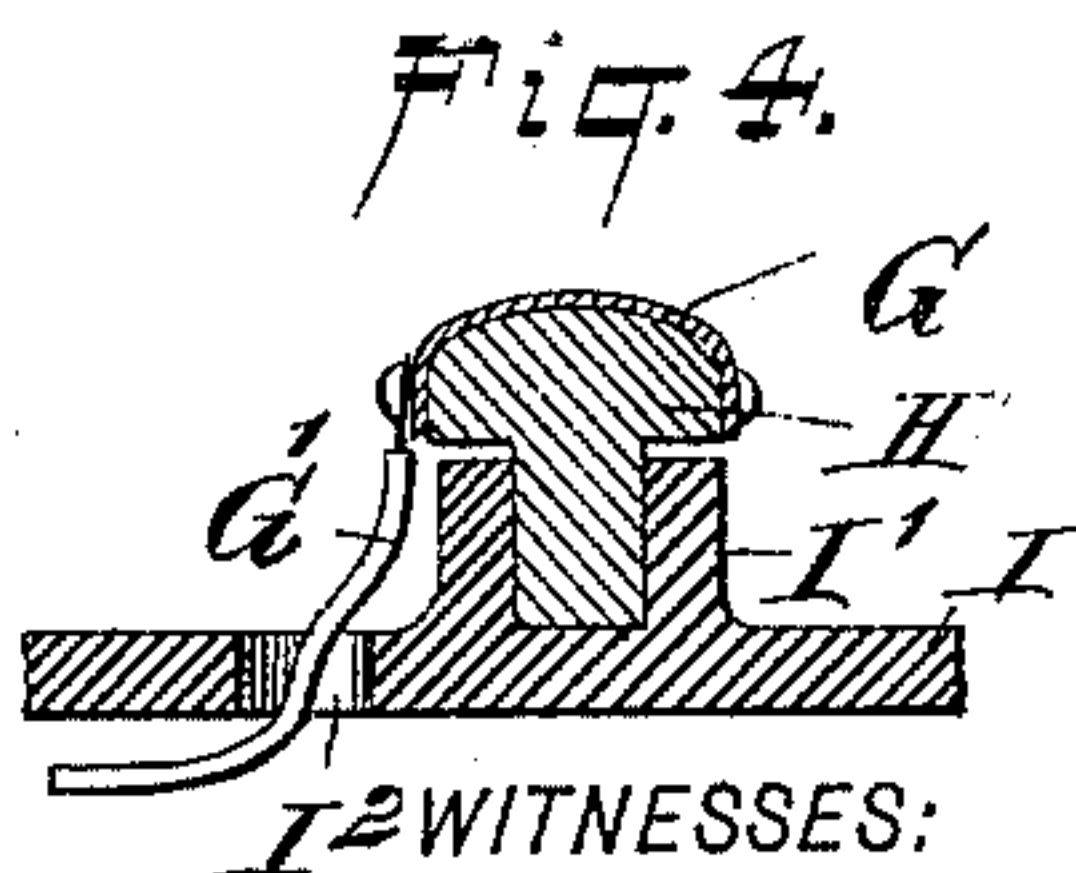
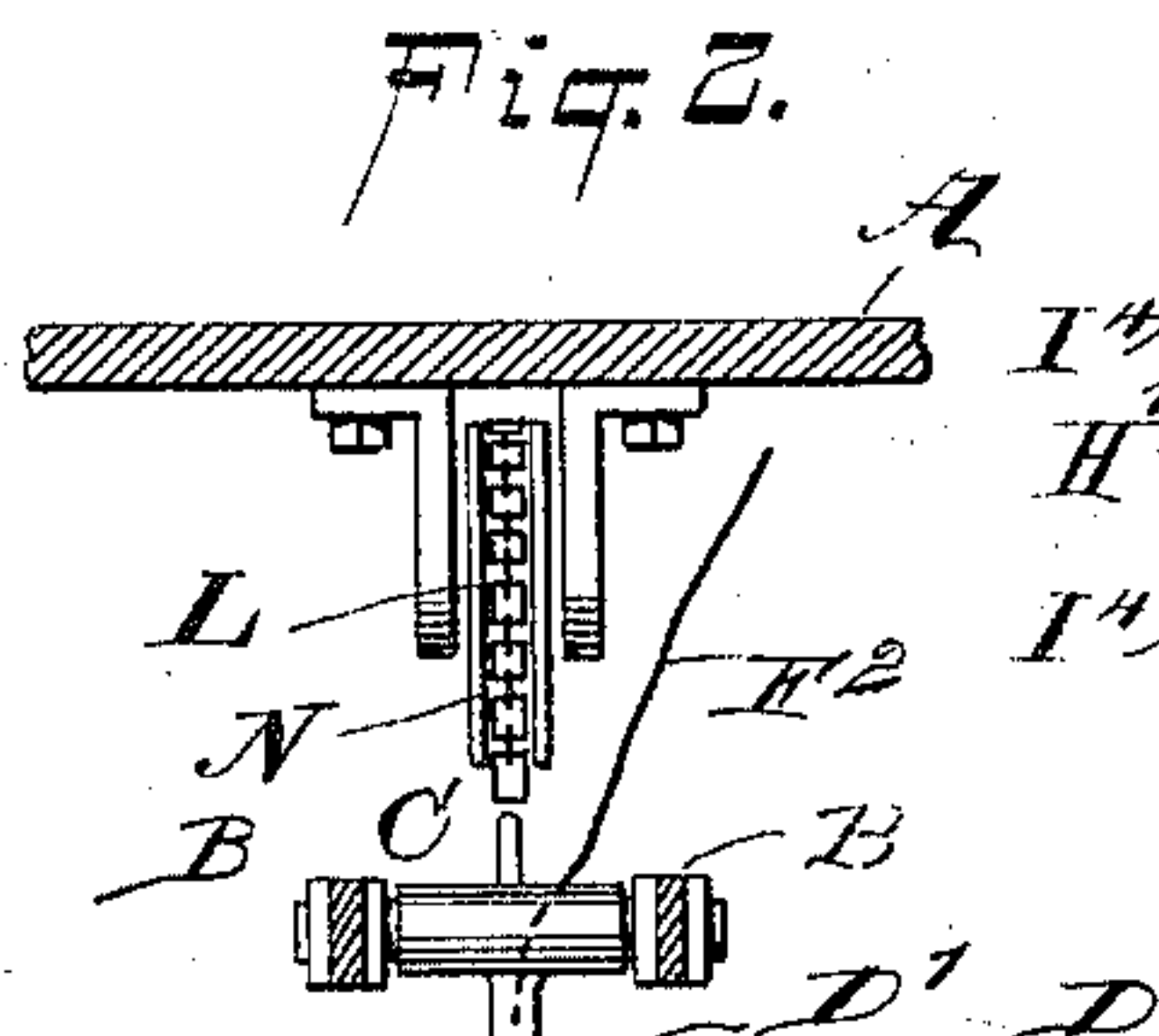
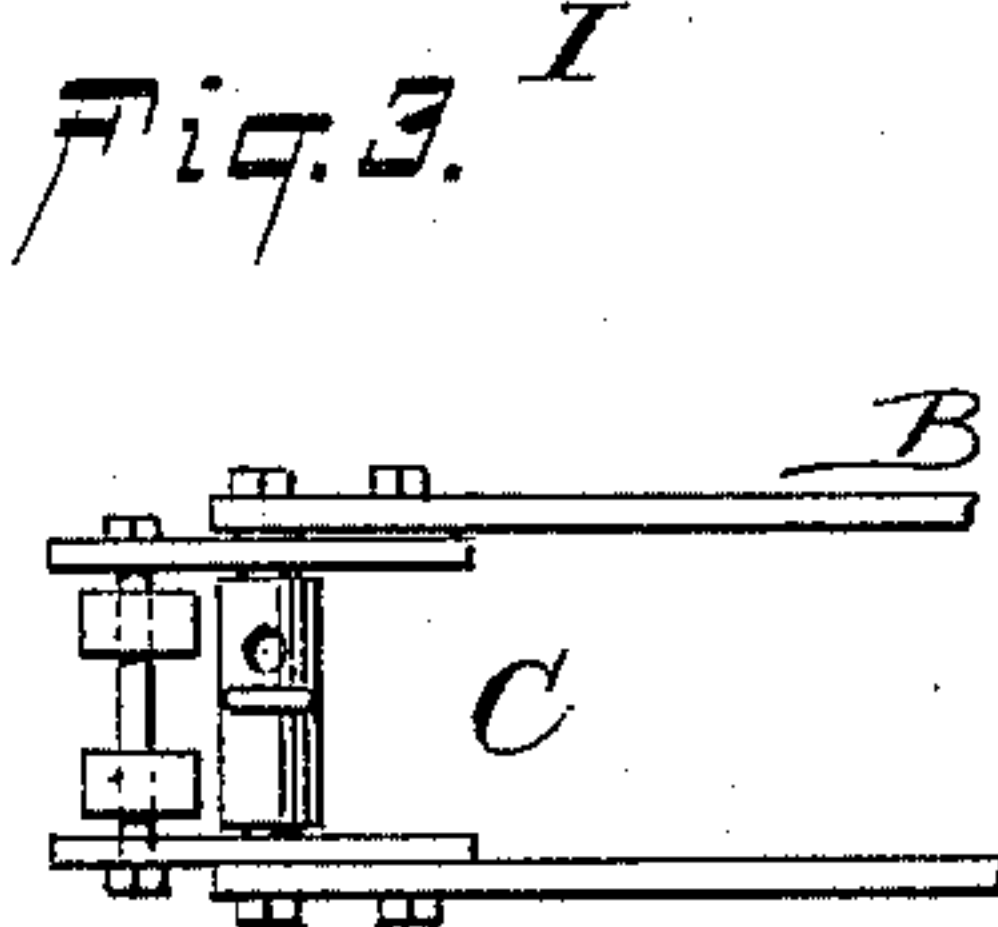
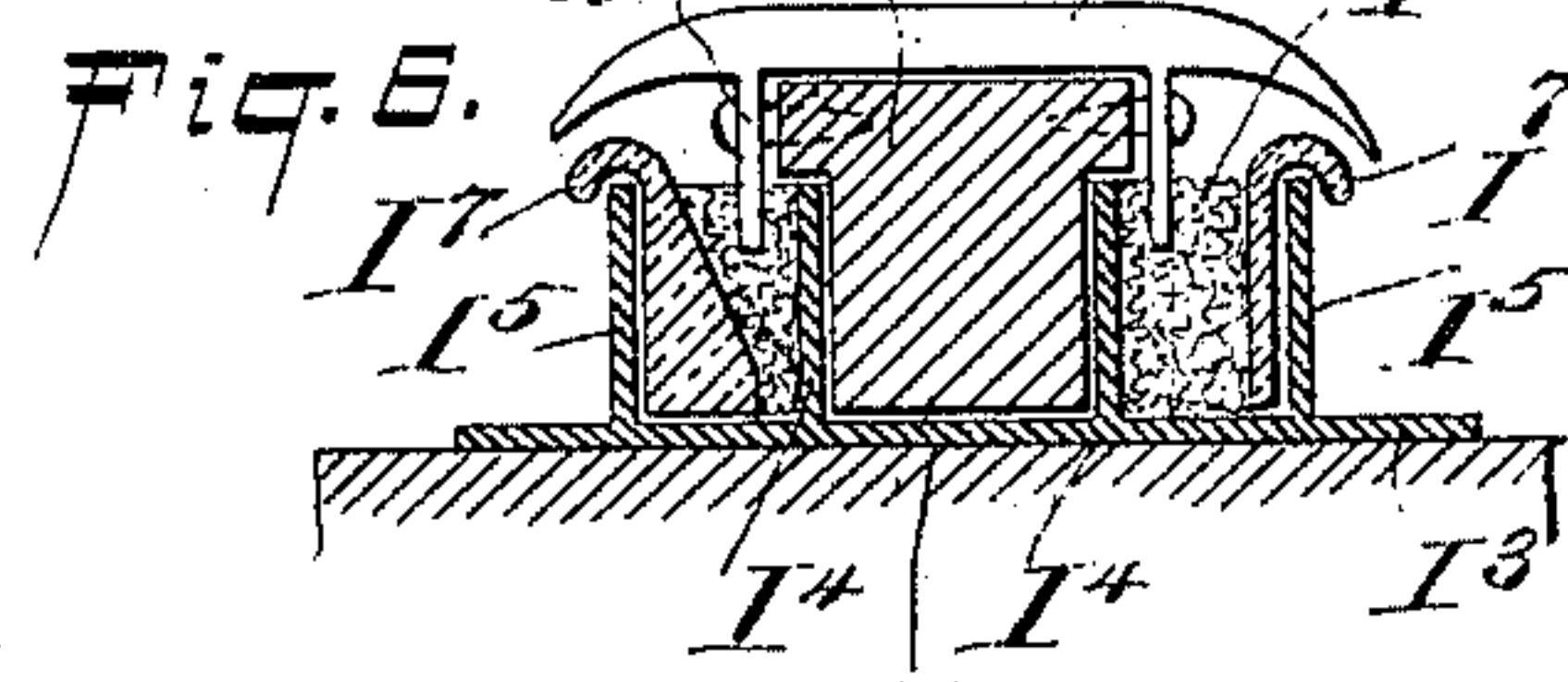
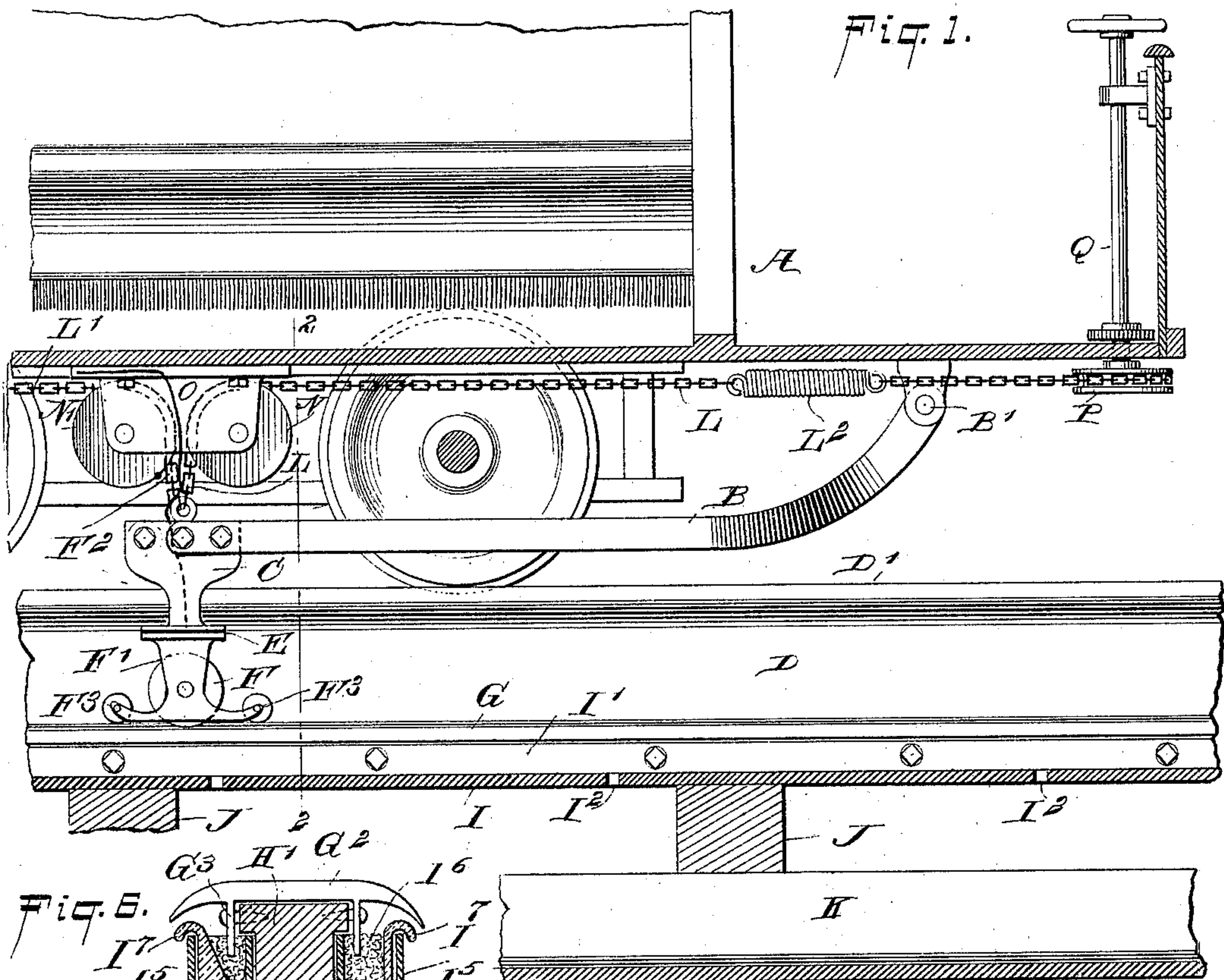


(No Model.)

L. BINNS.
UNDERGROUND TROLLEY.

No. 542,434.

Patented July 9, 1895.



WITNESSES:
William Goebel.
Thos. J. H. H. H.

INVENTOR
L. Binns
BY
Munn & Co.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

LEEDHAM BINNS, OF PHILADELPHIA, PENNSYLVANIA.

UNDERGROUND TROLLEY.

SPECIFICATION forming part of Letters Patent No. 542,434, dated July 9, 1895.

Application filed April 11, 1894. Serial No. 507,161. (No model.)

To all whom it may concern:

Be it known that I, LEEDHAM BINNS, a subject of the Queen of Great Britain, residing in Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved Underground Trolley, of which the following is a full, clear, and exact description.

The invention relates to the propulsion of vehicles by electricity; and its object is to provide a new and improved underground trolley which is comparatively simple and durable in construction and arranged to properly conduct the electricity to the motor in the vehicle without loss and without danger to the passengers riding in the car or persons or animals crossing the tracks.

The invention consists, principally, of a duct, a conducting-rail in the said duct and connected with the source of electricity-supply, and a frame hinged on the under side of the vehicle and carrying a trolley-pulley.

The invention also consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional side elevation of the improvement as applied. Fig. 2 is a transverse section of the same on the line 2 2 of Fig. 1. Fig. 3 is a plan view of part of the trolley-pulley-supporting frame. Fig. 4 is an enlarged cross-section of the conducting-rail. Fig. 5 is a sectional view of the duct at the crossing, and Fig. 6 is an enlarged cross-section of a modified form of conducting-rail.

The vehicle A to be propelled by a motor driven by electricity is provided on the under side of its platform with a bracket B', in which is fulcrumed a frame B extending longitudinally and carrying at its free end a head C located about mid-length of the car and secured to frame B by means of bolts, as indicated in Figs. 1 and 3. The head C is sufficiently narrow near its lower part to extend through a slot D' in the duct D, set in the pavement so as to be flush with the top thereof, as is plainly illustrated in Fig. 2.

On the lower end of the head C is arranged

an insulation E resting on a pulley-frame F' carrying the trolley-pulley F, adapted to travel on a conductor G, arranged in the shape of sheet metal over a lining of paper or like material and resting on top of the rail H, of wood or other suitable material, set between flanges I' formed on the top of the bottom plate I of the duct D, as is plainly shown in Fig. 2. The pulley-frame F' is connected with the end of a conducting-wire F² extending through the hollow head C to connect with the motor in the car A, the said conducting-wire being insulated in the said head C, so that the electricity from the conductor G passes through the pulley F, the frame F', and through the wire F² to the motor without passing to the head C and the frame B carrying the head.

The conduit or duct D is composed of similarly-formed side plates having at their upper portions inwardly-projecting flanges D² suitably spaced apart to form the slot and at their lower ends outwardly-projecting flanges or feet and a flat bottom plate I, on which said feet are secured, as clearly seen in Fig. 2.

The bottom plate I is provided throughout its length with apertures I², placed suitable distances apart, so that moisture or rain-water can readily pass through the said apertures to drain the duct D and to keep the same as dry as possible. Through one of the said apertures I² is passed a wire G', leading from a suitable source of electricity and connected with the conductor G, as is plainly shown in Fig. 4.

The bottom plate I for the duct D rests on the ties J, below which is arranged a longitudinally-extending channel K, located in alignment with the duct D, so that the water passing through the apertures I² drops into the said channel to be carried off at suitable places along the track to prevent accumulation of moisture at or near the duct.

The head C may be weighted, as illustrated in Fig. 3, so as to hold the trolley-pulley F with sufficient force in contact with the conductor G to insure proper contact of the pulley with the conductor to readily transmit the electricity from the conductor to the pulley and to the wire F² leading to the motor. The pulley-frame F' is preferably formed at the front and rear and directly over the con-

ductor-rail G with shoes F³, which project forwardly and rearwardly, as shown in Fig. 1, and are adapted to support pulleys traveling on the rail to insure steadiness of the pulley-frame and head C and to assist in conveniently crossing the cut conductor-rail at a crossing.

The upper end of the head C is connected with two chains L and L', extending upward and passing over pulleys N and N', respectively, to then extend in opposite directions under the bottom of the car to the platforms thereof, each chain being provided with an interposed spring L², as is plainly shown in Fig. 1. The outer end of each chain L or L' is adapted to wind on a pulley P, held on the usual staff Q, journaled in suitable bearings on the platform of the car and under the control of the operator or conductor, so that on winding up these chains L and L' on the pulley P the frame B is swung upward and the trolley-pulley F is thereby lifted off the conducting-rail G to prevent further transmission of electricity to the motor to stop the car. By using the springs L² in the chains L L' a yielding connection is made between the chain and the head C, so that the car in going over uneven surfaces does not affect the contact of the trolley pulley F with the conductor G.

As shown in Fig. 6, the conductor G² is provided with downwardly-extending flanges G³ adapted to be fastened on the upper end of the wooden rail H' set between the flanges I⁴ of the bottom plate I of the duct, the said bottom plate being further provided with additional longitudinally-extending flanges or ridges I⁵ to form channels between the corresponding flanges I⁴ for the wooden rail H'. The channel thus formed is filled, preferably, with a waterproof insulating substance, such as tallow, and the inner faces as well as the top edges of the said flanges I⁵ are additionally guarded against moisture by plates I⁷, preferably made of glass or other suitable material and having their upper ends curved or bent over the upper ends of flanges I⁵. The sides of the conductor G² extend over the top edges of the said plates, as is plainly illustrated in said Fig. 6. At a crossing the conductor-rail is cut, as shown in Fig. 5, to form a passage for the crossing-cable. The modified form of conductor-rail is in this case formed with ends I⁶ joining the flanges or ridges I⁵, and like ends I⁷ connect the flanges I⁴ with each other, the rail H' terminating at the inner face of this cut. The bottom plate I is turned up at its ends, as at I⁸, to bind the several parts in place. By this arrangement the wooden rail H' is thoroughly protected against moisture to prevent loss and leakage of electricity.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. An underground conduit having its base plate formed with integral longitudinal

flanges, and a non-conducting rail fastened in the said flanges and covered at its head with a conducting plate, substantially as described.

2. An underground conduit provided with a conducting rail composed of a non-conducting rail proper, and a sheet metal covering for the head of the said rail proper, and a covering of waterproof material applied over the sides of and adapted to protect the said non-conducting rail proper from moisture, as set forth.

3. An underground trolley, comprising a frame adapted to be pivoted to the car, a head secured in the free end of the said frame, a trolley pulley journaled in a frame attached to the said head, chains connected with the said head and extending in opposite directions under the car, and means for winding up or unwinding the said chains to impart an upward or downward swinging motion to the said frame, substantially as shown and described.

4. An underground trolley provided with a swinging frame pivoted on the under side of the vehicle, a head held in the free end of the said frame and adapted to be weighted, a trolley pulley frame insulated on the lower end of the said head, and provided with a shoe which projects from the forward portion thereof and a pulley journaled in the said trolley pulley frame, substantially as shown and described.

5. An underground trolley, comprising a pivoted frame, a head secured in the free end of the said pivoted frame, a trolley pulley connected to said head, a chain connected to the head and provided with a spring whereby elasticity is imparted thereto, and means for winding and unwinding said chain beyond said spring, substantially as set forth.

6. An underground conduit, comprising a bottom plate having central longitudinal flanges projecting from its upper face, and side portions having at their lower ends outwardly projecting flanges secured to said bottom plate and at their upper ends inwardly projecting flanges, the adjacent edges of which are spaced apart to form a slot, substantially as set forth.

7. An underground trolley, provided with a frame adapted to be pivoted on the car, a head held on the free end of said frame, a trolley-pulley frame insulated on the lower end of the head, a pulley journaled therein and shoes mounted on said pulley frame and extending forwardly and rearwardly from the pulley, substantially as set forth.

8. An underground trolley, provided with a frame adapted to be pivoted on the car, a head held on the free end thereof, a trolley pulley frame insulated on the lower end of the head, a pulley journaled in the pulley frame, shoes mounted on the pulley frame and projecting forwardly and rearwardly from the pulley, and a roller on the under side of each shoe, substantially as set forth.

9. The combination of a slotted conduit,

having flanges projecting upward from its sides of said body portion, substantially as set forth.

of the conduit between said flanges and comprising a body portion of non-conducting material and a covering of metal, and insulating waterproof material arranged between said flanges and covering the otherwise exposed

Witnesses:
THEO. G. HOSTER,
C. SEDGWICK.

LEEDHAM BINNS.