far from the truck as possible. By

thus constructing the parts and supporting them from the platform above the wheels we avoid the liability to breakage of the supporting and guiding devices for the broom from contact with obstacles beneath the car by rocking of the car in transit.

To provide for easy renewal of the brush-splints and convenient repair of the rotary broom and its parts, we construct the same in the following manner: The cylindrical stock or head B, in which the splints are secured, is made in a number of sections or segments *b*, so that it may be detached from the shaft or its backing without removing the shaft from its bearings, and the several segments may be built up around and secured to the shaft or parts carried thereby after renewal of the splints. The splints of the snow-broom may be made of rattan, or similar elastic and tough material, or of metal in certain instances. The former is preferred. The splints are driven into holes in sections of the stock, this construction permitting the removal of worn or defective sections and the insertion of others without dismantling the entire broom, as was formerly necessary.

The broom-shaft, or the hub in which the segments *b* rest or around which they are disposed, is constructed preferably as follows: Mounted on an iron shaft *s*, so as to be incapable of turning thereon, are heads *h*, which are provided with sockets to receive the ends of an intermediate iron tube *t*, surrounding the shaft. The shaft may be square and pass through square openings in the heads, as shown; but its outer ends are turned down to form journals, so that the shaft may turn in the bearings M<sup>2</sup>. To form the hub or backing for removable segments *b*, sections of hub *b'*, preferably of wood, are clamped in position together around the shaft and between the heads by means of bolts *d* running the entire length of the shaft and extending through the heads *h*, the whole being drawn up firmly by nuts, Fig. 5. Upon this hub or backing, square or angular in form, are superimposed the sections *b b* of the stock, which latter are held down upon the hub formed as above by means of clamps *k*, preferably fastened down upon the heads. The segments being thus held down against radial movement on the flat bearings provided by the hub are prevented from shifting circumferentially around the shaft or hub. The clamps are preferably applied at the points where the segments of the brush-stock adjoin. The heads may have offsets on their inside, as shown, which, as indicated in Fig. 12, may also serve to hold the segments against rotation while forming bearings for the clamps and clamp screws or bolts. To remove any section *b* it is only necessary to loosen the two clamps *k k* at the opposite ends.

Fig. 7 is an end view of the head *h* from the inside, showing the openings for the reception of the square shafts and bolt-holes, &c.

Fig. 8 is a part section through the head *h*, showing more clearly the shouldered receptacle for the tube *t*.

Figs. 9, 10, and 11 are different views of the clamp *k*.

By building up the hub or bearing of wood to receive the brush-stock we obtain lightness, and by making the heads longitudinally movable with relation to one another on the shaft we permit the shaft or hub to be readily dismantled for repair.

While we have shown the hub made up of sections *b'* as square, it is quite obvious that it might have a greater or less number of angles or sides and be of equal utility in permitting the sections of the brush-stock to be firmly clamped against displacement. A four-sided hub and a four-segment stock will be found, however, to serve admirably.

The construction of the broom in the manner herein described is not specifically claimed, as it forms the subject of another application for patent filed by us March 10, 1890, Serial No. 343,222.

What we claim as our invention is—

1. In a railway snow-clearing apparatus, the combination, with the two rotary brushes or snow-clearing devices, of a motor geared to such brushes through devices for rotating the brushes at different speeds, and a clutch whereby the motor may be connected to either brush.

2. The combination, in a railway-sweeper,

of one or more propelling electric motors, two rotary brooms, an electric motor independent of the propelling-motor, driving-gear between the same and the brooms, and a clutch whereby said motor may be geared to either broom.

3. The combination, in a railway-sweeper, of an electric motor connected to a suitable shaft through a speed-reducing gear, a rotary broom geared to said shaft directly, and a second broom geared to said shaft through a counter-shaft, as and for the purpose described.

4. In a rotary snow-sweeper for electric railways, the combination of an electric motor mounted on a platform over the wheels, hangers depending from such platform beneath the same, and a rotary brush mounted on said hanger and belted to a shaft actuated by said motor.

5. The combination, with the horizontal rotary broom and the hangers in which the broom-shaft is mounted, of guides for said hangers depending from a car sill or platform above the wheels, and a horizontal rock-shaft from which said hangers are suspended.

Signed at Lynn, in the county of Essex and State of Massachusetts, this 23d day of January, A. D. 1890.

ISAAC F. BAKER.  
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