

W. M. SMITH.
Elevated Railway.

No. 93,361.

Patented Aug. 3, 1869.

Fig. 1.

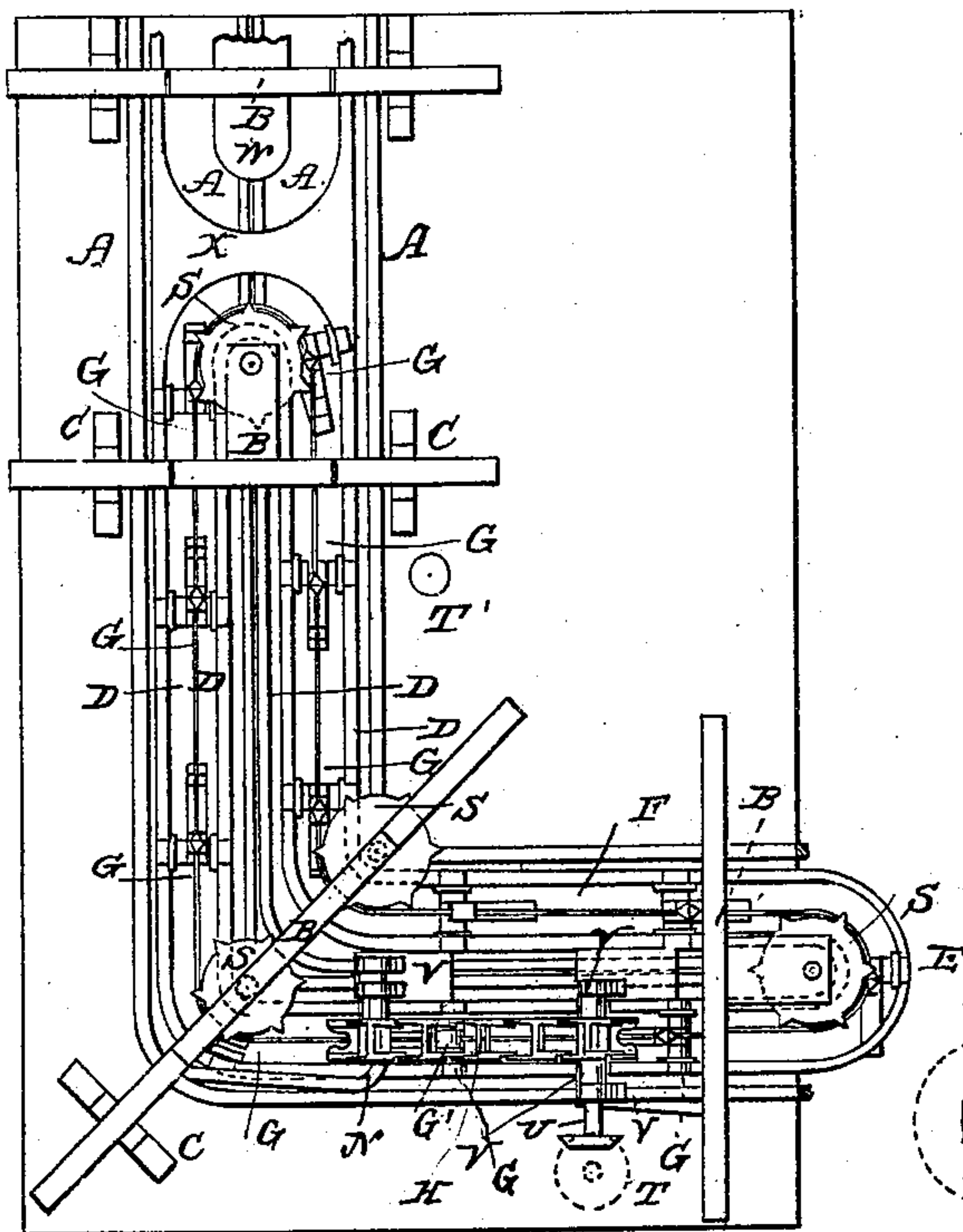


Fig. 3.

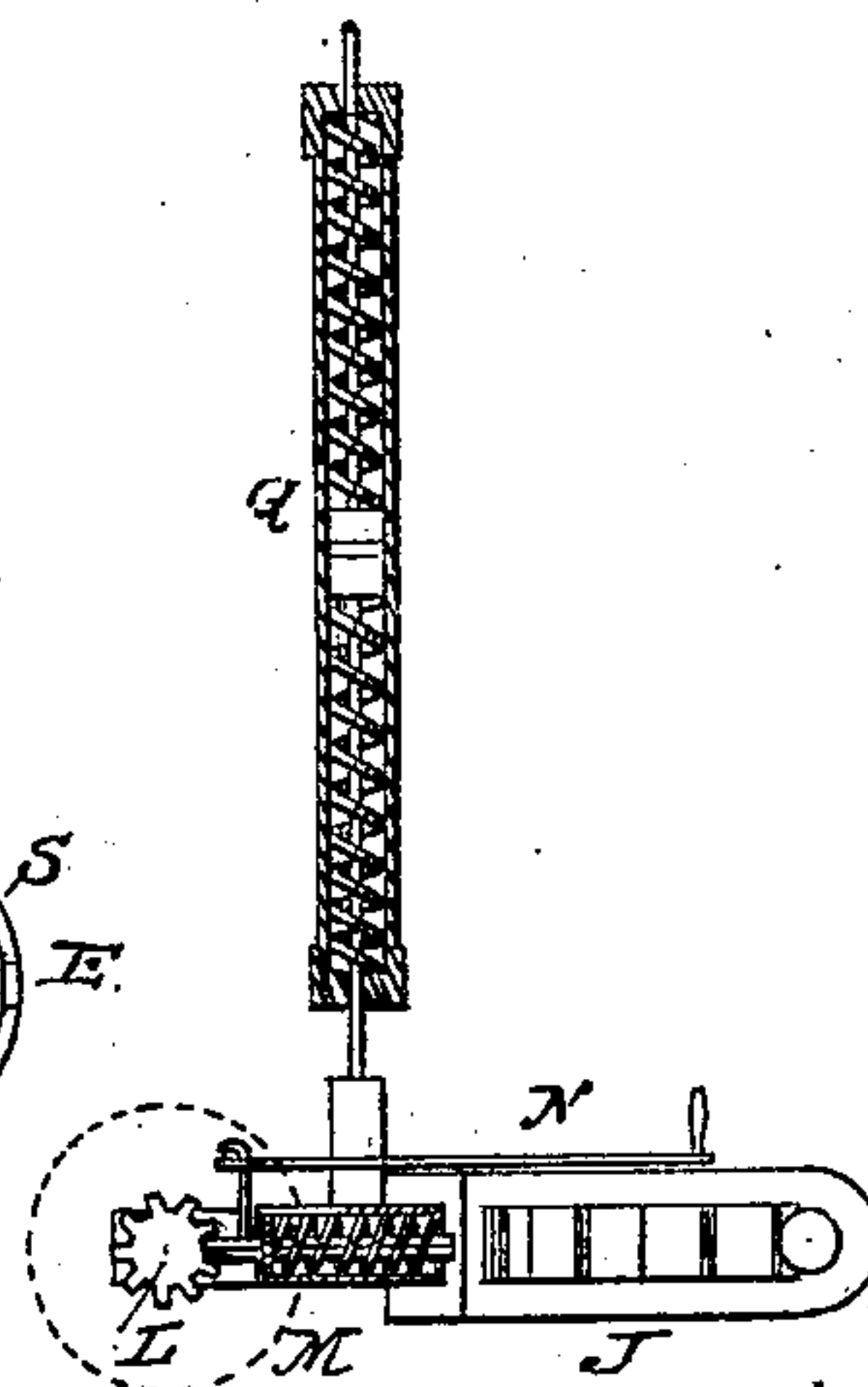


Fig. 4.

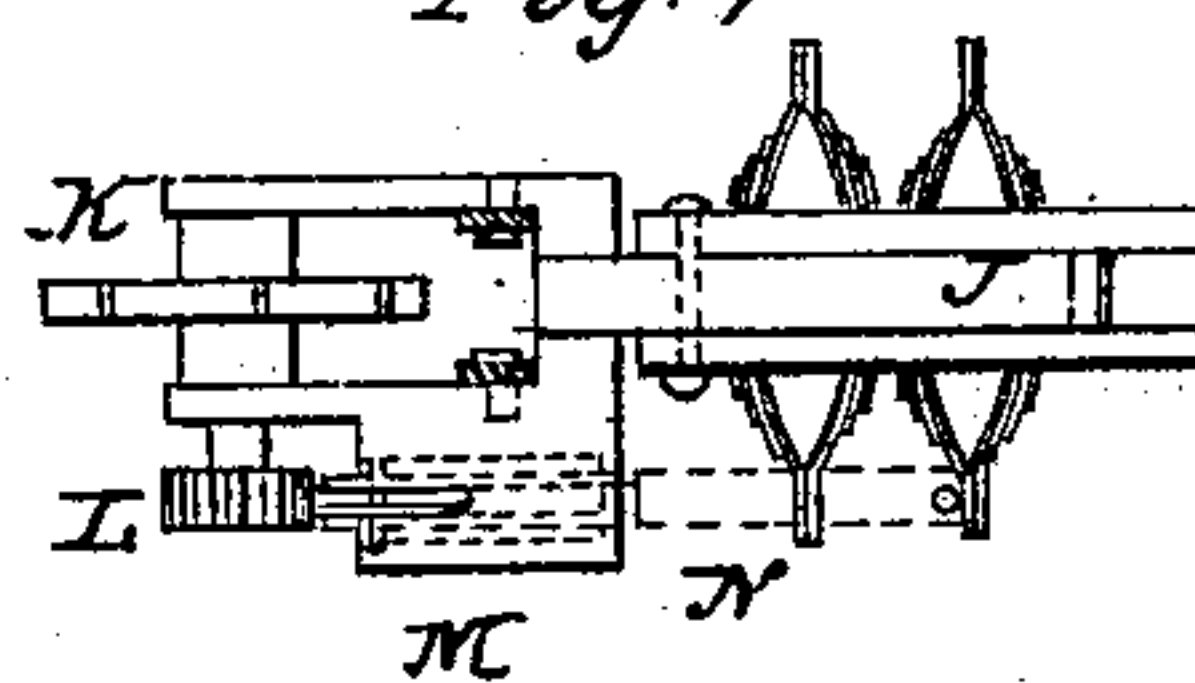


Fig. 2.

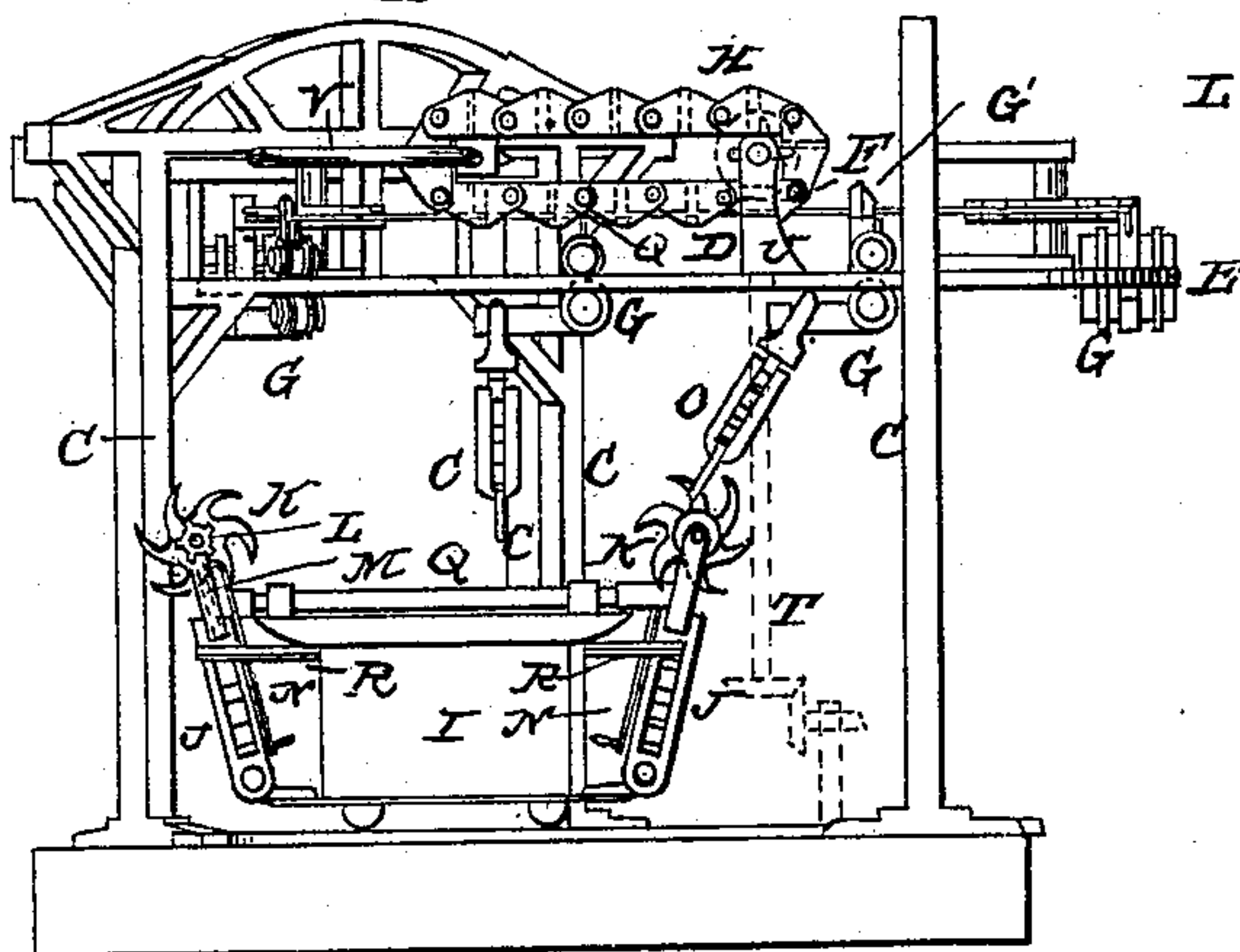
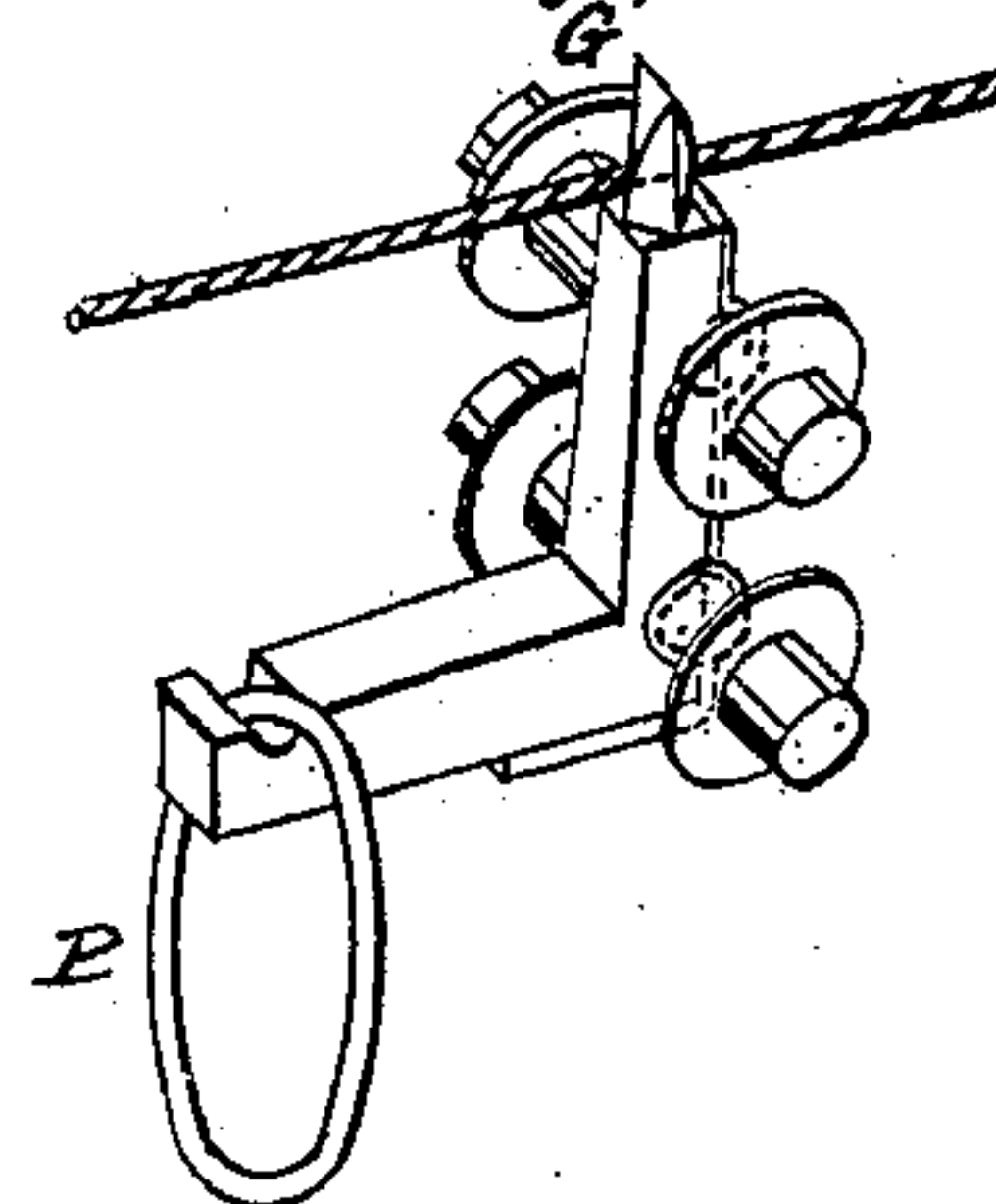


Fig. 5.



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Fig. 6.

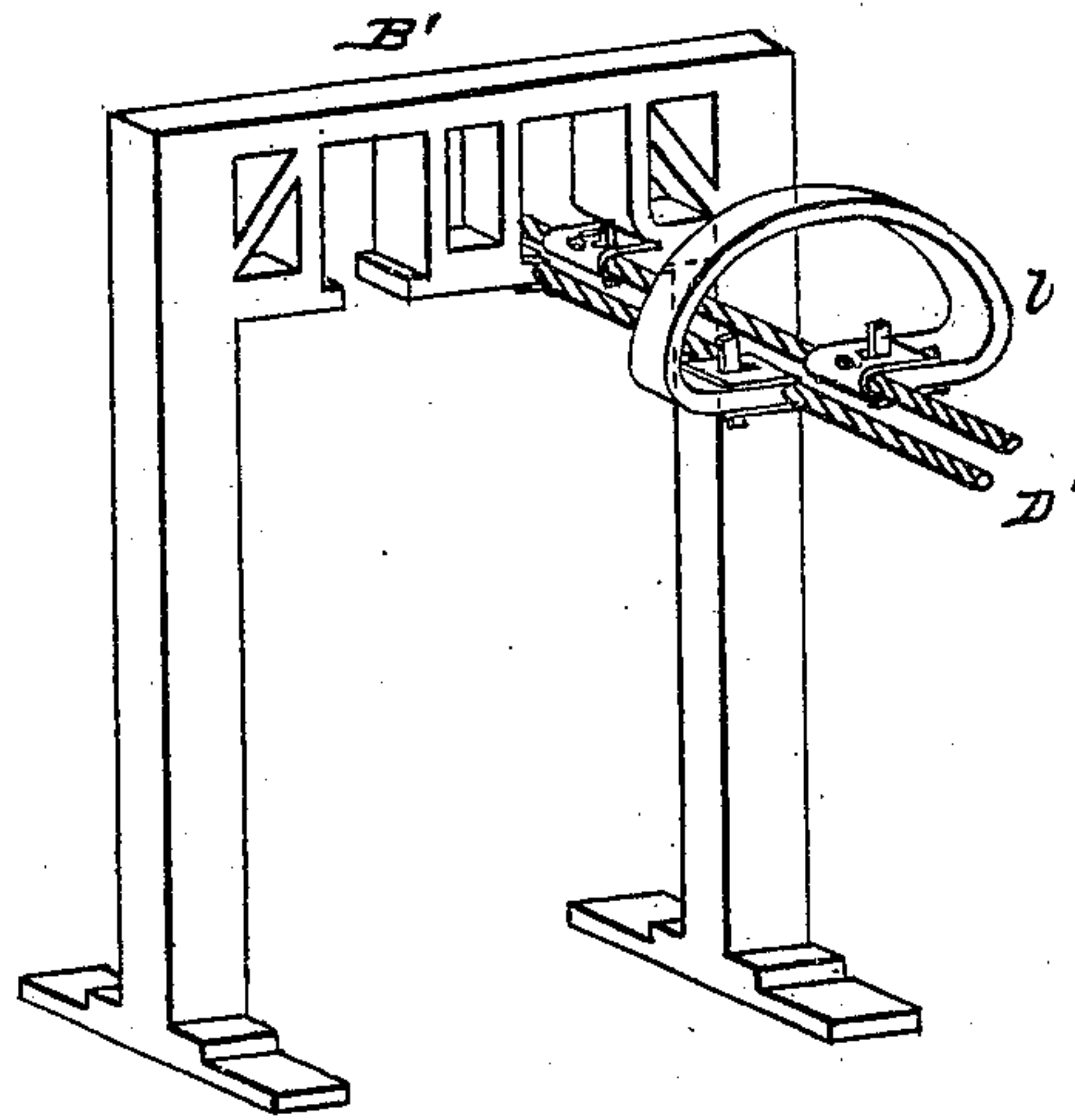
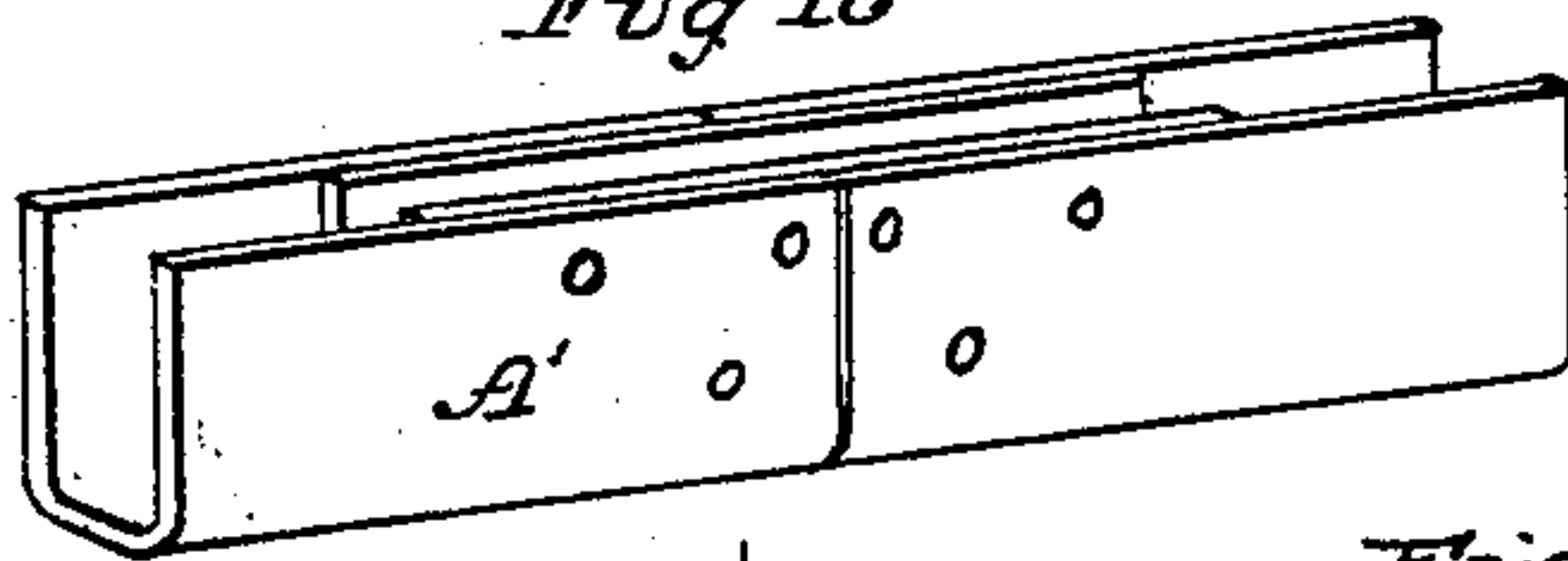


Fig. 10



B' Fig. 7

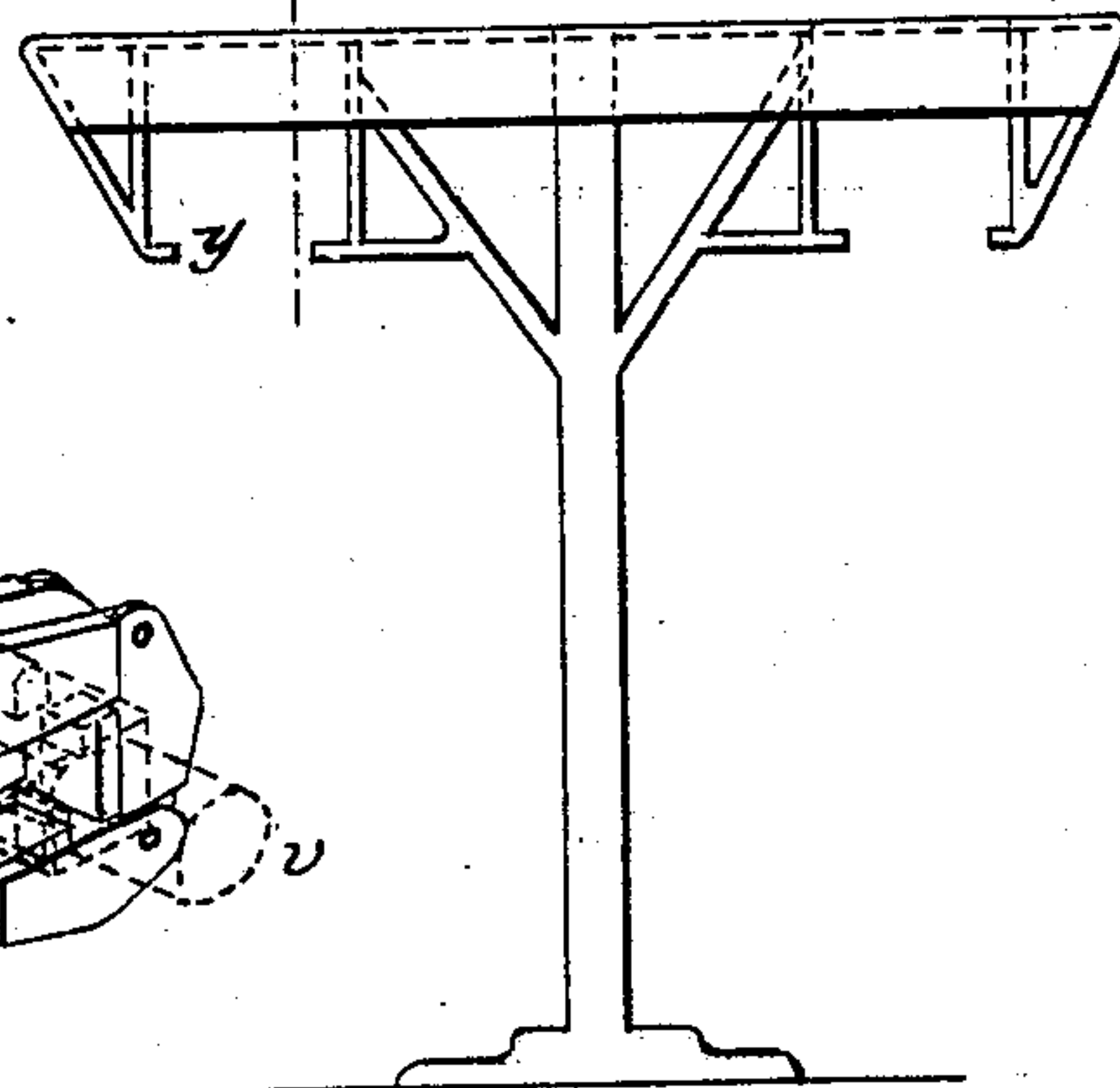


Fig. 8

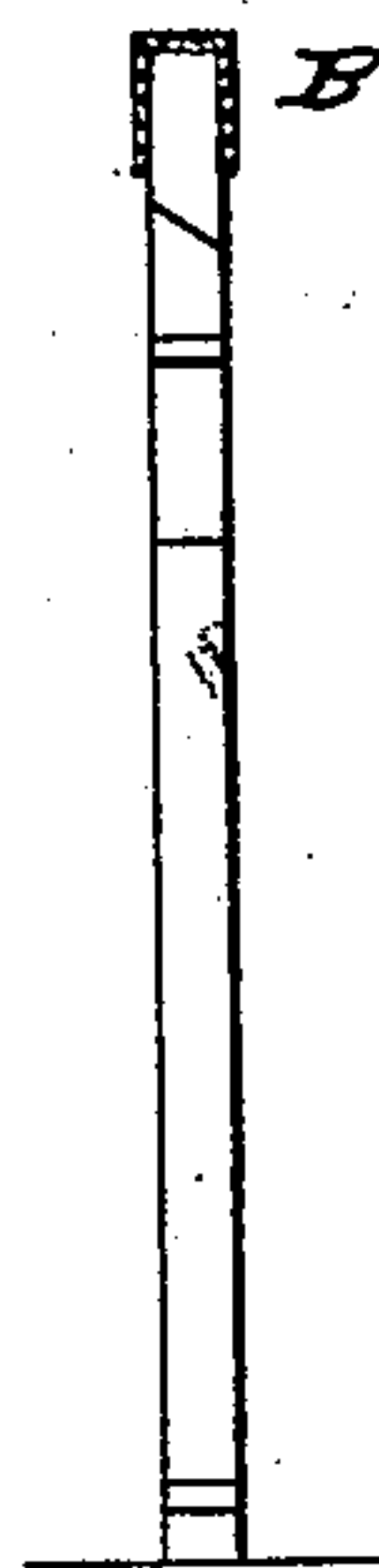


Fig. 9

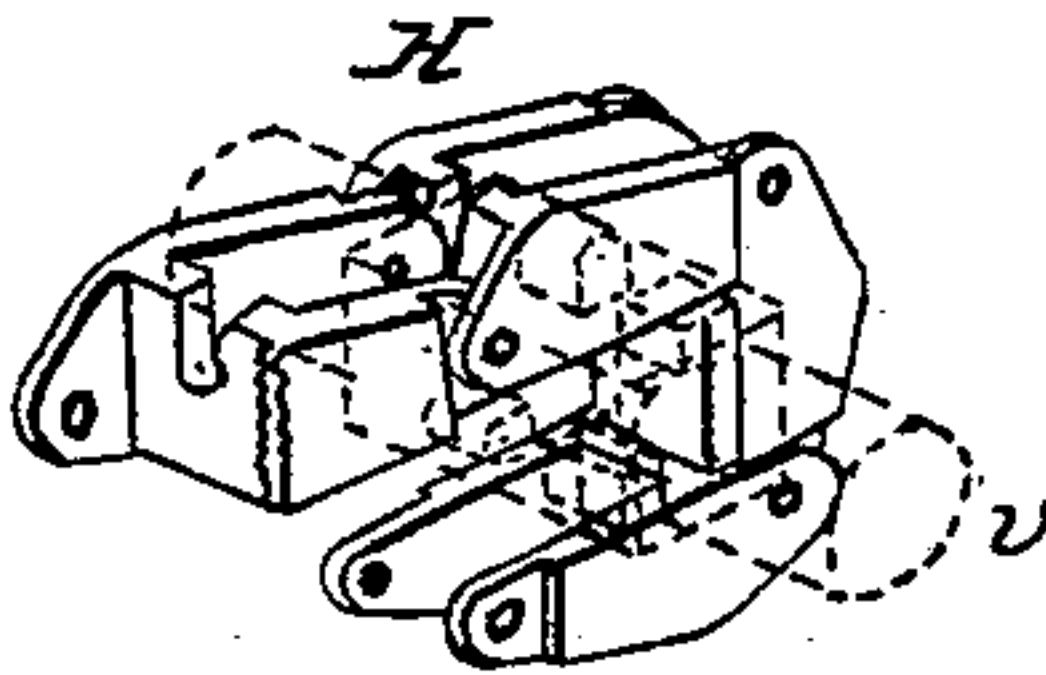
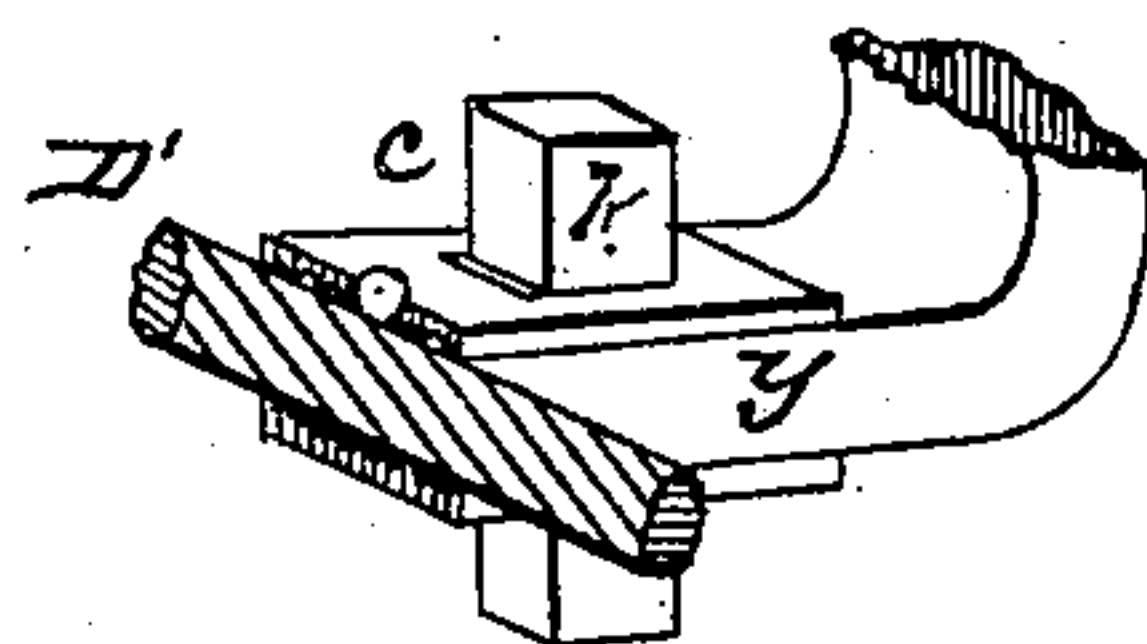


Fig. 11.



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UNITED STATES PATENT OFFICE.

WILLIAM M. SMITH, OF AUGUSTA, GEORGIA.

IMPROVED STREET-RAILWAY.

Specification forming part of Letters Patent No. **93,361**, dated August 3, 1869.

To all whom it may concern:

Be it known that I, WILLIAM M. SMITH, of the city of Augusta, in the county of Richmond and State of Georgia, have invented a new and Improved Elevated Railway, for the purpose of supporting one or more endless cables or chains, to be propelled by stationary engines, by which carriages, canal-boats, and other burdens may be propelled, as particularly shown in its application to street-cars in the following specification, and the drawings accompanying the same. I do hereby declare that the following is full, clear, and explicit description thereof, which will enable those skilled in the art to build and use the same, reference being had to the accompanying drawings, forming part of this specification, of which—

Figure 1 is a plan; Fig. 2, an elevation; Figs. 3, 4, 5, 9, 10, and 11, details on an enlarged scale; Fig. 6, a perspective view of frame-work supporting the railway; Figs. 7 and 8, elevation of frame-work.

This invention relates to a new and improved method of transmitting power from stationary engines to an endless cable, passing directly above the center and along the entire length of parallel, circular, or irregular street-railroads, or wherever the constant presence of active propelling-power is desired along the entire length of one or more lines, or between two or more given points, whereby burdens varying in character may be attached and detached therefrom at will. Conductors of street-cars may also cause the same to be propelled thereby, and controlled with greater ease than when drawn by horses. This method of drawing street-cars, if adopted, will secure to the public a safe and rapid mode of transportation, and save to the numerous street-railroad corporations an incalculable amount of money now expended in the purchase and feed of horses, besides the enormous loss sustained to them in the rapid depreciation of the value of their horses, by reason of the very excessive labor required of them.

This invention can be used as well for propelling canal-boats as street-cars; also, in the transportation of goods and passengers suspended to each cable-carriage, and in the excavation of canals, railroads, and other pur-

poses unnecessary to mention in this specification.

Similar letters of reference indicate corresponding parts.

Fig. 1 on Sheet No. 1 represents the plan or top view of one section of my invention, turning a right angle or street-corner, and the beginning of another section of the same.

The dark-blue lines A in Fig. 1 represent two parallel railroad-tracks, built on the ground, for the use of street-cars.

Directly above the center of each of said tracks is suspended to the arched cross-beams B, supported by columns C, an endless elevated railway, constructed with an open center, and fully indicated by the light-blue lines D, traversing the entire length of section E in Fig. 1.

The red lines F represent an endless cable or chain, passing through the upper end or heads G' of the cable-carriages G, and rigidly fastened therein, allowing an equal distance between the different cable-carriages.

The cable-carriage G is made with two pairs of wheels, the axles of which are rigidly fastened and revolve with the wheels. In the middle of each of said axles is turned out a recessed bearing, to which is adjusted the perpendicular end of a right-angled bar. Said pairs of wheels must be adjusted to said angled bar one above the other, and of sufficient distance apart to admit the rails of said elevated road between the wheels of the upper and nether pair, without touching the wheels of the nether pair when the carriage G is resting upon the surface of said elevated track. The face of said wheels should be made broad when the track is laid with cable-rails, and the flanges of the upper and nether wheels in all cases should not be more than one inch apart.

Near the horizontal end of said angled bar is attached the extension-ring O, which will be described in its proper connection.

The cable-carriages G are so constructed that when propelled by the endless driving-chain H, (seen in Fig. 2,) any street-car adapted to the use of this device, and filled with passengers, may be attached to any one of the passing cable-carriages, and detached therefrom by the conductor at will without any injurious shock either to the moving cable or

car, all of which is more fully represented in Fig. 2 by the letters I, J, K, L, M, N, O, Q, and R.

I represents the body of a street-car, attached to one of the cable-carriages G.

J indicates elevated spring draw-bars, attached thereto.

A large wheel, K, is fixed to an axle, which revolves in the elevated end of each of said draw-bars. On the end of each of said axles is rigidly fastened the spur or ratchet wheel L, as seen in Fig. 2. Immediately underneath each of said ratchet-wheels is a small tube, (marked M,) made at the end and in the edge of the elevated end of said draw-bar J. Within each of these tubes is a pawl, which holds the wheels L and K rigidly in one position by means of a spiral spring arranged within said tube and acting against said pawl.

N indicates a rod or cord, attached to a projection of the pawl in tube M.

When it is desired to attach the car to the moving cable F the pawl in tube M must be allowed to fasten the ratchet-wheel L, and the extension spring-ring O, attached to each cable-carriage, as indicated in Fig. 2, will rigidly fasten itself to one of the curved arms of the wheel K.

The extension-spring draw-bar J and the extension spring-ring O will overcome the shock which would otherwise be produced by the sudden fastening of a standing car to a moving cable.

When a car is desired to be stopped to take on passengers, it is only necessary to disengage the pawl in tube M from the ratchet-wheel L by means of cord N, and allow the wheel K to revolve whenever the extension-ring O, suspended from each cable-carriage, shall strike the arms of the same.

O indicates a spring extension-ring, and the method of applying it to the cable-carriage G.

Q indicates a hollow cylinder, containing two rods, with a spiral spring around each of them, which can be fully understood by reference to Q in Fig. 3. Said rods are firmly attached to the middle slide, forming part of the extension spring draw-bar J. Said spiral springs serve the double purpose of holding up the elevated ends of the draw-bars J, and at the same time preventing the forward draw-bar from lifting the front wheels of the car from the track, when the same is suddenly fastened to a high-moving cable, by forcing it to commence pulling at the top of the rear end of the car first.

R indicates a rod at each end of car I, which guides the extension draw-bar when suddenly loosed from the moving cable back to its place in the center of the front end of the car.

The cable-guide drums S in Fig. 1 have formed upon the periphery of each a number of grooved teeth, shaped like the ordinary crosscut-saw tooth, and properly spaced, for the reception between the teeth of the angled cable-heads G' while the carriages G are passing the angles and sectional ends of said ele-

vated road, thereby preserving to said carriages an undisturbed forward movement, and at the same time the grooved teeth are supporting and guiding the endless cable.

The cable-carriage G in Fig. 5 shows in detail the carriage designed to be used on the said endless road.

The object of the pair of wheels on each cable-carriage, underneath the rails of said elevated road, is to prevent the cable from elevating the carriages G from the track while running over uneven grades, as the said endless elevated road, when built for drawing street-cars, must, of necessity, be parallel to the tracks below. Therefore the nether wheels of the cable-carriages will run on the under side of said elevated track when passing over depressions in the grade.

A simple ring, P, as shown, attached to cable-carriage G in Fig. 5, may be used instead of the extension-ring O.

The endless driving-chain H in Fig. 2 must be of sufficient length to always have at least one of the heads G' of cable-carriages G among the driving-links of the same.

The links of this driving-chain are made with deep walls on either side, with a partition near the center of each link, and a recess formed in the middle of the same, in order that the endless driving-chain H will pull directly and equally against the heads G' of carriages G, all of which is fully shown in Fig. 9.

The carriages G must be rigidly fastened to the endless cable F, at equal distances apart, and at such intervals as will allow the head G' of each of said carriages to pass properly in front of the recessed partition of one of the driving-links of the endless chain H.

U in Fig. 9 shows the driving-shaft of the endless chain H.

V in Fig. 1 indicates the bearing supporting the shafts carrying the driving-chain H.

W in Fig. 1 indicates the beginning of the second section of the said elevated railroad.

Fig. 6, on Sheet No. 2, shows the plan of frame-work to be adopted in building said elevated road, when it is desired to have the same supported on two columns.

The cross-beam in Fig. 6 must be made (similar in structure to the cross-beam in Fig. 7) with thin deep walls, narrow closed top, open underneath, having what is known as a square brace extending from each supporting-column, and attached to and supporting said beam where the outer edge of each outside hanger supporting said elevated road is fastened to said cross-beam.

No special plan for building the columns supporting said cross-beam. The columns must be planted in the ground at the curb-stone, on each side the street, where the said elevated road is built.

When said road is built in parallel lines along the same street, said cross-beam must have attached thereto two single and one center or double hanger.

Each of said hangers must have a short pro-

jecting angle, of sufficient length only to allow the wheels of carriages G freely to pass the arm and the projecting end of each hanger.

Said hangers must be so attached to said cross-beam, in pairs, that their projecting angles will allow the track of said elevated road to be laid with an open center.

Z in Fig. 6 represents a circular clamp, showing two cables held rigidly parallel to each other. Such clamps must be used when said elevated tracks are laid with cable-rails, in order to prevent the cables from springing apart, thereby allowing the columns supporting the same to be planted at greater intervals than would otherwise be safe.

Fig. 11, on Sheet No. 2, represents an enlarged section of the cable-rail support in Fig. 6.

Y is a section of one of the hangers, fastened firmly to and suspended from the cross-beam B' in Fig. 6.

D' is a cable-rail, resting in the grooved end of hanger Y.

C shows an inside view of the clamp fastening the same thereto.

In laying said elevated tracks with cable-rails it is designed to have the hangers on cross-beams B', to which the cable-rails are fastened, made with circular recessed ends, as indicated by the red marks below and above cable D', as seen, resting in the end of hanger Y, so that when the cable-rail is fastened to the hanger Y by clamp C and draw-key K, in Fig. 11, solder or other metal may be poured into the hole in the clamp C, (represented by the round red spot in the center thereof,) until the circular recessed end of hanger Y and the irregularities in the cable-rail are filled, thereby forming a fastening which will not permit the cable-rails to slip therein, besides affording a quick and safe mode of laying said elevated roads.

The method of fastening cable-rails with solder or other metal is designed to be adopted in fastening the endless cable F in the heads of G' of every cable-carriage used for the transportation of the same.

Fig. 7 shows the plan of frame-work for said elevated road when it is desired to have but one supporting-column to each span of the same.

The single column, supporting cross-beam and hangers, in Fig. 7, when used in building said elevated road, must be planted firmly in the ground midway between the two tracks built on the surface, so that the center of the tracks above will stand perpendicular to those below. The same relative position of the upper and nether tracks must be observed in all cases, whether said elevated road is supported by single or double columns.

The braces, hangers, and cross-beam of the single column in Fig. 7 are substantially the same as described in Figs. 6 and 11.

A' in Fig. 10 is the end of two rails united. Said rails are made the same as cross-beams B², but not so heavy, and are intended to be

used for said elevated road when the cable is not adopted for that purpose.

Fig. 4 is a front view of the spring-extension draw-bar J. It is made with two slide-frames, fitted one within the other, having opened centers and closed ends. The springs are placed one above another until the open centers are filled.

In the top of the middle slide is situated the wheels K and L. The top spring is firmly held to its place by the outer slide, the lower end of said slide being fastened to the platform or other part of the car.

There must be placed underneath the bottom spring and lower end of the middle slide-frame an india-rubber spring, to overcome the shock which would occur when the extended draw-bar is loosed from the moving cable.

When the cable-carriage is attached to the wheel K the middle slide compresses the springs until the traction is overcome.

The extension-spring ring O is made in the same manner as the draw-bar J.

X in Fig. 1 indicates the space between two sections of the road.

T in Fig. 2 represents a vertical shaft geared to the driving-shaft of chain H, and propelled by a stationary engine under ground.

T' in Fig. 1 shows the proper location for another stationary engine when the said elevated track is laid in sections.

When the said elevated track is laid in sections, it will be necessary to have proper descending grades underneath every interval between sections, so arranged that the car on each track will, of its own momentum, pass to the track of the cable-carriages of the next section. The same will have to be done where the tracks cross each other.

Double street-railroad tracks must be laid at their terminus, so that the cars arriving will pass to the return-track, in order that the returning spring extension-ring O may fasten itself to an arm of wheel K in the rear extension draw-bar J, thereby starting the cars on its return trip at once.

The said elevated road can be suspended from the houses on either side of streets over which the same is built.

I do not confine myself to stationary steam-power for propelling said endless cable, but will use water-power when it can be made available, substantially as herein set forth, with regard to stationary steam-power.

What I claim as new, and desire to secure by Letters Patent, is—

1. An endless elevated railway, consisting of two separate rails or wire cables, properly supported by elevated frame-work, and carrying the carriages G, which are adapted to be connected to the car running on the track below, the carriages being connected by a cable and propelled by stationary engine or engines, all arranged and operating substantially as and for the purposes set forth.

2. The peculiar construction of the carriages G, with upper and lower wheels, with a suit-

able projection above for the attachment of the cable and the arm which connects with the car, all constructed and arranged to operate as and for the purposes set forth.

3. In this described railway, the endless driving-chain, arranged to operate as described, and adapted to the peculiar construction of the cable-carriages, as and for the purposes set forth.

4. The hanger Y, clamp C, and key K, constructed and applied substantially as and for the purposes set forth.

5. The clamp Z, formed and attached to the cable, substantially as and for the purposes set forth.

6. Also, one or more spring-extension draw-bars, arranged to act in connection with the carriages G, as and for the purposes set forth.

7. In combination with the extension draw-bars, when arranged on the platform of the car, the extension-spring Q, as and for the purposes set forth.

8. The extension spring-ring O, operating in connection with the carriages G and car, substantially as and for the purposes set forth.

9. The wheel K, ratchet-wheel L, and pawl M, substantially as and for the purposes set forth.

10. In the described railway, the guide-drum S, adapted to the carriages and cable, substantially as and for the purposes herein set forth.

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Witnesses:

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