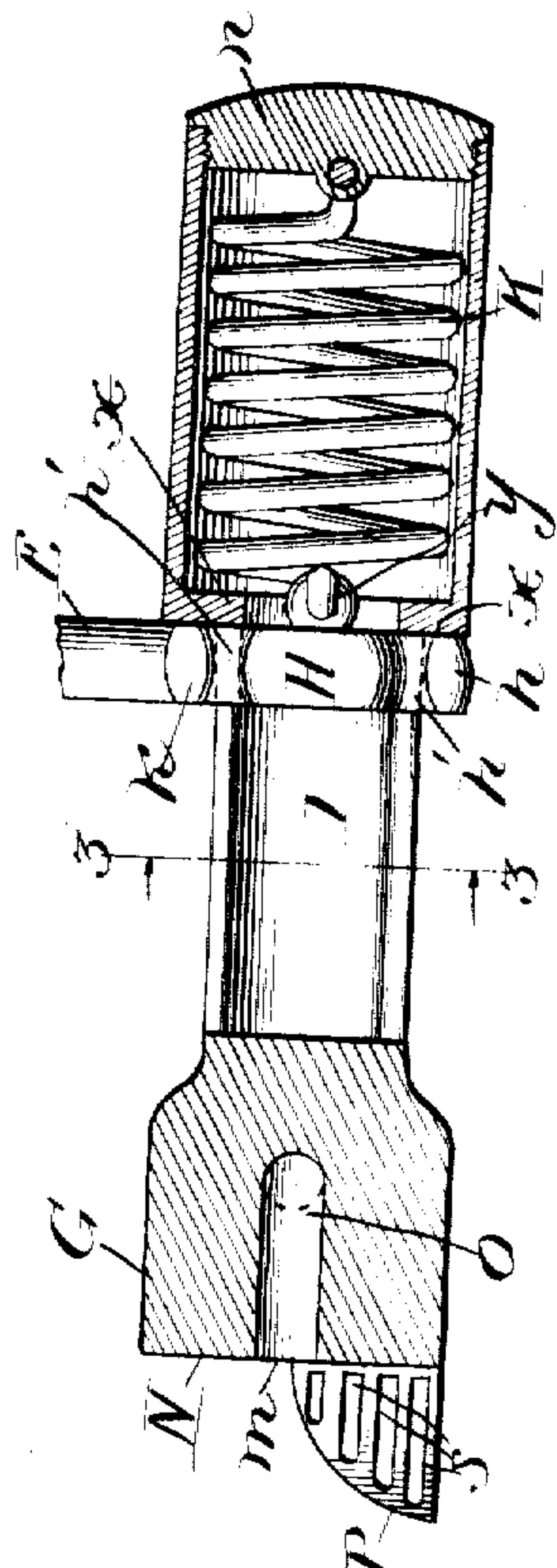
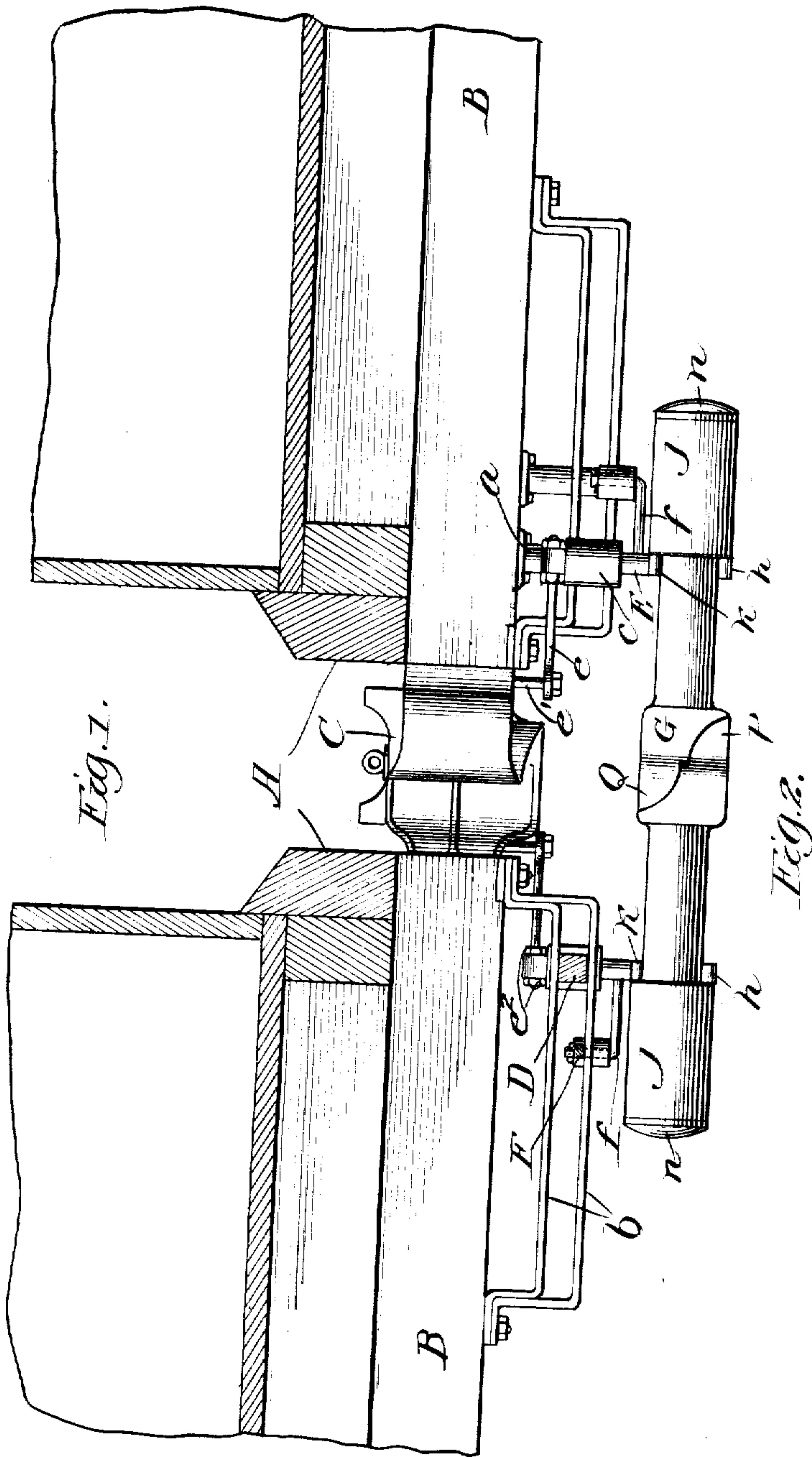


908,701.

F. H. RUTHERFORD.  
CONNECTOR FOR TRAIN PIPES.  
APPLICATION FILED JULY 17, 1907.

Patented Jan. 5, 1909.  
3 SHEETS—SHEET 1.



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**F. H. RUTHERFORD.**  
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3 SHEETS—SHEET 2.

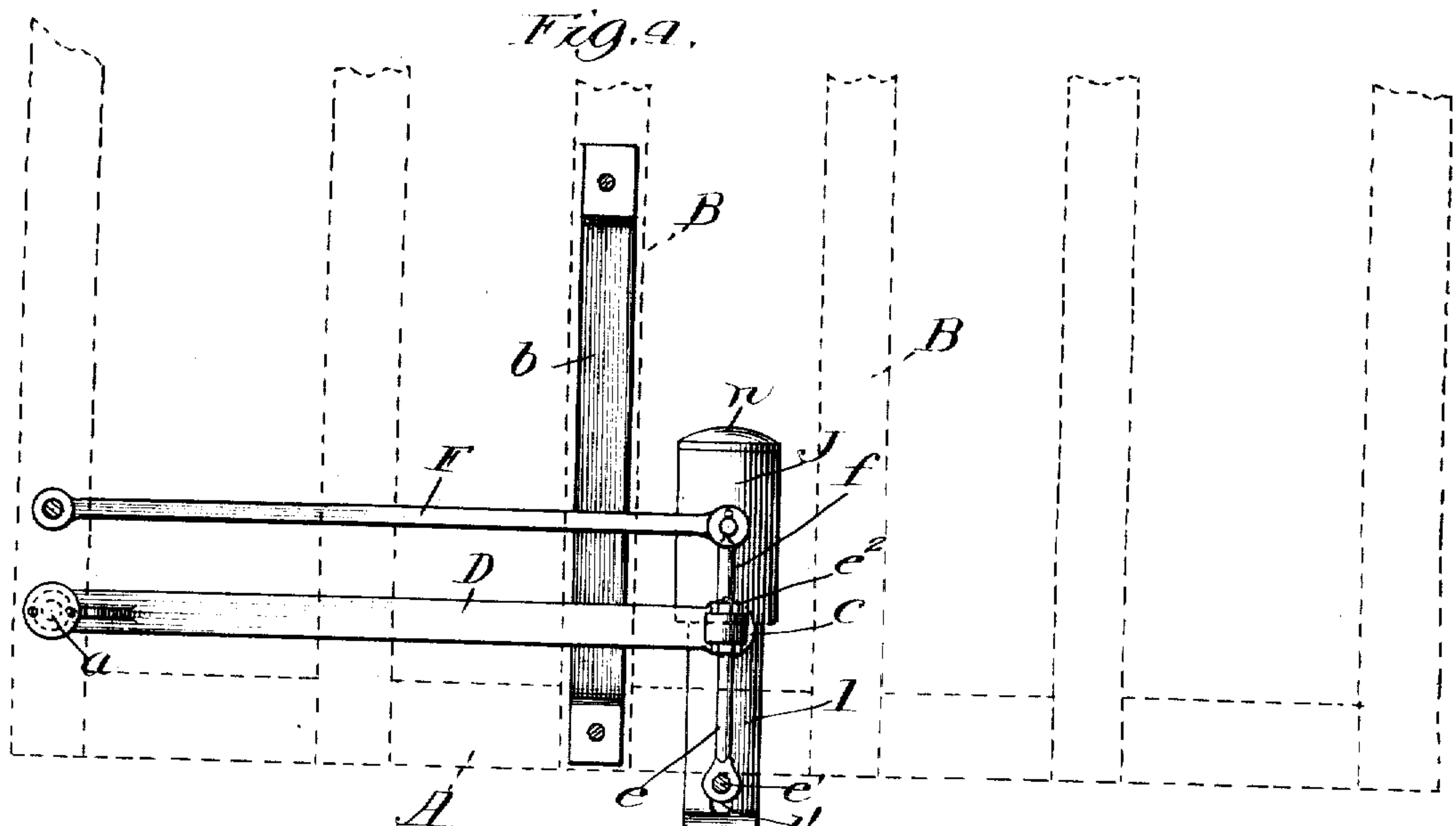
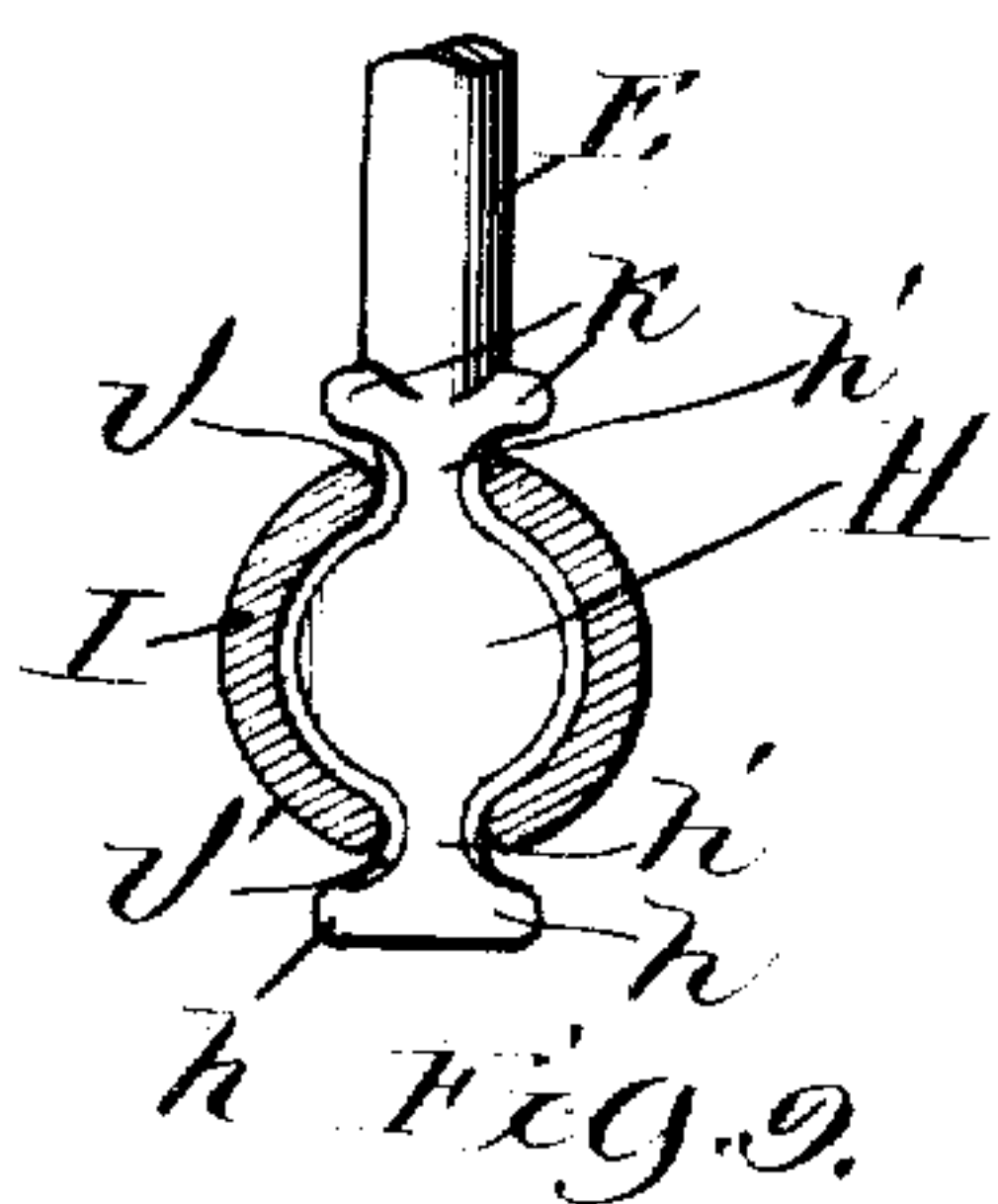
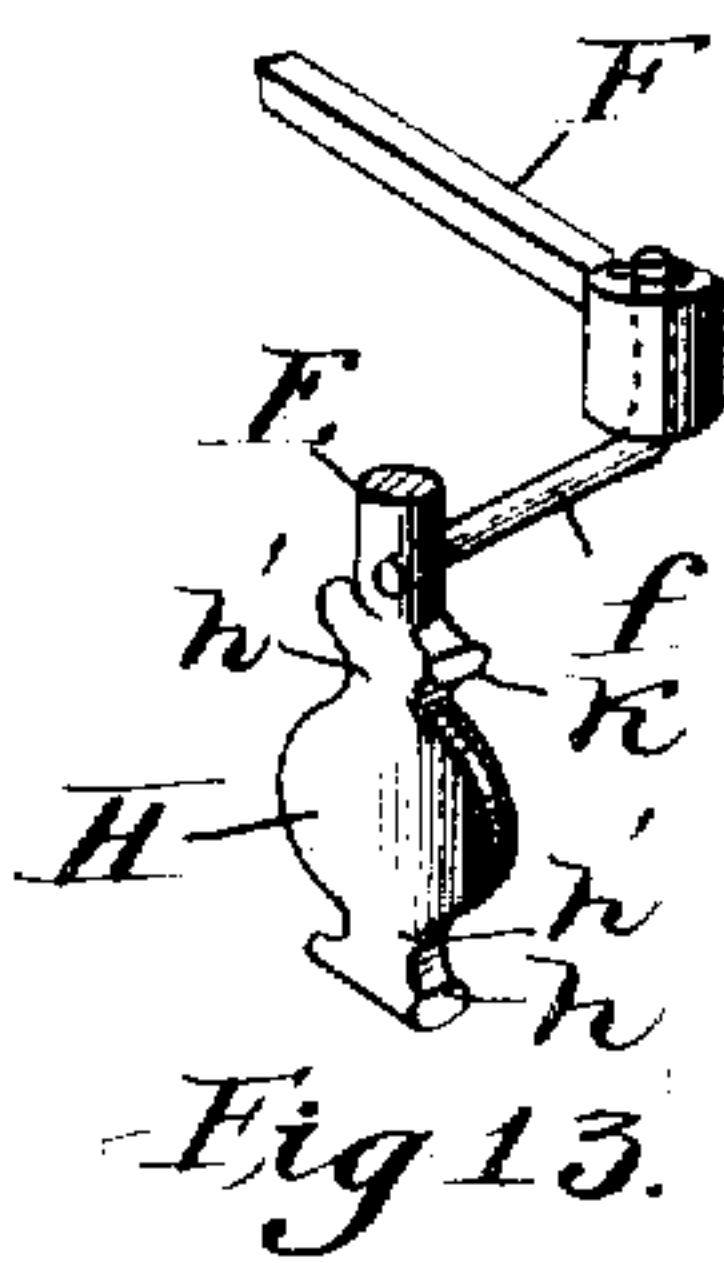
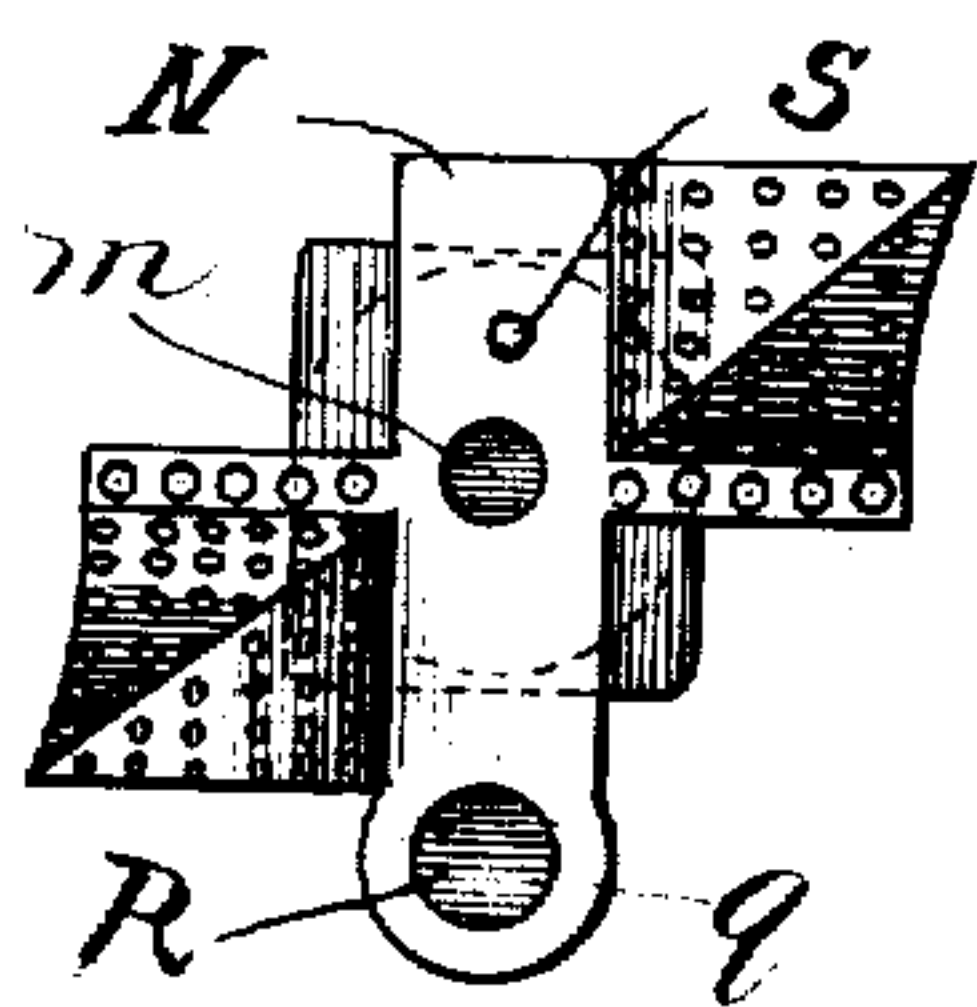


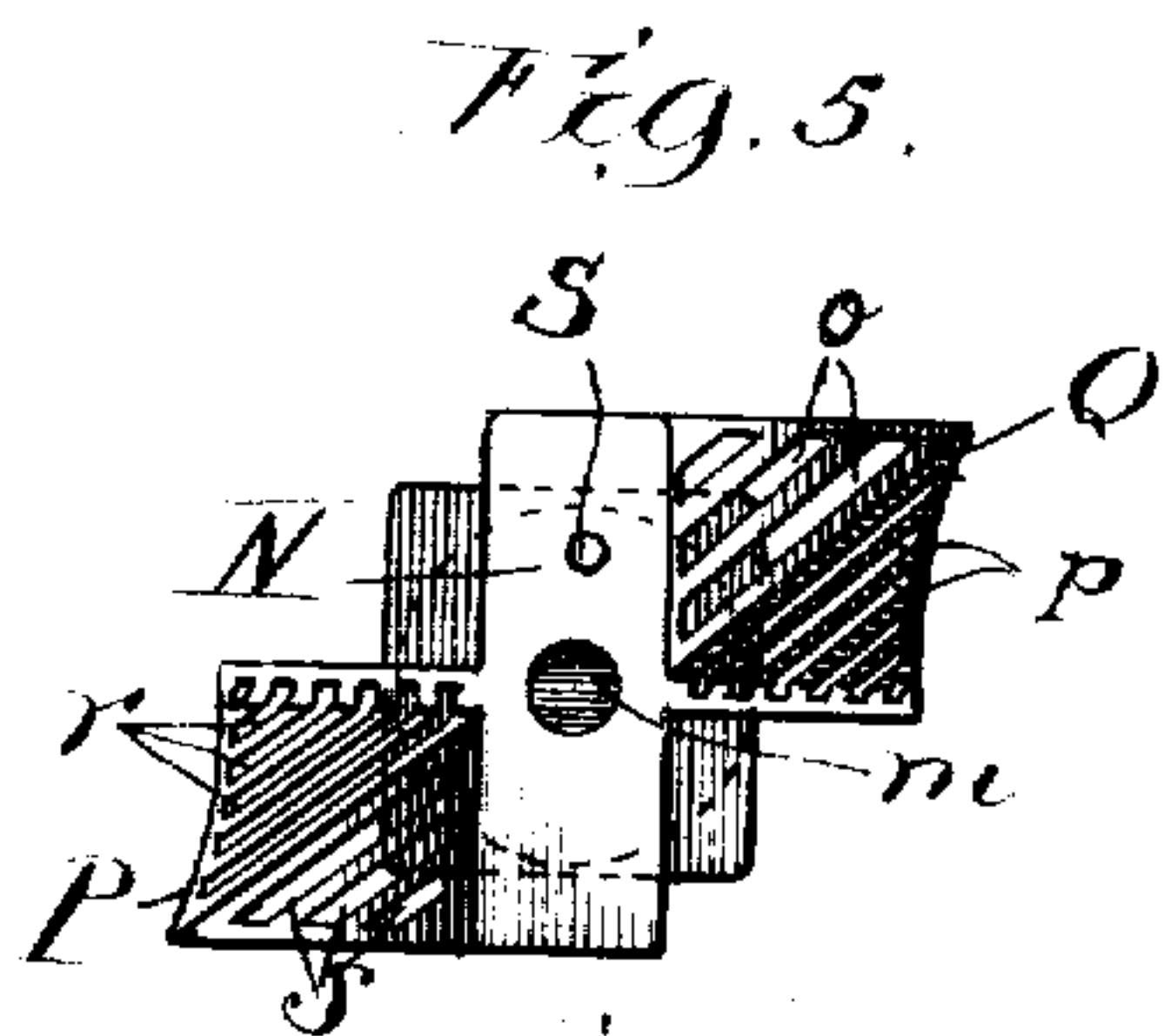
Fig. 5.



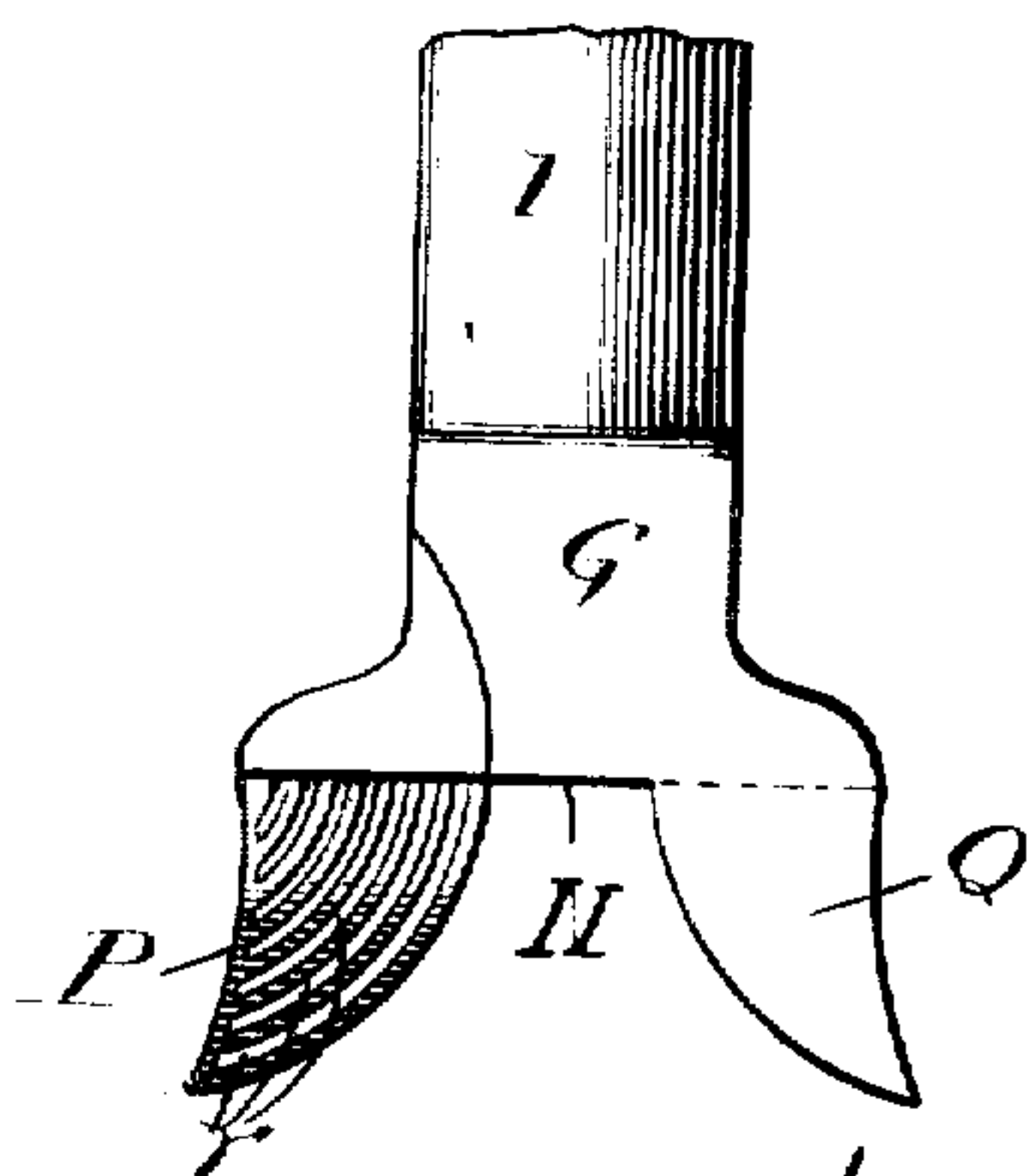
h Fig. 9.



*Fig 13.*



Αἰγ. σ.



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3 SHEETS—SHEET 3.

Fig. 11.

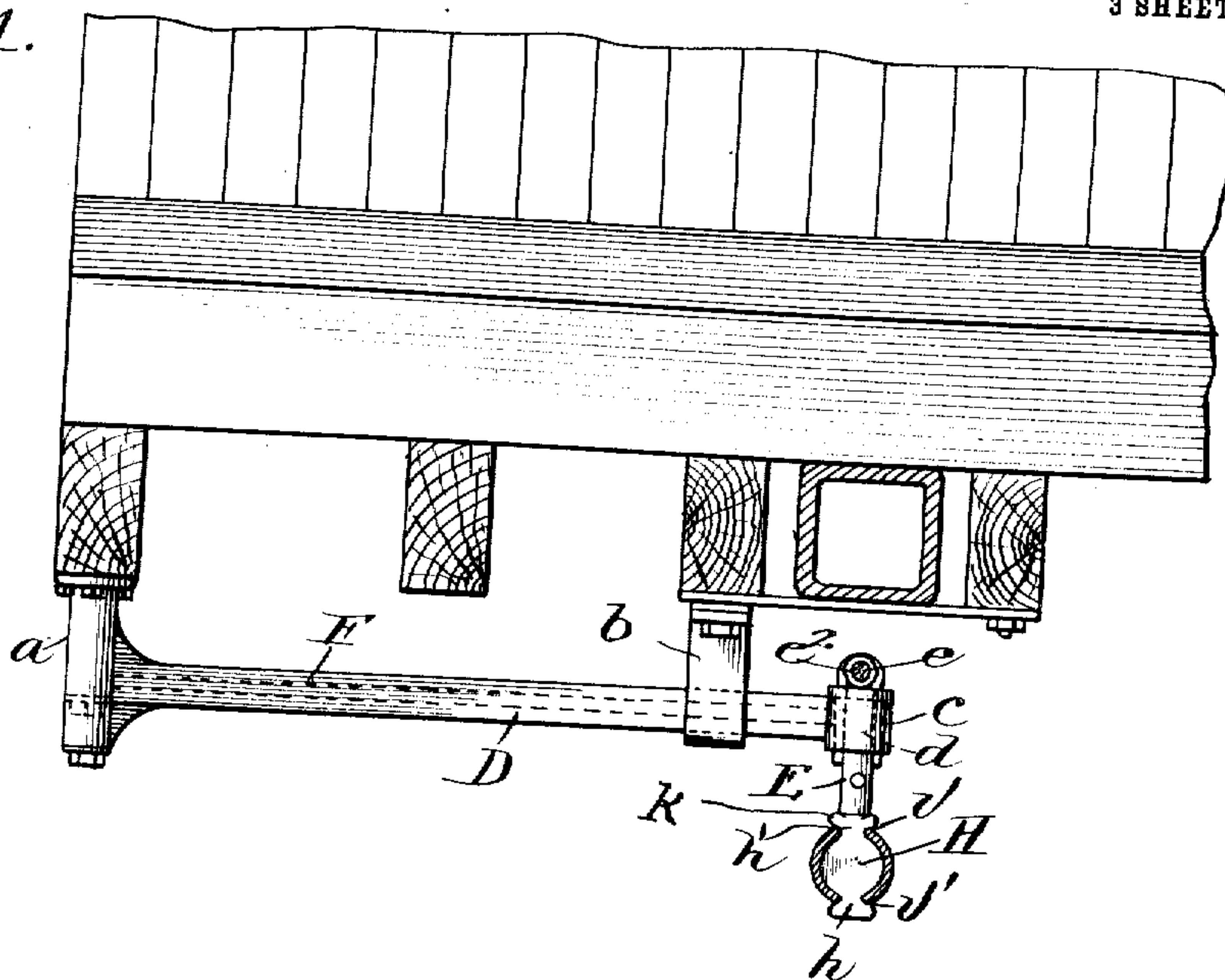


Fig. 12.

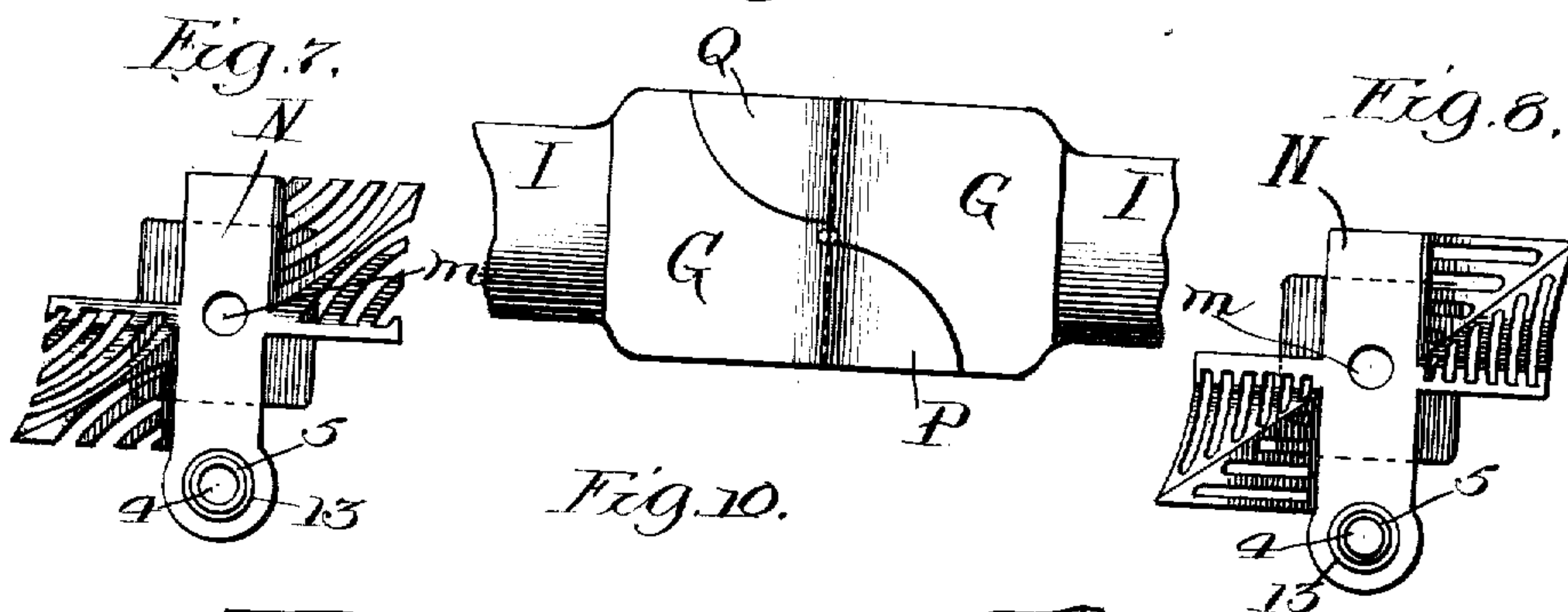
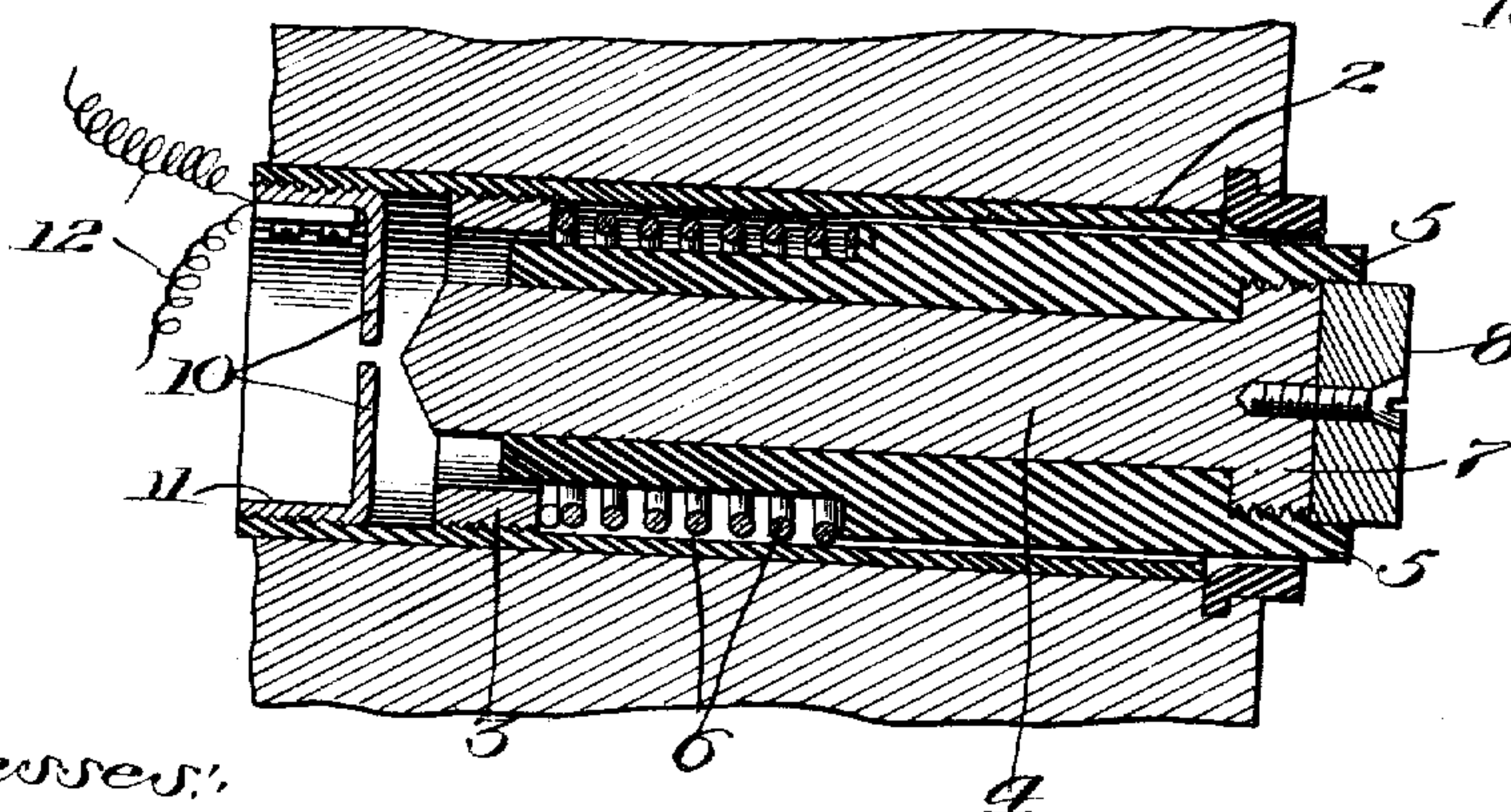


Fig. 10.



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attys



# UNITED STATES PATENT OFFICE.

FRANK H. RUTHERFORD, OF CHICAGO, ILLINOIS.

## CONNECTOR FOR TRAIN-PIPES.

No. 908,701.

Specification of Letters Patent.

Patented Jan. 5, 1909.

Application filed July 17, 1907. Serial No. 384,266.

*To all whom it may concern:*

Be it known that I, FRANK H. RUTHERFORD, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Connectors for Train-Pipes, of which the following is a clear, full, and exact description.

My invention relates to automatic connectors for the train-pipes of either electric or steam, freight or passenger cars.

One of the necessary features of a successful train-pipe connector is its ability to successfully and operatively engage with the connector of the companion cars, during all seasons of the year and in every kind of weather, so that the proper continuity of the electric pipe systems may be satisfactorily accomplished through the entire train. Another necessary feature of a practical train-pipe connector is its ability to move with the car-coupler, and yet be carried independent thereof, so that, in the event of the car-coupler being torn from its moorings, said connector can wrench loose from the same without being injured. And yet another feature which a successful train-pipe connector must possess, is the ability, when the colliding car-couplers lap past each other (as in practice they frequently do), to automatically move to an angle, exceeding that which the cars may assume to one another when on a curved track.

The object of my invention is to provide a train-pipe connector so constructed that the ice and snow will be cut and shaved from its colliding face, when it engages with its companion connector, and thus keep the mouths of the openings in the head of the connector from which the train-pipes lead, clean.

A further object of the invention is to so support the connector that it can turn at an angle of seventy degrees or more, according as may be necessary, without its ability to automatically adapt itself to any position which the exigencies of its use require, or its yielding ability being effected. And still another object is to support the connector independent of the car-coupler, while at the same time tying or connecting it to the same in such manner that, should the car-coupler be torn loose from the car, the connection between the two will break loose and leave the connector and its supporting mechanism practically uninjured and ready

for use when the proper repairs have been made to the car-coupler.

In the drawings:—Figure 1 is a side elevation of the end portions of two cars coupled together and having my improved connector applied thereto. Fig. 2 is a longitudinal section of the connector alone, drawn to a larger scale. Fig. 3 is transverse section thereof taken on dotted lines 3, 3, Fig. 2. Fig. 4 is a plan view of the underside of the end of a car having my improvements applied thereto. Fig. 5 is a front end view of the connector drawn to the same scale as in Figs. 2 and 3. Fig. 6 is a plan view thereof. Figs. 7, 8 and 9 are front views of fragments of the connector head showing modified forms of horns. Fig. 10 is a longitudinal section of the electric coupler, full size. Fig. 11 is a view of a portion of the end of a car showing my improvement partially in section. Fig. 12 is an enlarged side elevation of two of the coupler-heads locked together. Fig. 13 is a detail perspective view of the head and link of the hanger.

In the drawings A represents the end of a car to which my improvements are applied, and B, B, the center-sills thereof, between which the draw-bar of the car-coupler C is suitably disposed.

D represents a transversely arranged lever having one end pivoted to a pivotal stud *a* secured to and depending from the bottom of the car near one side, and the other end terminate about midway the width of the car, under the draw-bar. Alongside the draw-bar a guide-frame *b* is secured to and depends from the center-sill B that consists, preferably, of two straps between the horizontal portions of which a guide-way and support is formed for the swinging end of said lever. This swinging end of the lever is provided with a boss *c*, in which the upper end of the shank *d* of a hanger E is pivotally secured, in any suitable manner. The upper end of this hanger shank extends above the lever and is connected by a link, *e*, to the lower extended end of the coupler-pin *e'* in the head of the car-coupler. The rear screw-threaded end of link *e* is, preferably, secured to the hanger by means of nuts *e<sup>2</sup>* placed both in front and to the rear of the shank of said hanger, so that, the relative position of the hanger to the car-coupler can be properly adjusted and maintained. In order to keep the hanger E in such position that the connector will always be par-



allel to the draw-bar, I have provided an arm F, which corresponds in length to and is parallel with said lever, and has its outer end suitably pivoted to the bottom of the car in the same longitudinal plane as the pivot of said lever. Its inner end, which terminates in the same longitudinal plane as that of said lever, is provided with a downwardly extending boss, the lower end of which is pivotally connected by a link, *f*, to the rear surface of the hanger, preferably, in a plane below the boss of the contiguous end of the lever. The action of arm F is to always keep the front of the hanger in a transverse plane parallel to the end of the car.

The lower end of the hanger is provided with oppositely projecting transverse lugs *h*, and separated by a comparatively narrow neck *h'* above said lugs, and said hanger is provided with a transversely disposed pivotal boss H, the contours of which correspond to the transverse contours of the bore of the hollow forward part I of the body of the connector. This part, I, of the body of the connector is provided both above and below boss H, with longitudinally extending slots *v*, *v'*, of such width as to accommodate necks *h'*, above which latter, the hanger is provided with another pair of diametrically opposite transversely projecting lugs *k*. The connector is suspended or rather supported by the hanger which extends down through said slots and has its boss H enter the bore of the body thereof and provide the pivot therefor. The rear part J of the body of the connector is made greater in transverse dimensions than the forward part thereof to provide shoulders *x* that are kept normally pressing forward against the rear of the hanger by means of a coil contraction-spring K, whose forward end is secured to the screw-eye *y* projecting to the rear from boss H, and whose rear end is suitably fastened in the center of a head *n* closing the rear end of the body of the connector. The contraction of spring K holds the connector forward, and its tension is such that the shoulders *x* bear against the rear of the hanger with sufficient pressure to normally maintain said connector in the horizontal position shown in the drawings.

The forward end I of the body of the connector merges into the rear of head G thereof, about its center of height, said head being, preferably, elongated vertically, and having its engaging face N in a transverse vertical plane, substantially at right angles to the axis of its body. At about its center of height this head and the engaging face thereof is provided with a circular or other suitably shaped orifice which forms a mouth *m* for the flue or passage O extending rearwardly through said head and connected with the steam-pipes of the car by means of a flexible tube or otherwise. On one side of

the engaging face, preferably, above the plane of the mouth *m*, the head is provided with a forwardly projecting horn Q, and below the plane of said mouth on the opposite side thereof it is provided with a horn P. These horns P and Q are each provided with two engaging surfaces, that are divided by a ridge extending from its most advanced point diagonally to the rear, to a point adjacent to where their edges intersect the center of height of the engaging face. The engaging surface of the lower horn is provided with two faces the uppermost one of which is provided with slots *r* that extend practically parallel to the ridge of the horn; and the lowermost one of which has a series of slots *s* therein that are, preferably, larger and fewer in number than those made in the upper. The upper portion of the upper surface of said lower horn is also provided with an overhanging edge that is parallel to the upper edge of the same and is intersected by said slots. The upper horn is likewise provided with two faces that are likewise provided with slots *o*, *p*, and these slots as well as *r*, *s* of the lower horn, may be substantially parallel to the ridge or edge of the horn, or disposed at an angle thereto, substantially as shown in Figs. 6 and 7 of the drawings, and, if desired, instead of slots the engaging face of the horn may be provided with a series of grooves corresponding in curvature to said slots which would convert the said engaging faces into corrugated surfaces.

In Fig. 9 of the drawings, I show yet another modification of horns for my improved connector, in which the engaging faces thereof are provided with circular or other suitably shaped openings therein. The object of thus slotting or grooving or perforating the faces of the horns is to assist the removal of the ice or snow which may collect thereon, when two coacting connectors come together. The engagement of the horns cuts the ice and snow and permits the same to drain off or chip off or be forced through the slots or perforations therein, so as to remove the accumulation of the same and permit the engaging faces of the connectors to come flat together, and so that the mouth of one aligns and communicates with the mouth in the other. The upper end of the engaging face N of the connector may, if desired, be also provided with an opening S, which is, preferably, smaller in dimensions than the orifice *m*, and forms the end of a passage in the head, that extends to and communicates with the signal pipes of the train. And if desired, the lower end *q* of the engaging face, I, may extend below the plane of the lower horn, and be provided with an opening R therein, which forms the end of the passage extending through the head and through a suitable stub that communicates with the air-pipes of the car.



I do not desire to be confined to any particular construction of either the horns or engaging faces of the head of the connector for assisting in removing and draining the accumulation of snow and ice from the engaging surfaces of the connector, for this type of a connector horn, once being made known, will suggest many other modifications that may be resorted to to accomplish this result.

In the preferred type of my invention all orifices except mouth *m* in the engaging face of the connector head are dispensed with, and an electric coupling is made integral with or secured to the said connector, preferably, at the lower end of the engaging face of the same. This electric coupling comprises an exterior shell 2, which is, preferably, cylindrical in form, and is either attached to the lower end of said connector by means of straps, or is inserted in an opening made to receive the same, and it is so adjusted that the forward end of its bolt or plunger will project slightly beyond the face of the connector. Near the rear of the shell, 2, I secure in its bore a bushing or annulus 3, and in front of this bushing, said shell has seated therein a longitudinally reciprocal metal plunger, 4, which is surrounded by and incased in a jacket, 5, of wood fiber or other insulating material. The rear portion of the outer circumference of this jacket 5 is reduced in diameter to correspond to the opening of the bushing, and between the shoulder at the forward end of this reduced portion, and said bushing, the casing is surrounded by a coil expansion spring, 6, which keeps the said bolt or plunger normally at the limit of its forward movement. The forward enlarged end or head, 7, of plunger 4 is greater in diameter than the remainder of its length, and said head is countersunk into the adjacent end of the jacket. Secured to the forward end or head of said plunger, 5, by means of a screw or otherwise, is a suitably shaped contact-plate 8. The rear end of the plunger, 4, is, preferably, made of a blunt cone-shape, and when the said plunger is pushed to the rear, by the engagement of its opposite end by the corresponding end of the plunger of the opposing coupling, said cone-shaped end comes in contact with the inwardly projecting arms, 10, 10, of a contact-ring 11, secured in the rear end of the shell 2. The ring 11 forms the terminal of a suitable electric circuit in the car with the wires 12 with which it is connected so that, as said contact part is made of copper or similar conducting material, when the contact of the opposing coupling comes into engagement therewith, the circuit between the cars will close.

If it is desired, the forward end of the opening in which shell 2 of the electric coupler is inserted, may be rabbeted or

countersunk in a suitable manner and a rubber gasket 13 inserted therein, whose edges will extend out beyond the engaging face of the connector a short distance. Thus when the plungers of two opposing couplers come together and aline, the engagement of the rubber casing will inclose and effectually protect and guard the same.

The construction of an electric coupling such as I have described will prevent any current passing therethrough until the said coupling is in operative engagement.

I do not desire to be confined to the particular form of electric connector described, for any suitable electric connector, capable of doing the work would answer for the purpose of my invention.

What I claim as new is:—

1. A train-pipe connector the head of which is provided with means that will remove the ice and snow incrustated upon its meeting surface when in contact with the engaging connector.

2. A train-pipe connector the head of which has guide-horns the engaging surfaces of which are provided with means that will remove the ice and snow incrustated upon their meeting surfaces when in contact with the engaging connector.

3. A train-pipe connector the head of which is provided with guide-horns the surfaces of which superficially engaged by the horn of the opposing coupler are perforated.

4. A train-pipe coupler the head of which is provided with horns the surfaces of which superficially engaged by the horns of the opposing coupler are slotted.

5. A train-pipe connector the transversely disposed engaging face of which is provided with an upper horn projecting from one side and a lower horn projecting from the opposite side thereof, both of which have their surfaces that are superficially engaged by the horns of the opposing coupler perforated.

6. A train-pipe connector the transversely disposed engaging face of which is provided with an upper horn projecting from one side and a lower horn projecting from the opposite side thereof both of which have their surfaces that are superficially engaged by the horns of the opposing coupler slotted.

7. A train-pipe connector the head of which is provided with a horn the superficial area of which in front elevation is rectangular and which has its upper horizontal edge overhanging and the faces of said horn superficially engaged by the horn of the opposing coupler being perforated.

8. A train-pipe connector the head of which is provided with a horn the upper horizontal edge of whose base is overhanging and the faces of said horn superficially engaged by the horn of the opposing coupler being perforated.



9. A train-pipe connector the head of which is provided with a horn the surface of which engaged superficially by the horn of the opposing coupler is perforated and the upper horizontal edge of whose base is overhanging.

10. A train-pipe connector the head of which is provided with a series of slots, and the upper horizontal edge of which overhangs and is intersected by said slots.

11. A train-pipe connector comprising a forward hollow body portion having a longitudinal slot in its uppermost part, and a hanger having a neck extending down through said slot and having a pivotal boss on the lower end of said neck located and operating within the bore of said body portion.

12. A train-pipe connector comprising a forward hollow body portion having an upper and a lower longitudinal slot therein, and a hanger having a pivotal boss located and operating within the bore of said body portion and having a narrow neck extending upwards and downwards from said boss through said slots.

13. A train pipe connector comprising a forward hollow body portion having an upper and a lower longitudinal slot therein, and a hanger having a pivotal boss located and operating in the bore of said body portion and having narrow necks extending therefrom through said slots, and transverse lugs projecting therefrom at the ends of said necks farthest from said boss.

14. A train-pipe connector comprising a forward hollow body portion having a longitudinal slot in its uppermost segment or part, and having the portion thereof to the rear of said slot increased in transverse dimensions, and a hanger extending down through said slot and having a pivotal boss located and operating within the bore of the said body, and means for normally keeping the said connector at the limit of its forward movement.

15. A train pipe connector comprising a forward hollow body portion having a longitudinal slot in its uppermost segment or part, and having a portion thereof to the rear of said slot increased in transverse dimensions, and a hanger extending down through said slot and having a pivotal boss located and operating within the bore of the said body, and a contraction spring connecting said pivotal boss and the rear end of the body of said connector, for normally keeping the said connector at the limit of its forward movement.

16. A train-pipe connector consisting of a suitable head and body therefor, a hanger for supporting the same suitably tied to the car-coupler of the car to which said connector is applied, and reciprocating means for supporting said hanger which is connected

to the body of the car adjacent to the longitudinal side thereof independent of the car-coupler and center-sills of the car.

17. A train-pipe connector consisting of a suitable head and body therefor, a hanger for supporting the same suitably tied to the car-coupler of the car to which said connector is applied, and reciprocating means for supporting said hanger which is pivotally connected to the body of said car adjacent to the longitudinal side thereof independent of the car-coupler and center-sills of the car.

18. A train-pipe connector consisting of a suitable head and body therefor, a hanger for supporting the same suitably tied to the car-coupler of the car to which said connector is applied, and a horizontally disposed transverse lever, one end of which supports said hanger under the car-coupler, and the other end of which is pivotally connected to the body of the car adjacent to one of its longitudinal sides.

19. A train-pipe connector consisting of a suitable head and body therefor, a hanger for supporting the same suitably tied to the car-coupler of the car to which said connector is applied, a horizontally disposed transverse lever, one end of which supports said hanger under the car-coupler, and the other end of which is pivotally connected to the body of the car adjacent to one of its longitudinal sides, and means for keeping the front surface of the hanger parallel with the end of the car during the reciprocation of said lever.

20. A train-pipe connector consisting of a suitable head and body therefor, a hanger for supporting the same suitably tied to the car-coupler of the car to which said connector is applied, a horizontally disposed transverse lever, one end of which supports said hanger under the car-coupler, and the other end of which is pivotally connected to the body of the car adjacent to one of its longitudinal sides, and a guide-frame secured to and depending from said car having a longitudinal horizontal guide-way through which said lever extends.

21. A train-pipe connector consisting of a suitable head and body therefor, a hanger for supporting the same suitably tied to the car-coupler of the car to which said connector is applied, a horizontally disposed transverse lever, one end of which supports said hanger under the car-coupler, and the other end of which is pivotally connected to the body of the car adjacent to one of its longitudinal sides, means for maintaining the front face of the hanger in a plane parallel to the end of the car during the reciprocation of said lever, and a guide-frame through the horizontal longitudinally extending guide-way of which said lever extends.

22. A train-pipe connector consisting of a



suitable head and body therefor, a hanger for supporting the same suitably tied to the car-coupler of the car to which said connector is applied, a horizontally disposed transverse lever, one end of which supports said hanger under the car-coupler, and the other end of which is pivotally connected to the body of the car adjacent to one of its longitudinal sides, and a pivoted arm arranged parallel to said lever and having its inner end suitably connected to said hanger for maintaining the forward face thereof parallel with the end of the car.

23. A train-pipe connector consisting of a suitable head and body therefor, a hanger for supporting the same suitably tied to the car-coupler of the car to which said connector is applied, a horizontally disposed transverse lever, one end of which supports said hanger under the car-coupler, and the other end of which is pivotally connected to the body of the car adjacent to one of its longitudinal sides, and a pivoted arm arranged parallel with and corresponding in length to said lever, one end of which is pivoted to the car in the same longitudinal plane as the

pivot of said lever, and the other end of which is suitably connected to said hanger.

24. A train-pipe connector comprising a longitudinally yielding body and a stationary pivot therefor which is located mediate its ends, and means supporting said pivot which does not surround said body.

25. A train-pipe connector comprising a longitudinally yieldable body which is pivoted mediate its ends and supported by means that does not present any substantial interference to the rotative movement thereof on the axis of its support.

26. A train-pipe connector comprising a longitudinally yielding body having a stationary pivot mediate its ends and adapted to rotate in an arc of substantially one hundred and eighty degrees.

In testimony whereof I have hereunto set my hand and seal this 27th day of June, A. D., 1907.

FRANK H. RUTHERFORD. [L. S.]

Witnesses:

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