

No. 748,503.

PATENTED DEC. 29, 1903.

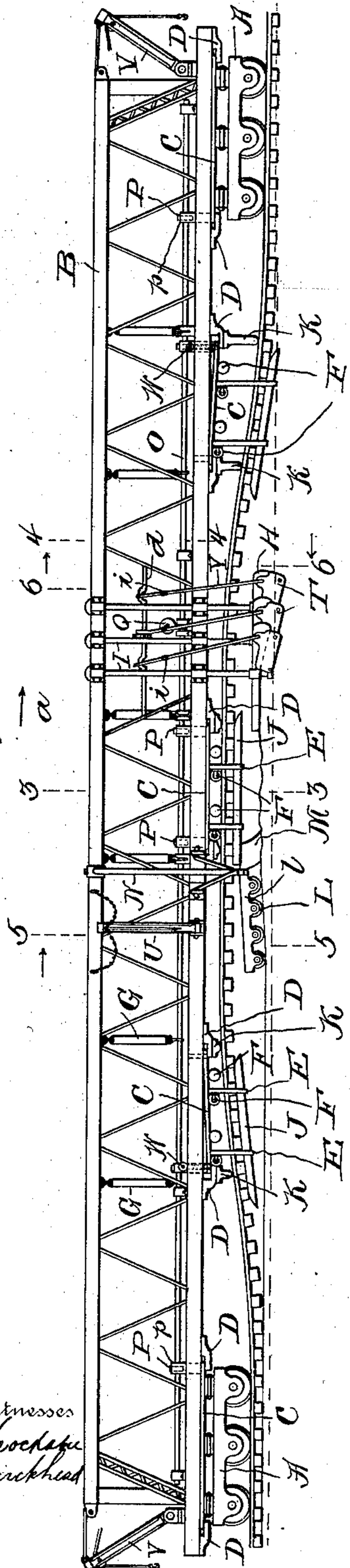
E. HOLBROOK.

MACHINE FOR RAISING, REGRADING, AND BALLASTING RAILWAY TRACKS.

APPLICATION FILED JUNE 23, 1903.

NO MODEL.

Fig. 1.



Witnesses  
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T. H. Birchhead

Fig. 3.

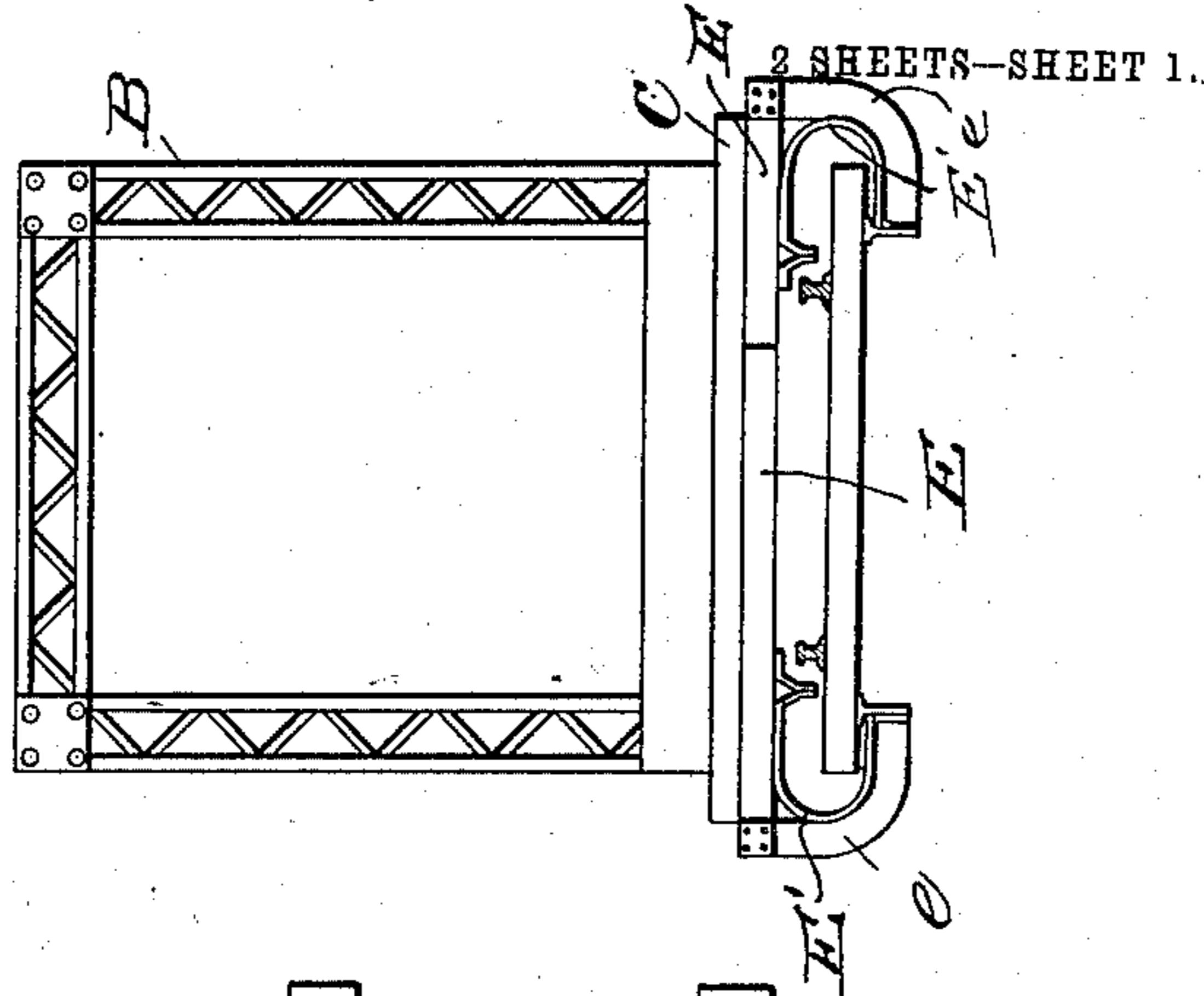
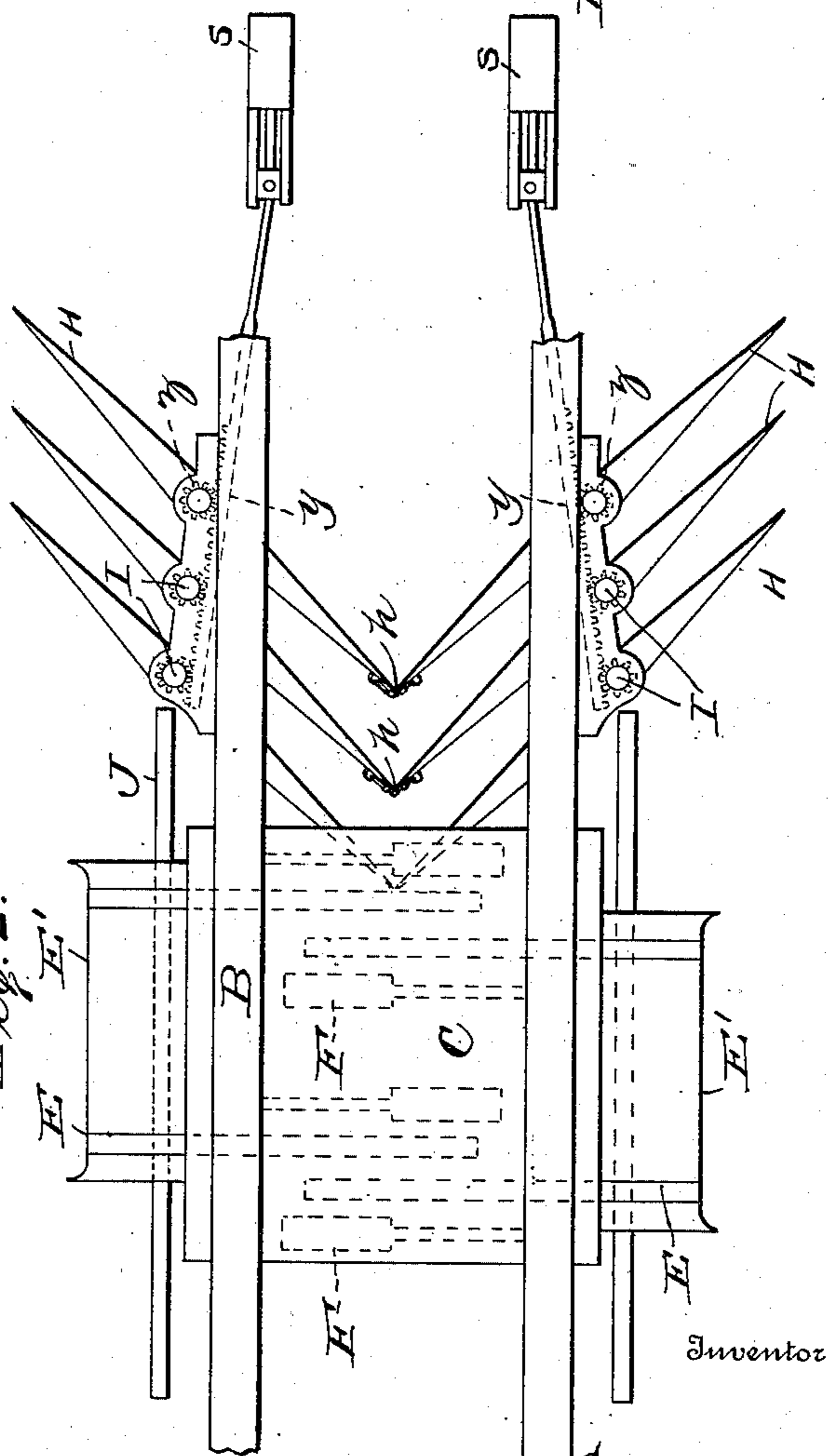


Fig. 2.



Inventor

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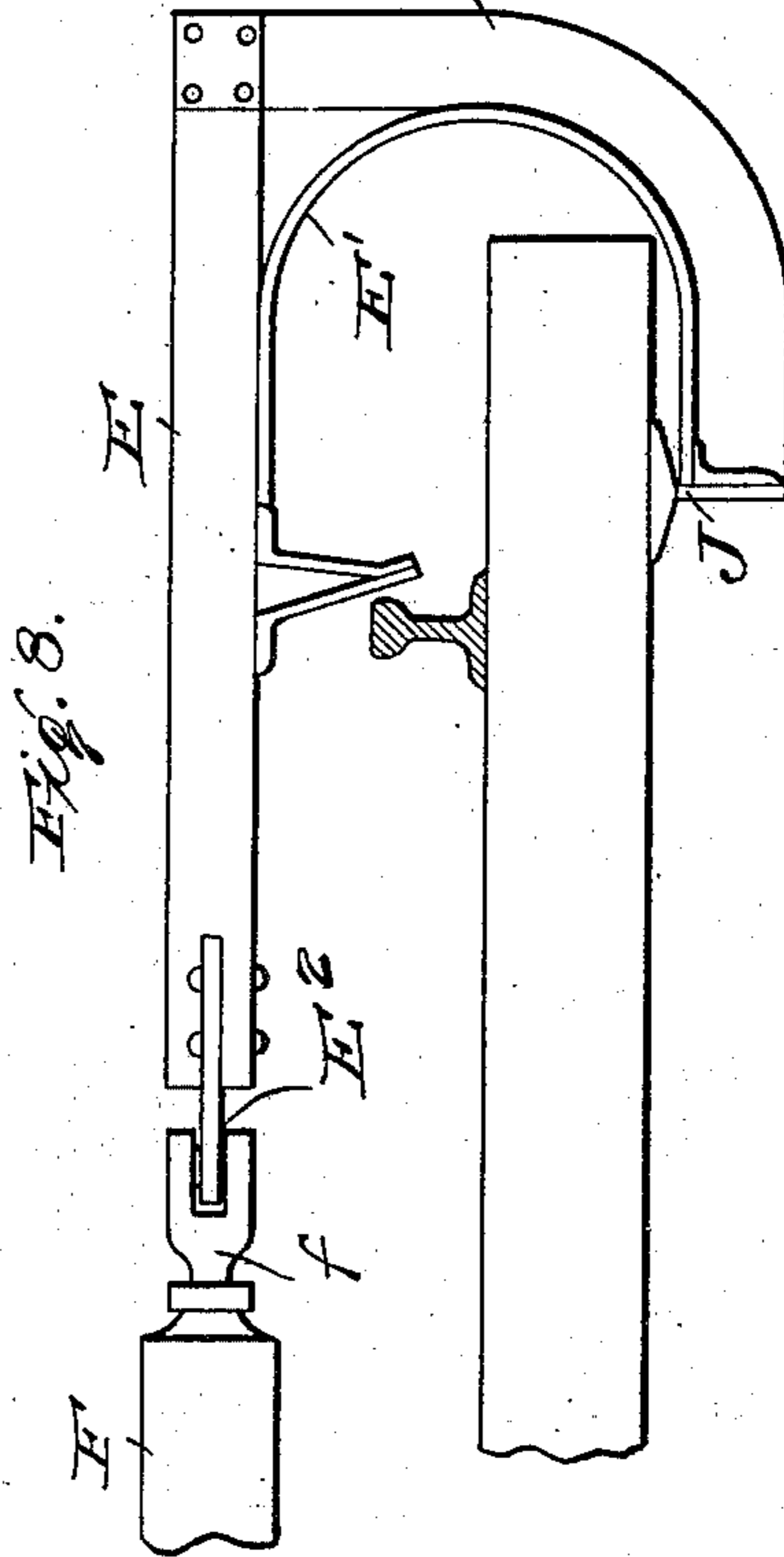
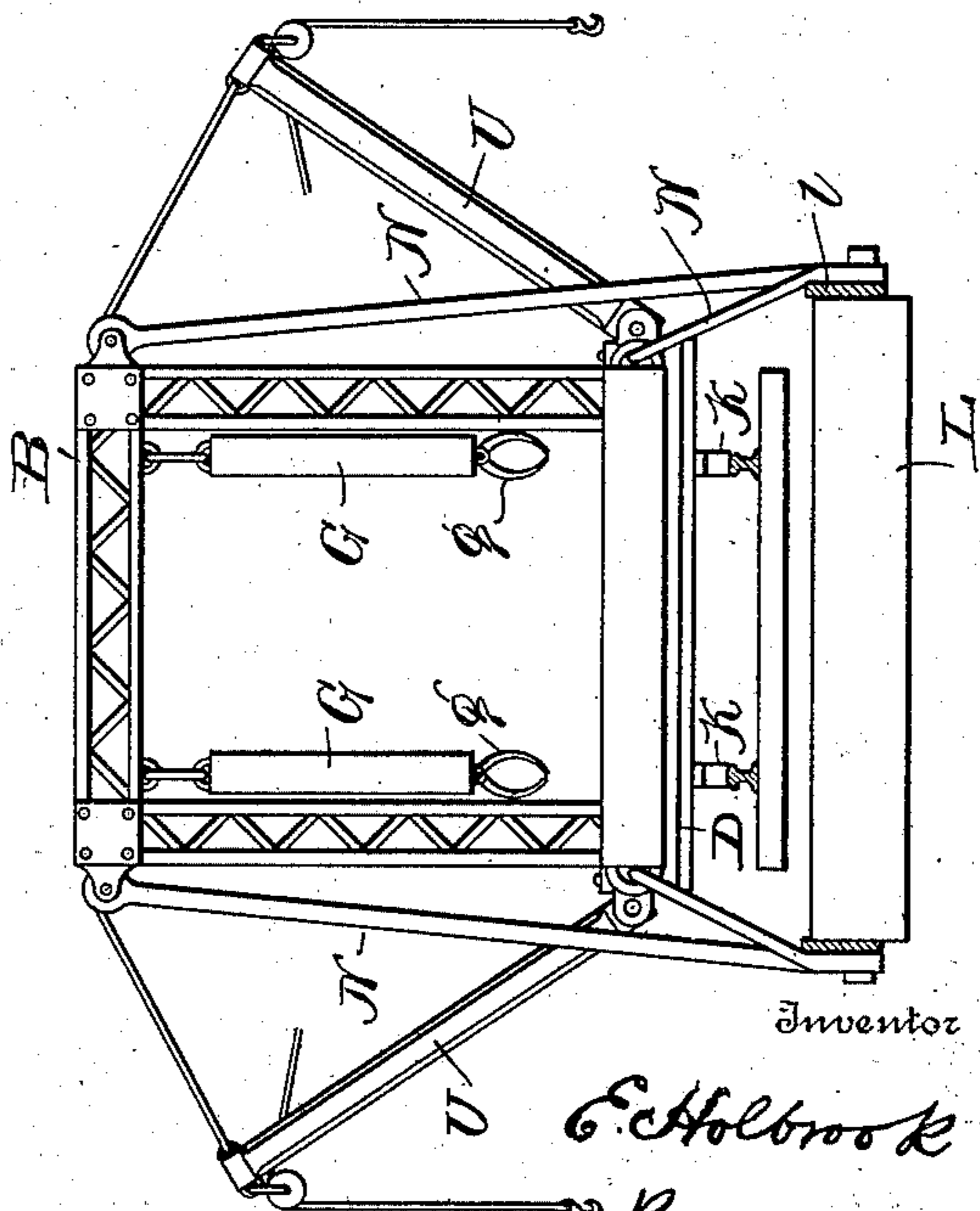
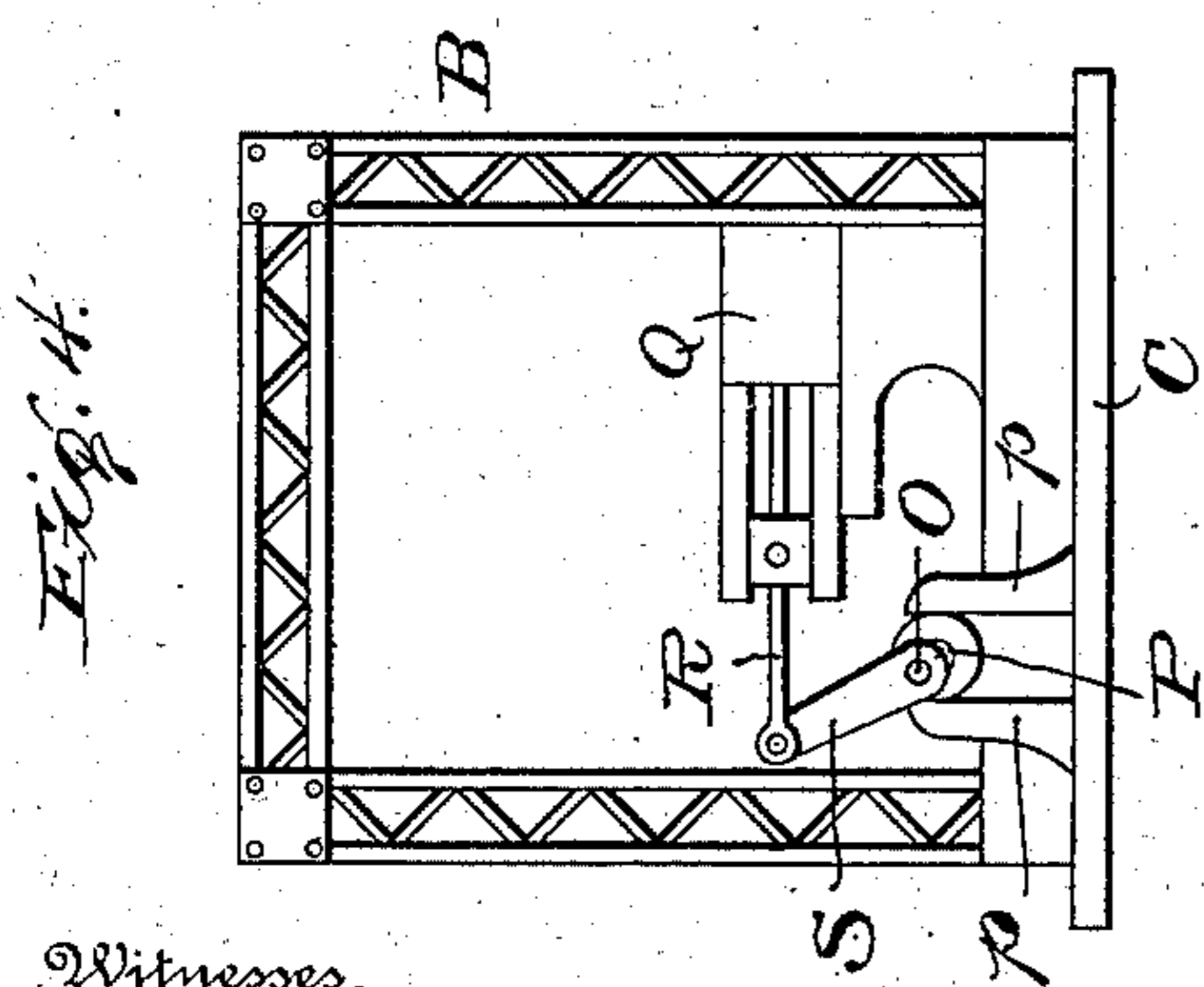
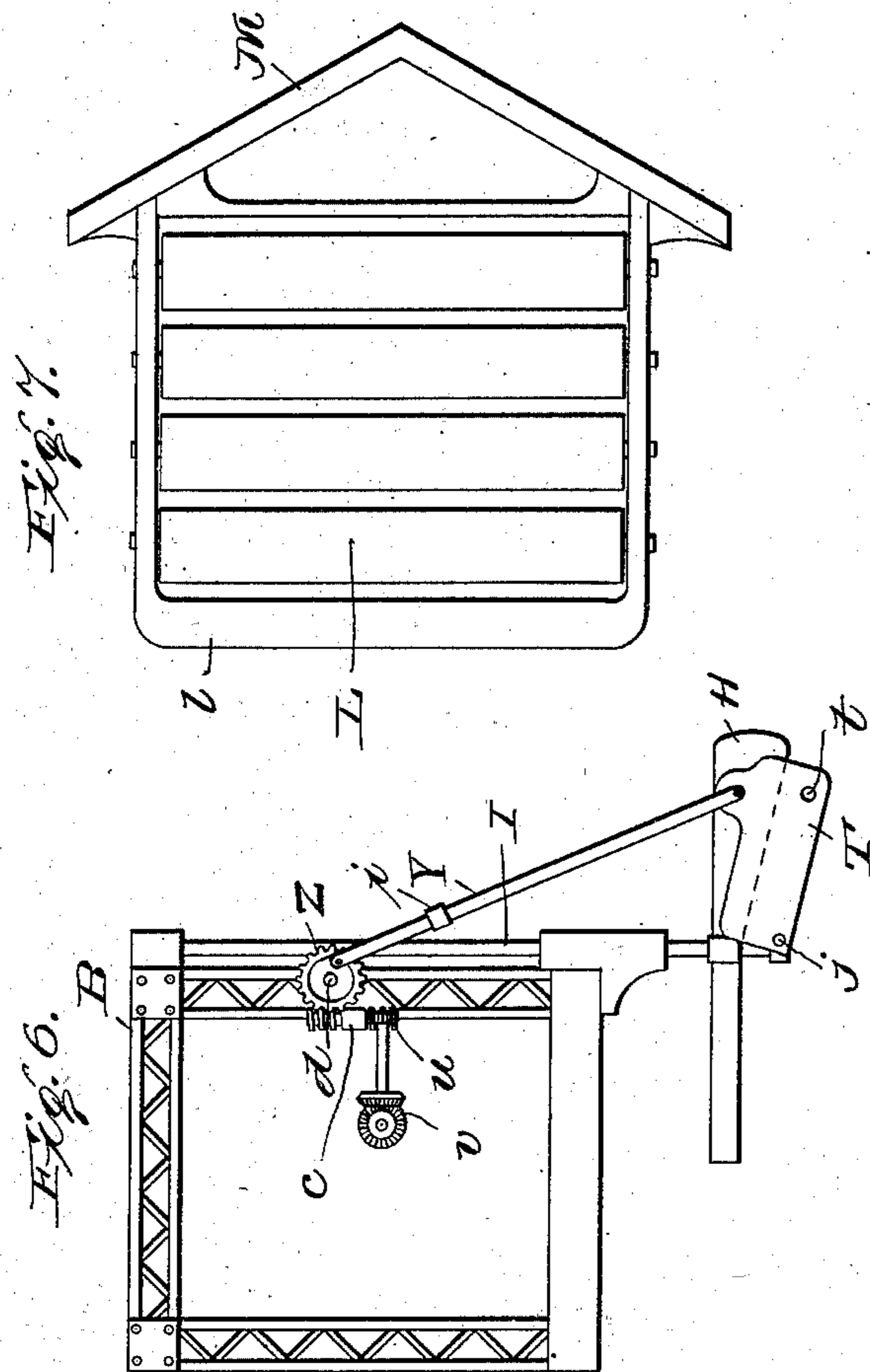
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2 SHEETS—SHEET 2.



Witnesses  
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# UNITED STATES PATENT OFFICE.

ELLIOT HOLBROOK, OF OKLAHOMA, OKLAHOMA TERRITORY.

MACHINE FOR RAISING, REGRADING, AND BALLASTING RAILWAY-TRACKS.

SPECIFICATION forming part of Letters Patent No. 748,503, dated December 29, 1903.

Application filed June 23, 1903. Serial No. 162,784. (No model.)

*To all whom it may concern:*

Be it known that I, ELLIOT HOLBROOK, a citizen of the United States, and a resident of Oklahoma city, Oklahoma Territory, have invented certain new and useful Improvements in Machines for Raising, Regrading, and Ballasting Railway-Tracks, of which the following is a specification.

My invention relates to machines for raising, reggrading, and ballasting railway-tracks, and is especially applicable to operations in which it is desired to change the grade of existing railroad-tracks without serious interruption to traffic.

It frequently happens that it is desirable to lower the grade of railway-tracks through cuts at the top of hills and to raise the track across embankments near the foot of such grades with material removed from the cuts near the top of a hill. While improved machinery has been provided for lowering the grades by cutting operations utilizing steam plows, shovels, and the like, the work of raising the track and filling under the same has been conducted in the same way for years—that is, the material is brought in cars from the steam-shovel and unloaded in such manner as to form a ridge of loose material along each side of the track. It is then spread out and rolled down the bank until the same is widened several feet. After such widening more material is unloaded in a similar manner along each side of the track, which is then jacked up, the material shoveled under the track by manual means, spread, and then tamped. This operation is repeated until the road-bed is of the desired elevation for the new grade. The material can be supplied by a steam-shovel plant at the rate of from two thousand to four thousand cubic yards a day, with average interruptions to the work by the traffic; but it requires a large force of workmen to place the material under the track, especially if the embankment is low, so that the amount that goes on the sides of the dump is small compared with the amount that is required on top.

The main object of my invention is to dispense with hand-labor in these operations by providing a machine which will operate to raise the track and to place the material under the same from the sides as the machine

is traversed over the track and to provide such a machine as will possess the fewest number of parts operating in the most effective manner for attaining the desired result.

With these objects in view my invention consists, broadly, in a car structure adapted to be traversed over the track provided with means for raising or lifting the track from its bed, and, further, provided with means for drawing the material from the sides of the track and distributing it underneath the same, and in such a machine provided with means for leveling and compacting the material under the track; and it further consists in the novel construction of machine and in the details thereof, as hereinafter more particularly described with reference to the accompanying drawings and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a side elevation of my machine, showing the relative location of parts upon the track that is being raised. Fig. 2 is an enlarged detail top plan view showing the movable track-sustaining arms and filling-plows. Fig. 3 is a detail view, in vertical section, on the line 3 3, Fig. 1. Fig. 4 is a similar view on the line 4 4, Fig. 1. Fig. 5 is a similar view on the line 5 5, Fig. 1, looking in the direction of the arrow. Fig. 6 is a similar view on the line 6 6, Fig. 1, looking in the direction of the arrow. Fig. 7 is a top plan view of the compacting-rollers and finishing-plows, and Fig. 8 is an enlarged detail view of the movable skid-supporting arms.

I have shown in the drawings one form of apparatus embodying my invention, though it is to be understood that modifications of the same may be made within the spirit and scope of my invention without departing from the broad features as covered by the claims.

Referring to the drawings, the supporting structure consists, essentially, of the supporting-trucks A, on which is mounted a long car-body B in the form of a bridge structure, suitably braced and of such length as can be properly used upon different tangents and curves of the track to be relaid. This car structure may be propelled by its own power or by a locomotive, as will be well understood without specific illustration.

Slidably mounted in suitable guides D on

the under side of the car structure is a series of bed-plates C, preferably five in number, though any suitable number may be employed, the end plates being located immediately over and attached to the trucks and the central and intermediate plates being distributed at equal distances between said end plates. On each of the central and intermediate plates I mount in suitable guides transversely-movable skid-supporting arms E, having outer hooked ends *e*, adapted to support the skids or runners J. These skids or runners are attached thereto, as shown in Fig. 8, and are intended to be passed under and support the cross-ties, and thereby the whole track structure after it has been raised from its bed, and to continue to raise and support the track as the car structure is traversed over the track. The arms E are preferably arranged in pairs and are connected together by a boiler-plate E' with the opposite ends flanged, so as to prevent as much as possible the fouling of said arms, as shown only in Figs. 2 and 8. Each arm is connected to the piston-rod of a power-cylinder F through the medium of suitable connecting-rod *f*, engaging a pin E<sup>2</sup>, carried by a bracket on the side of said arm, as shown in Fig. 8, whereby upon admission of steam, air, or water into the cylinder by proper manipulation of suitable valves (not deemed necessary to show, as their arrangement and construction may be of any suitable approved type well-known by those skilled in the art) the arms are moved transversely of the bed-plates C.

Fixed to suitable shafts I, rotatably mounted upon the car, is a series of filling plows or scrapers H, having enlarged outer ends shaped to draw the material from the sides of the track inwardly, while the inner ends follow and smooth the surface of the material thus drawn in. On the outer end of each of the plows is a vertically-adjustable wing or plate T, pivotally supported by a pin *j*, carried by a collar on the shaft I and connected by a link or rod Y with suitable operating mechanism, such as a crank mounted upon a suitable horizontal shaft *d* and operated by any suitable means—as, for example, by worm-gear *u*, journaled in a bearing *c*, meshing with a worm-wheel Z and driven by bevel-gearing *v*, the worm-gear Z preferably carrying the crank-pin for the central rod Y, as shown in Figs. 1 and 6.

The vertical shafts I are preferably geared together, as by a rack or pinion *y* and *z*, driven by auxiliary engines *s*, suitably located on the car-body B, or other convenient means of effecting rotation of said shafts may be used, and they may be independently rotated so as to turn the plows from a position parallel to the sides of the car-body to one at an angle thereto, as shown in Fig. 2, in which position the inner ends of said plows are coupled together by any suitable coupling device, as a chain and hook *h*, thereby strengthening the structure to better resist the strains

in operation as the plows advance and draw the earth, &c., inwardly under the raised track. To permit the plows to swing parallel to the car structure, the rods or links Y are provided with suitable universal joints *i*. The plates T may be raised above the grade before the plows are swung parallel to the car-body and the rods Y hooked into the holes *t* to support the same out of contact with the road-bed as the structure traverses the rails. The outer ends of the intermediate plates C are also preferably raised by jackscrews W to clear the ground as the structure moves over the rails to operating position.

Extending longitudinally of the bridge structure or car-body B is a shaft O, provided with eccentrics P, engaging corresponding lugs *p*, projecting upwardly from each of the bed-plates C. This shaft is adapted to be operated through a connecting-rod R of a power-cylinder Q in engagement with a pin on the crank S, carried by the shaft O. The object of this construction is to provide for adjustment of the various bed-plates so as to have the centers either on a straight line or upon an arc of a circle corresponding, respectively, to the tangent or curve over which the machine is being traversed, thus maintaining the raised track in proper alinement.

Distributed at suitable points along the car-body is a series of power-cylinders G, suspended from the top structure and having their piston-rods provided with suitable tongs or grappling-hooks *g*, adapted to grasp the rail, so that when the said tongs or hooks are brought into engagement with the rail and motive fluid admitted to the cylinders the pistons thereof raise the track a sufficient distance above the old grade to permit the insertion of the skids, filling-plows, and compacting-rollers, as hereinafter more fully described.

Projecting from the under side of the car-body, preferably from the guides D, is a series of stops K of graduated length adapted to come into contact with the rail as the latter is raised by the power-cylinders G and to arrest the same with said rail at the proper point above the grade.

The letter V indicates a suitable crane or derrick for lifting the rollers from the ground onto the car-body and for unloading the same at the proper point alongside of the track, while a similar crane U is properly mounted upon each side of the car-body near the rear end of the center bed-plates C and adapted to draw the compacting-rollers L and finishing-plow structure M, carried by a suitable frame *l*, from alongside of the track where it is deposited in proximity to the point where the regrading is to begin and place it underneath the raised track. When the compacting-roller and finishing-plow structure is in the space under the raised track, it is attached to beams or girders of the car-body by means of suitable links N hung from said beams or girders and having the lower ends

supporting the front part of said compacting-roller structure by engagement with the frame, as shown in Figs. 1 and 5. Jack-screws W are preferably mounted at the opposite ends of the two intermediate bed-plates C, one side of each of which has sufficient play in its guides to permit said sides to be raised when the machine is not in operation in order to retain the advancing ends of the skids J a sufficient distance above the track to prevent them from coming into contact with obstructions as the machine is advanced to bring it in position for active work of regrading.

With the parts constructed as hereinbefore described, in operation the machine is brought into position moving in the direction of the arrow *a*, Fig. 1, and when the center plate C is over the part of the track to be raised and regraded the power-cylinders G are operated as hereinbefore indicated, so that their hooks *g* may raise the track bodily a sufficient distance above the grade and until the rails thereof come into contact with the stops K. The cylinders F are then operated to move the removable arms E, carrying the skids J inwardly to bring the said skids underneath the cross-ties with the rails resting against the stops K, whereupon the hooks or tongs *g* are released and withdrawn from engagement with the track, the latter being then sustained upon the runners or skids J, which are, as shown in the drawings, preferably tapered at the ends, so as to facilitate the sliding movement under the cross-ties as the machine advances. The crane U is then operated to draw the compacting-rollers and finishing-plow structure previously deposited alongside of the track into position under said track, and it is then coupled to the car-body structure. The shafts I are then rotated to bring the filling-plows H into the position shown in Fig. 2 and their inner ends coupled together. The machine is then moved forward in the direction of the arrow *a*, the plows H drawing the earth previously deposited alongside of the track toward the center of the track and the finishing-plow M, following the movement of said filling-plows, throws out stones and removes bunches which may be left by the action of the filling-plows. The compacting-rollers L follow the action of the finishing-plow and compact the earth or ballast to the proper density and level the same, and as the machine advances the track is gradually lowered into position by its own weight as the cross-ties leave the rear ends of the skids or runners J, the advancing skids or runners to the corresponding extent passing under the cross-ties and raising the same. As a curve is approached the bed-plates C are suitably adjusted by the operation of the power-cylinder Q, which turns the shaft O in the proper direction and to the proper point for movement of the plate C to bring their centers on the curve in order that proper alinement of the track supported by the skids J may be maintained.

The amount of filling accomplished by the filling-plows H may be regulated within certain limits by adjustment of the plates T, as hereinbefore indicated, and the pressure to which the new bed may be subjected may be increased by additional weights or power-cylinders upon the frame *l* of the compacting-roller structure.

When the machine has operated over the required distance, it may be run back to its original position and the operations hereinbefore described repeated, and where ballasting is to be done in addition to the regrading the ballast will be distributed along the track and enough material put under the track to raise it to its finished grade, and the subsequent compacting and filling and finishing can be done by hand in the usual way.

I claim as my invention—

1. In a machine for raising and regrading railway-tracks, the combination with a car-body carried by suitable trucks, of mechanism carried by said body for raising the track and supporting the same above the road-bed, and means for drawing material from the sides of the track under the said track as the structure advances, substantially as described.

2. In a machine for raising and regrading railway-tracks, the combination with a car-body carried by suitable trucks, of mechanism carried by said body for raising the track and supporting the same above the road-bed, means for drawing material from the sides of the track under the said track as the structure advances, and means connected to said car-body for compacting the filled material under said track as the car advances, substantially as described.

3. In a machine for raising and regrading railway-tracks, the combination with a car structure movable over the rails of the track, mechanism on said car structure for raising the track from its bed, and supporting devices on the car structure adapted to engage and hold the track structure above the bed as the car structure advances, substantially as described.

4. In a machine for raising and regrading railway-tracks, the combination with a car structure movable over the rails of the track, mechanism on said car structure for raising the track from its bed, and skids or runners adapted to pass under the cross-ties of the track structure when the track is raised, and to raise and support said track as the car structure advances, substantially as described.

5. In a machine for raising and regrading railway-tracks, the combination with a car-body carried by suitable trucks, of mechanism carried by the said car-body for raising the track and supporting the same above the bed as the car advances, substantially as described.

6. In a machine for regrading railway-tracks, the combination with a car structure

movable over the rails of a track, of mechanism on the car-body for raising the track from its bed, and mechanism on the car structure adapted to support the said track and to raise  
5 additional track structure as the car advances, and to lower the receding track structure into place on its bed, substantially as described.

7. In a machine for raising and regrading  
10 railway-tracks, the combination with a car structure carried by suitable trucks, of means on said structure for engaging and raising the track above the road-bed, runners or skids carried by said car structure, means for  
15 moving said runners or skids into position under the raised track and adapted to raise and support the same as the structure advances, and mechanism for drawing the material from the sides of the track underneath  
20 the same and distributing over the road-bed, substantially as described.

8. In a machine for raising and regrading railway-tracks, the combination of a car structure carried by suitable trucks, of means on  
25 said structure for gripping and raising the track above the road-bed, runners or skids carried by said car structure, means for moving said runners or skids into position under the raised track to support the same as the  
30 structure advances, mechanism for drawing the material from the sides of the track underneath the same and distributing it over the road-bed, and rollers for compacting said distributed material, substantially as described.

9. In a machine for raising and regrading  
35 railway-tracks, the combination of a car structure carried by suitable trucks, of means on said structure for gripping and raising the track above the road-bed, runners or skids  
40 carried by said car structure, means for moving said runners or skids into position under the raised track to support the same as the structure advances, mechanism for drawing the material from the sides of the track underneath the same and distributing it over  
45 the road-bed, a finishing-plow adapted to follow said distributing means for removing bunches or stones, and compacting-rollers adapted to follow said finishing-plow, substantially as described.  
50

10. In a machine for raising and regrading railway-tracks, the combination with a car-body supported by suitable trucks running upon the rails of said track, of a series of  
55 movable bed-plates mounted upon said car-body, means for rotating the same to bring the centers in alinement or upon a circle corresponding to the tangents or curves of the track, suspending-arms carried by said plates,  
60 skids supported by said arms and adapted to pass under and raise and sustain the track as the structure moves forward, and means for drawing material from the sides of the track as the structure advances and distributing it over the road-bed, substantially as described.  
65

11. In a machine for raising and regrading railway-tracks, the combination with a car-body supported by suitable trucks running upon rails of said track, of a series of movable bed-plates mounted upon said car-body, means for moving the same to bring the centers in alinement or upon a circle corresponding to the tangent or curves of the track, suspending-arms carried by said plates, skids  
70 supported by said arms and adapted to pass under and raise and sustain the track as the structure moves forward, means for drawing the material over the road-bed from the sides of the track as the structure advances, and  
80 means for removing bunches or stones and compacting the distributing material under the track, substantially as described.

12. In a machine for raising and regrading railway-tracks, the combination of a car structure supported upon suitable trucks running upon the rails of said track, of bed-plates supported by and movable on the car-body, transversely-movable arms guided on said bed-plates and carrying skids or runners, means  
90 for moving said arms transversely of the bed-plates for introducing the runners underneath the raised track, and means carried by the car-body for raising the track above the road-bed for the insertion of said skids, substantially as described.  
95

13. In a machine for regrading railway-tracks, the combination with a car structure movable over the rails of said track, of means for raising the track above its bed, means  
100 carried by the car structure for further raising and supporting the track as the structure advances, and stops bearing upon the rails, substantially as described.

14. In a machine for raising and regrading  
105 railway-tracks, the combination with a car structure movable over the rails of the track, of means for raising and supporting the track above its bed as the structure advances, vertical shafts journaled on the car structure,  
110 plows or scrapers carried by said shafts and adapted to draw material from the sides of the track underneath the raised track, as the structure advances, substantially as described.  
115

15. In a machine for raising and regrading railway-tracks, the combination with a car structure movable over the rails of the track, of means for raising and supporting the track above its bed as the structure advances, adjustable plows or scrapers rotatably mounted on the car structure and adapted to draw material from the sides of the track underneath the raised track, and mechanism for swinging said plows at an angle to the car structure or parallel thereto, substantially as described.  
120  
125

16. In a machine for raising and regrading railway-tracks, the combination with a car structure movable over the rails of the track,  
130 of mechanism for raising and supporting the track above its bed as the structure advances,

vertical shafts journaled on the sides of the car structure, plows or scrapers carried by said shafts, and means for rotating the shafts to bring the plows parallel to the car structure or swing them outwardly at an angle thereto, substantially as described.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

ELLIOT HOLBROOK.

Witnesses:

E. L. SPARKS,  
J. N. SALMEN.