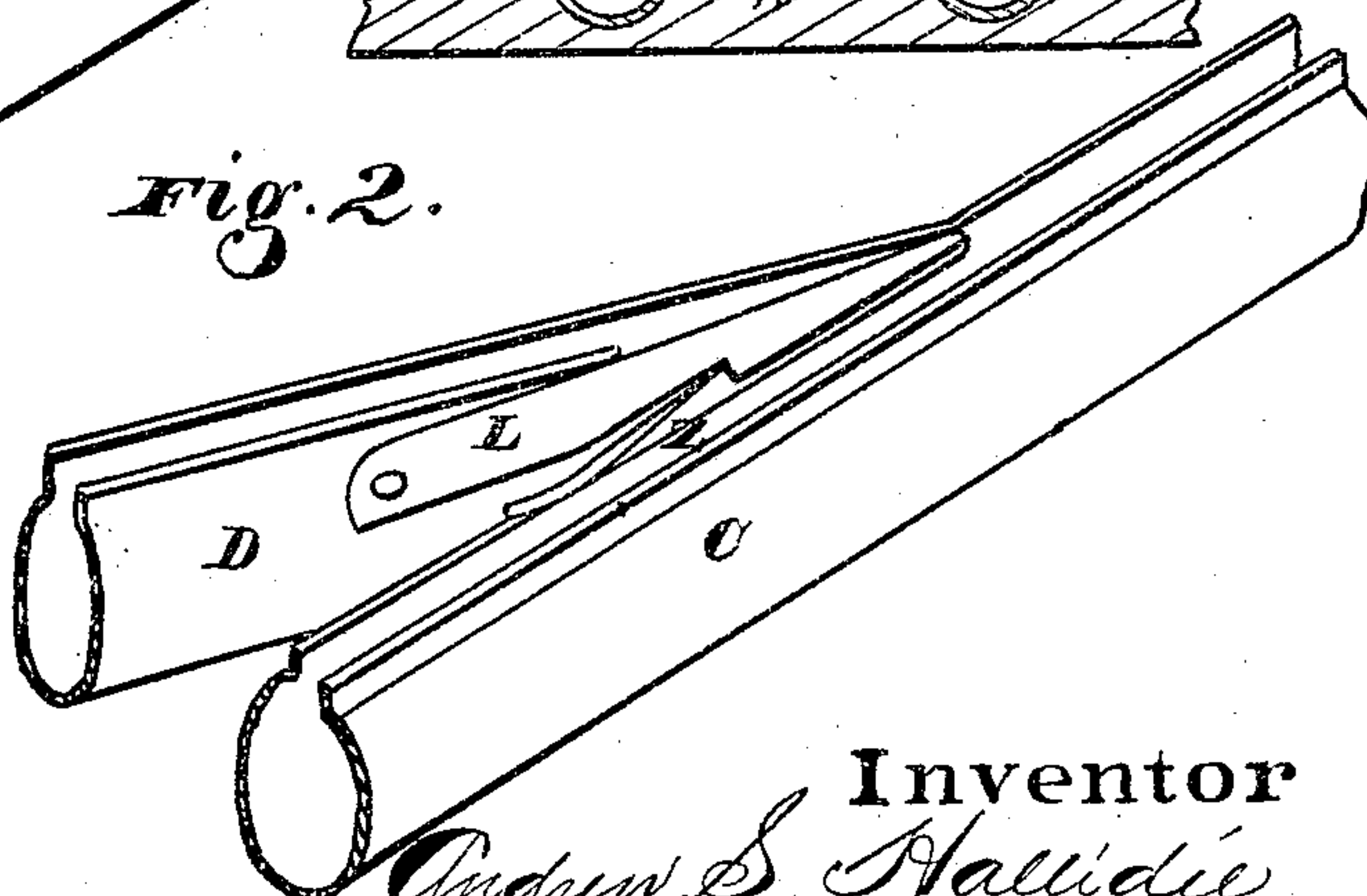
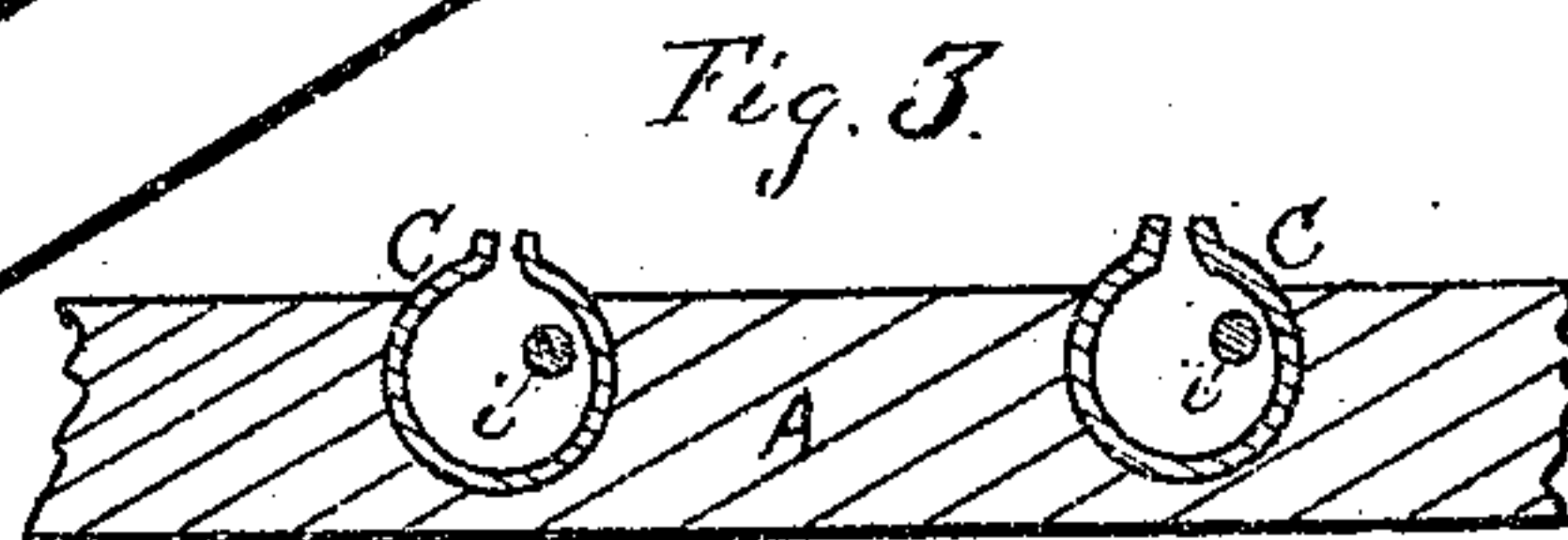
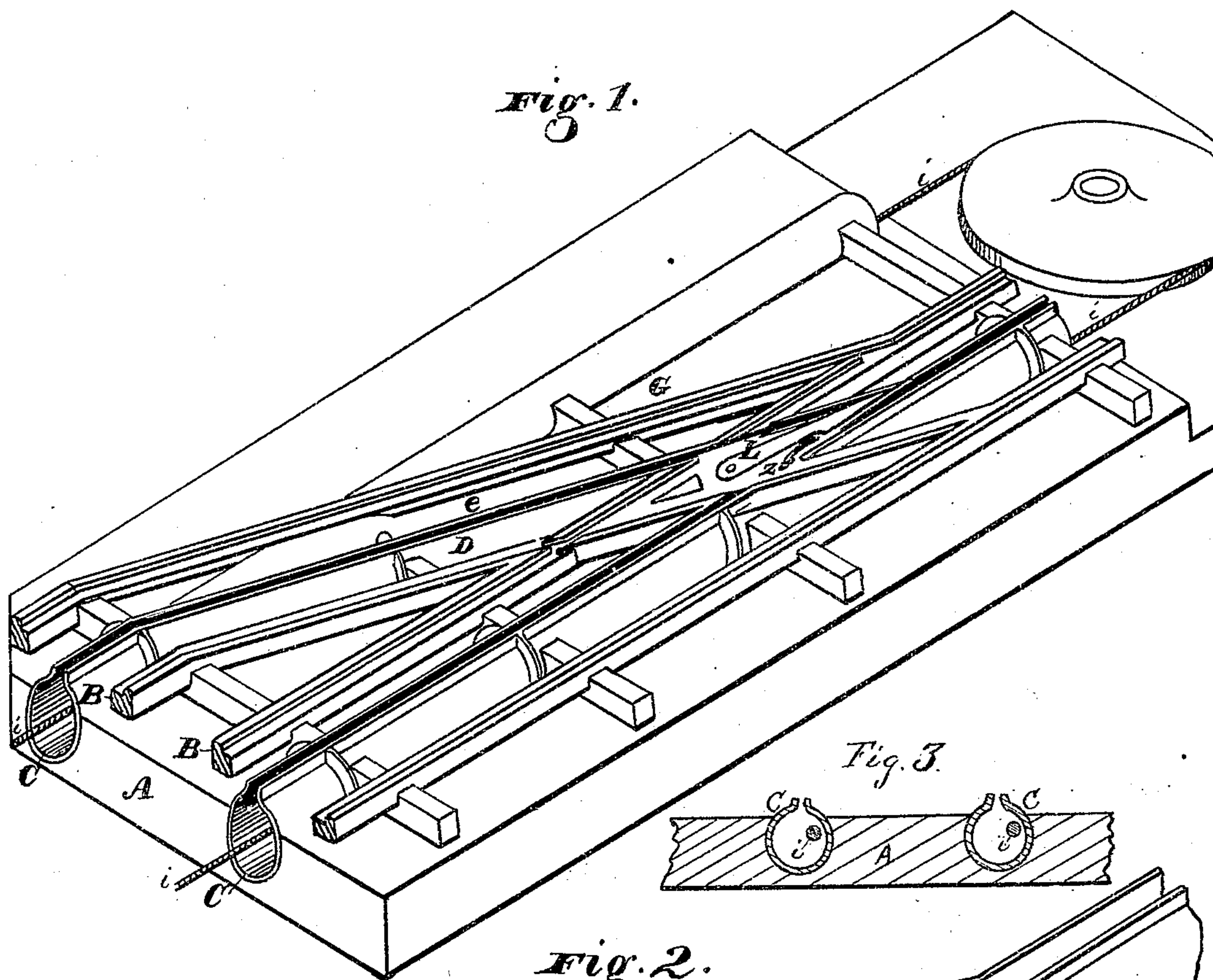


A. S. HALLIDIE.
ENDLESS TRACTION RAILWAY.

No. 179,016.

Patented June 20, 1876.



Witnesses
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UNITED STATES PATENT OFFICE.

ANDREW S. HALLIDIE, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN ENDLESS TRACTION RAILWAYS.

Specification forming part of Letters Patent No. **179,016**, dated June 20, 1876; application filed April 3, 1876.

To all whom it may concern:

Be it known that I, ANDREW S. HALLIDIE, of San Francisco city and county, State of California, have invented Improvements in Street-Railroads; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvement without further invention or experiment.

My invention relates to that class of railroads in which the cars are propelled along the tracks by means of an endless wire rope or cable, which is arranged to traverse in an underground tube or tunnel, the car being connected by a gripping device which moves inside of the tube by means of a shank or other connection which passes through a slot in the tube.

My improvements consist in certain details in the construction and arrangement of the tracks, switches, and underground tubes, by which I am able to operate the road with less expense, and with less trouble and annoyance, than heretofore.

Referring to the accompanying drawings for a proper representation of my invention, Figure 1 is a perspective view of my railway. Fig. 2 is an enlarged section of the switch. Fig. 3 is a cross sectional view.

Let A represent the street or road surface upon which the railroad is constructed. B B represent two parallel lines of tracks upon which the cars are moved in opposite directions, and C C are the slotted tubes in which the propelling-cable travels, one of the tubes being placed midway between the two rails of each track.

According to my plan of operating a railroad by the endless cable system, I employ a special car or dummy separate from the ordinary cars of the road for carrying the gripping attachment, as described and claimed in a separate application for a patent made by me. I also use a gripping device, which is constructed with an L-shaped foot or lower end which moves inside of the tube, as described in the Letters Patent No. 129,130, which were issued to me on the 16th day of July, A. D. 1872. The object of this L-shaped foot is to enable me

to support the rope in the tube at one side of the slot, so as to permit the griper-jaws to pass the rope-supporting pulleys, and also to prevent the dirt and other matters which might drop through the slot from fouling or becoming entangled with the rope.

In employing these devices in connection with the above-described system of propulsion, I find it necessary to make certain improvements and additions in the construction and arrangement of the road, all of which are herein fully explained.

At the terminus of the parallel tracks B B it is necessary to transfer the dummy or traction car from one track to the other, in order to follow the travel of the rope, and enable the same traction-car to haul cars in both directions. Turn-tables have heretofore been used for this purpose, but they are expensive to build and keep in repair, and cause a great deal of trouble in transferring the cars. Instead of employing turn-tables as heretofore, I connect the two-parallel tubes C C at some point at or near their terminus by a diagonal or branch tube, D, which has a slot, e, corresponding with the slots in the tubes C, and which connects with them at each end. This branch tube simply connects the tubes C C, while the propelling-rope passes, as usual, through the tubes C C, and its object is to provide a passage-way for the L-shaped griper from one rope-carrying tube to the other when it is desired to transfer the dummy or traction car from one track to the other. A diagonal track, G, is also constructed to connect the tracks B B, one rail being placed on each side of the slotted tube. If this connecting tube and track be placed at a point where the main tracks are inclined, the dummy or traction car will move automatically by gravity from one main track to the other, but where the ground is level the car can be transferred by hand-power. In order to render this method of transferring the car convenient, and to obviate the necessity of turning the dummy or griper, I construct the rope-carrying tubes C C so that the rope in both tubes will travel upon the same side of the slot through which the griper-shank passes; or, in other words, when I support the rope on the right-hand side of the slot in one tube I also support it on

the right-hand side of the slot in the opposite tube, or if the opposite or left-hand side is chosen, I mount the ropes so that their position with reference to the slots will correspond; otherwise the L-shaped foot of the griper would stand in the wrong direction after the car has been transferred. Therefore, in operating with this arrangement, after the car has been uncoupled from the dummy, and the rope released from the gripping-jaws, the griper-foot is elevated above the rope, and the car moved along the diagonal track with its griper moving in the branch tube until the car stands upon the opposite track, and the griper-foot is ready to drop into position and seize the rope in the opposite tube, thus completely transferring the dummy from one track to the other without the use of turn-tables.

At the point where the slot in the main tube connects with the slot in the branch tube, it is evident that an opening of objectionable size would be made by the meeting of the two slots. To obviate this difficulty, or, rather, objection, I employ a pivoted V-shaped switch-rail, L, at the meeting angle, which is pressed by a spring, Z, so as to force its point against the side of the slot in the main tube and across the end of the tube in the branch slot, thus closing the end of the branch slot, except from pressure applied in one direction, while it leaves the slot in the main tube unobstructed. These improvements are quite important in the working economy of this system of propulsion. They enable me to trans-

fer the traction-dummy without vexatious delays, and without much labor, whereas the turn-tables heretofore used required several minutes loss of time in transferring the dummy, while the operation was very laborious.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. As an improved device for transferring cars which are propelled by an endless rope moving in an underground tube from one track to another, and in which the rope and car are connected by a gripping device, which is permanently attached to the car, the diagonal or angular tube D arranged to connect the rope-containing tubes B B, said diagonal tube having a longitudinal slot, e, which is arranged to connect with the longitudinal slots of the tubes B B, all combined and arranged to operate substantially as and for the purpose described.

2. The improvement in mounting the propelling-rope inside of the tubes B B, with reference to the longitudinal slots in the same, the same consisting in mounting the rope upon the same side of the slot in each tube, substantially as and for the purpose above described.

3. The pivoted switch-rail L and spring Z, substantially as and for the purpose described.

ANDREW S. HALLIDIE.

Witnesses:

GEO. H. STRONG,
JNO. L. BOONE.