No. 685,478. Patented Oct. 29, 1901.

J. E. JACO.
AIR BRAKE COUPLING.
(Application filed May 16, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

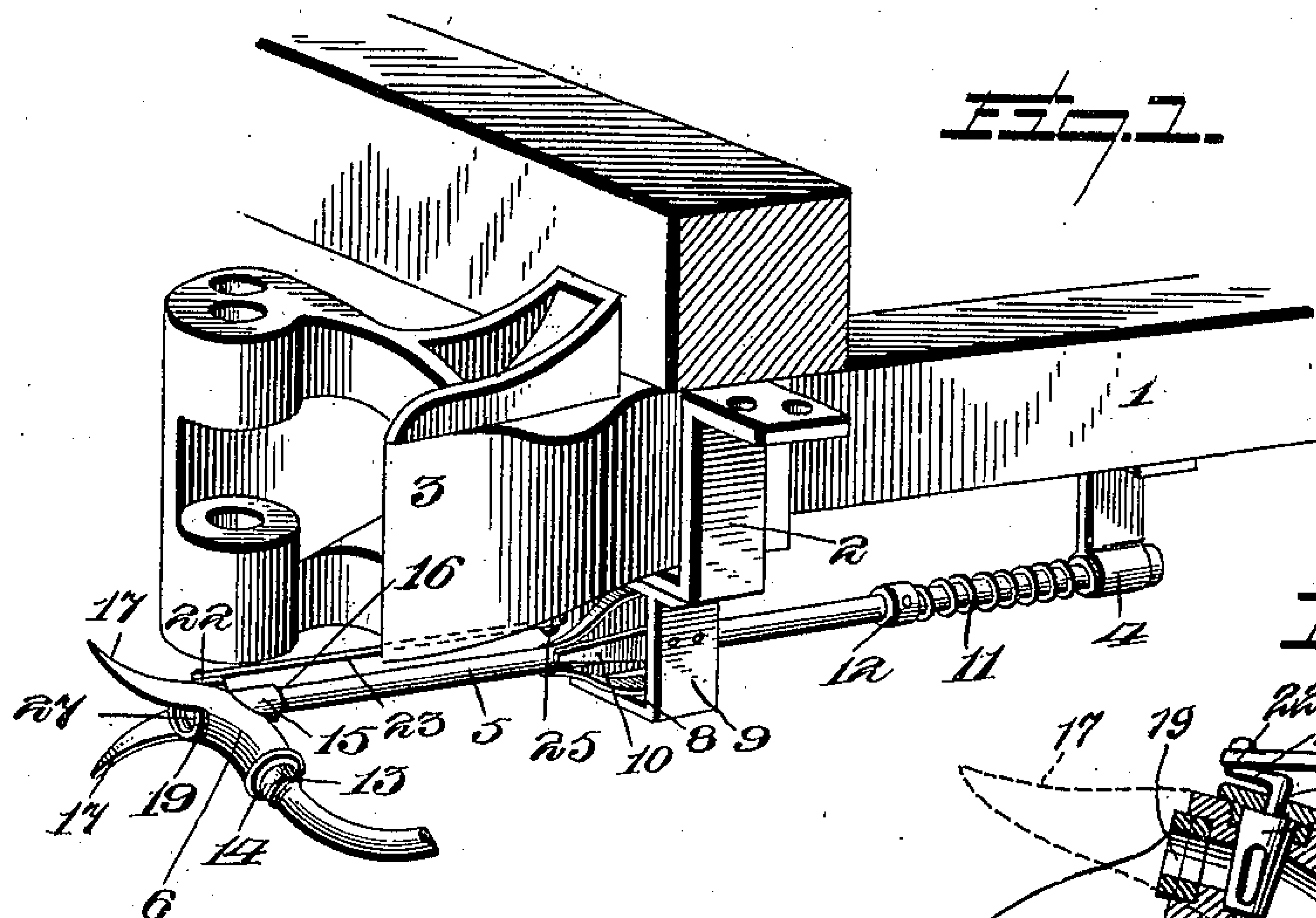

Fig. 7.

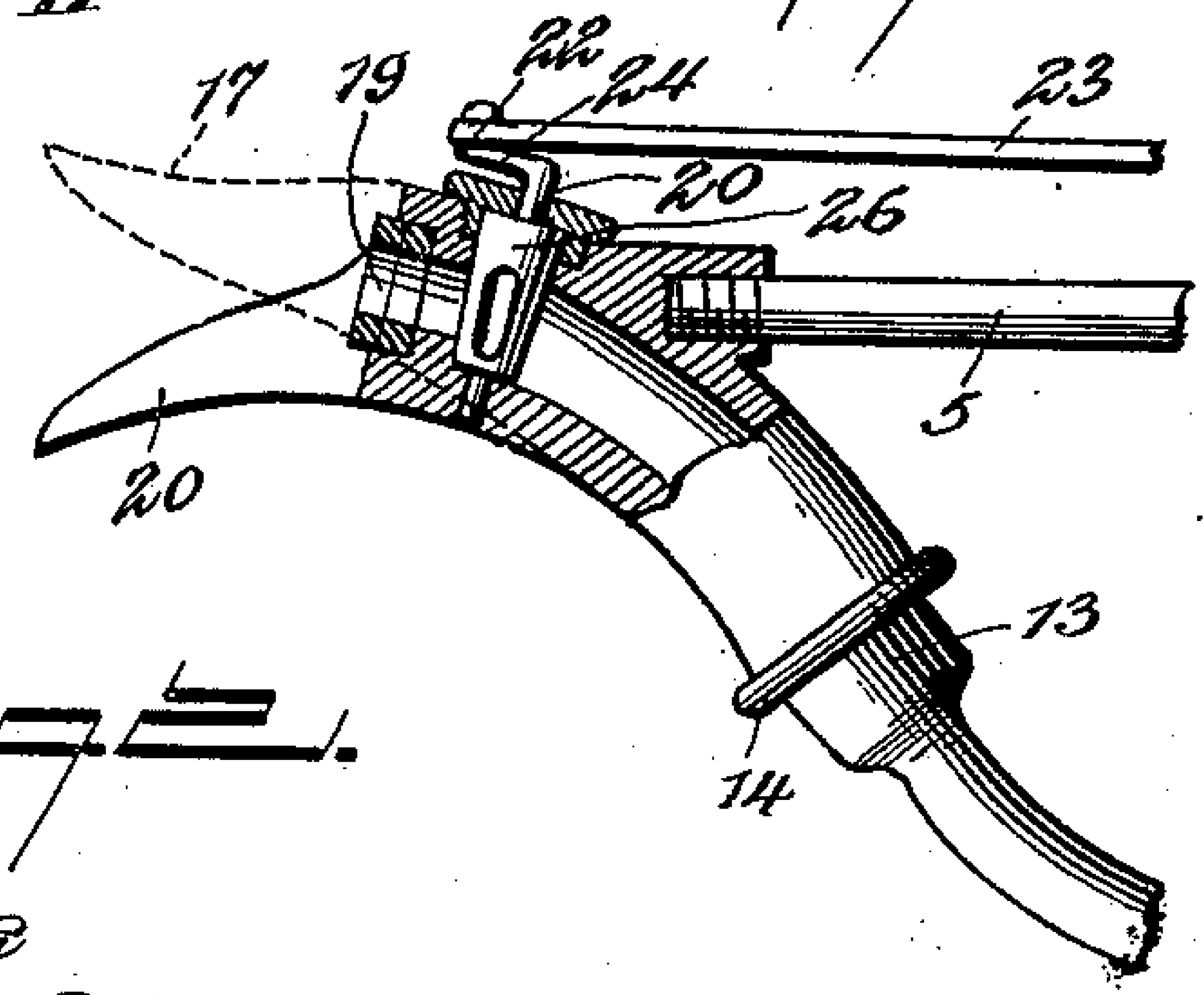

Fig. 2.

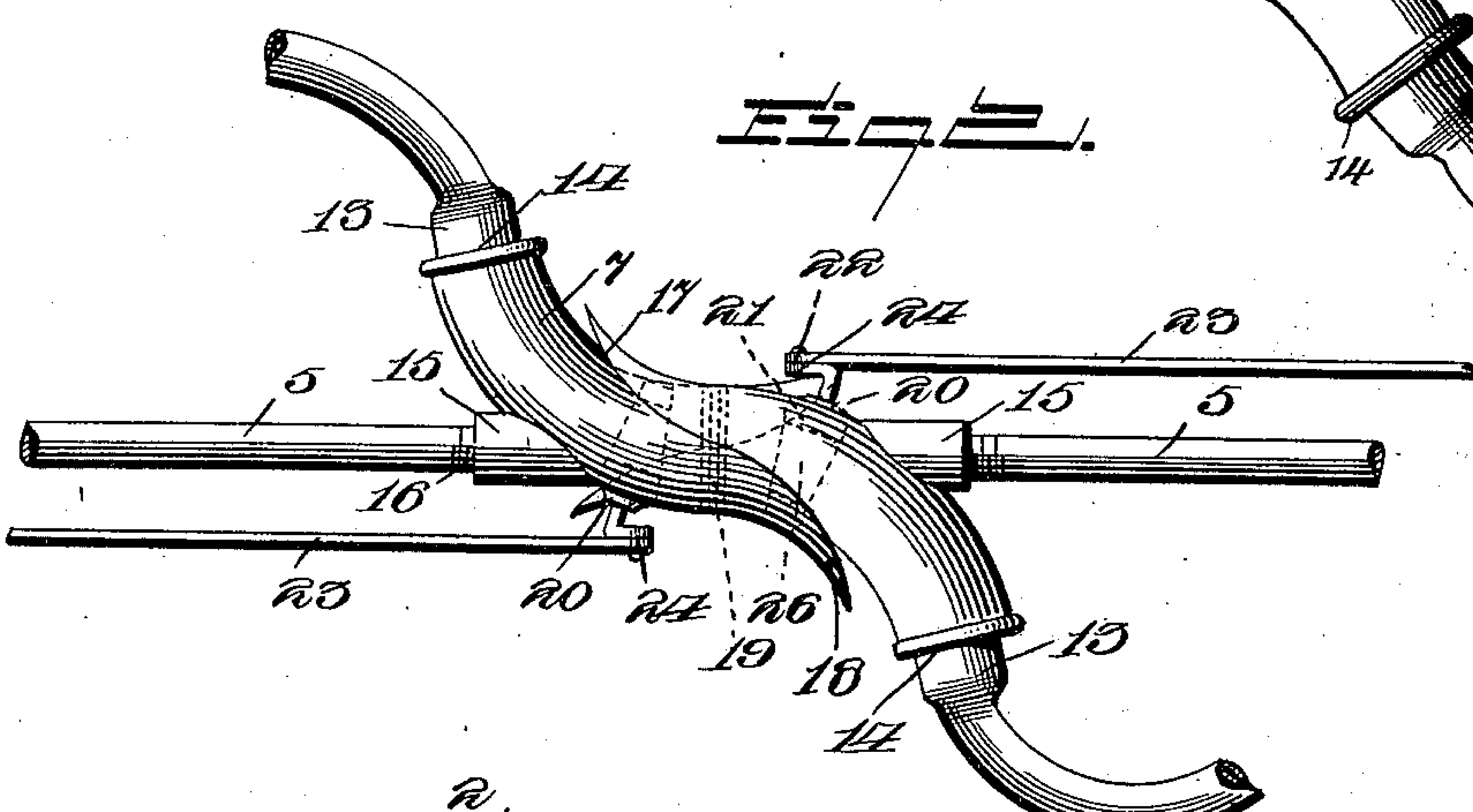

Fig. 3.

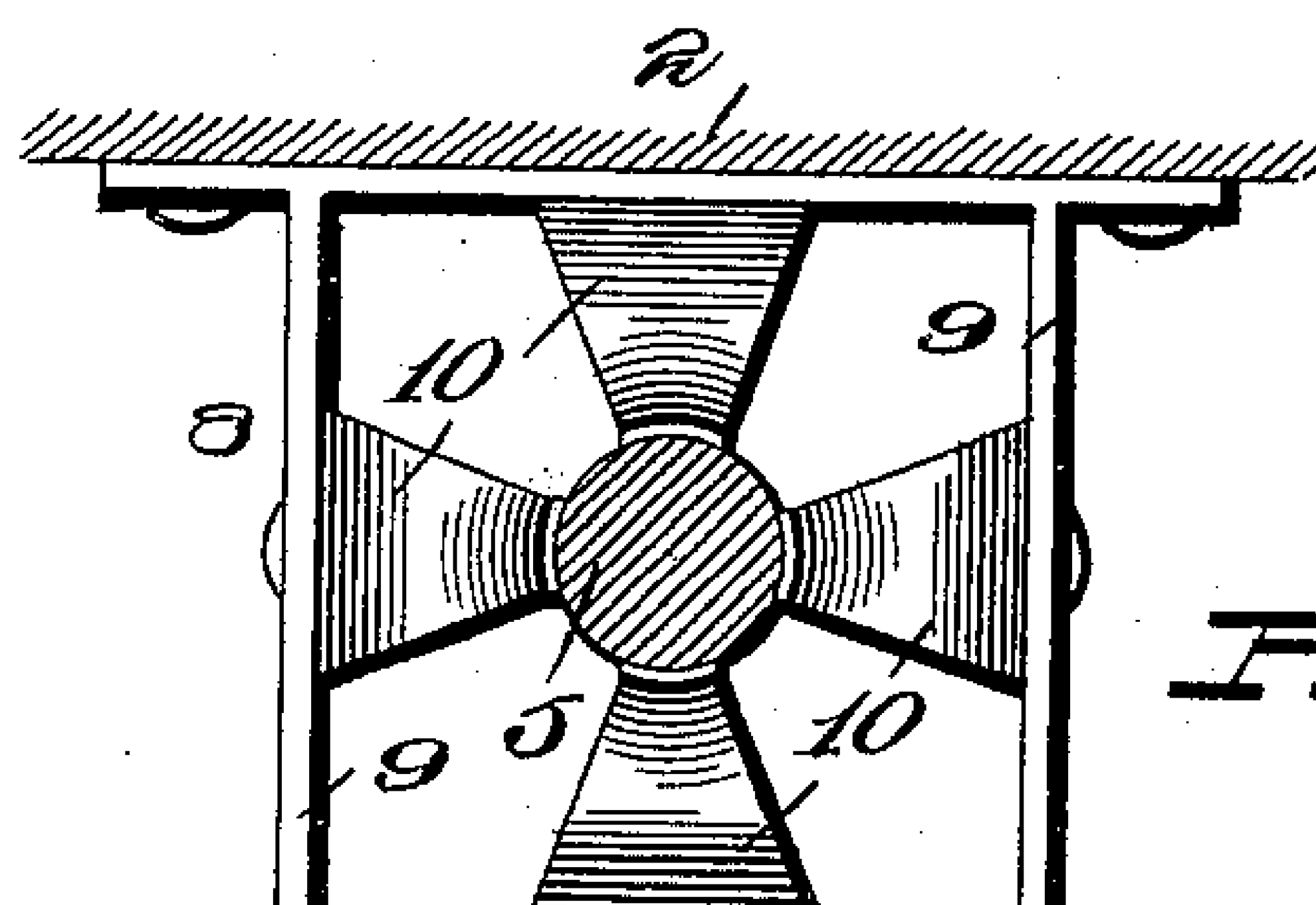

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Fig. 4.

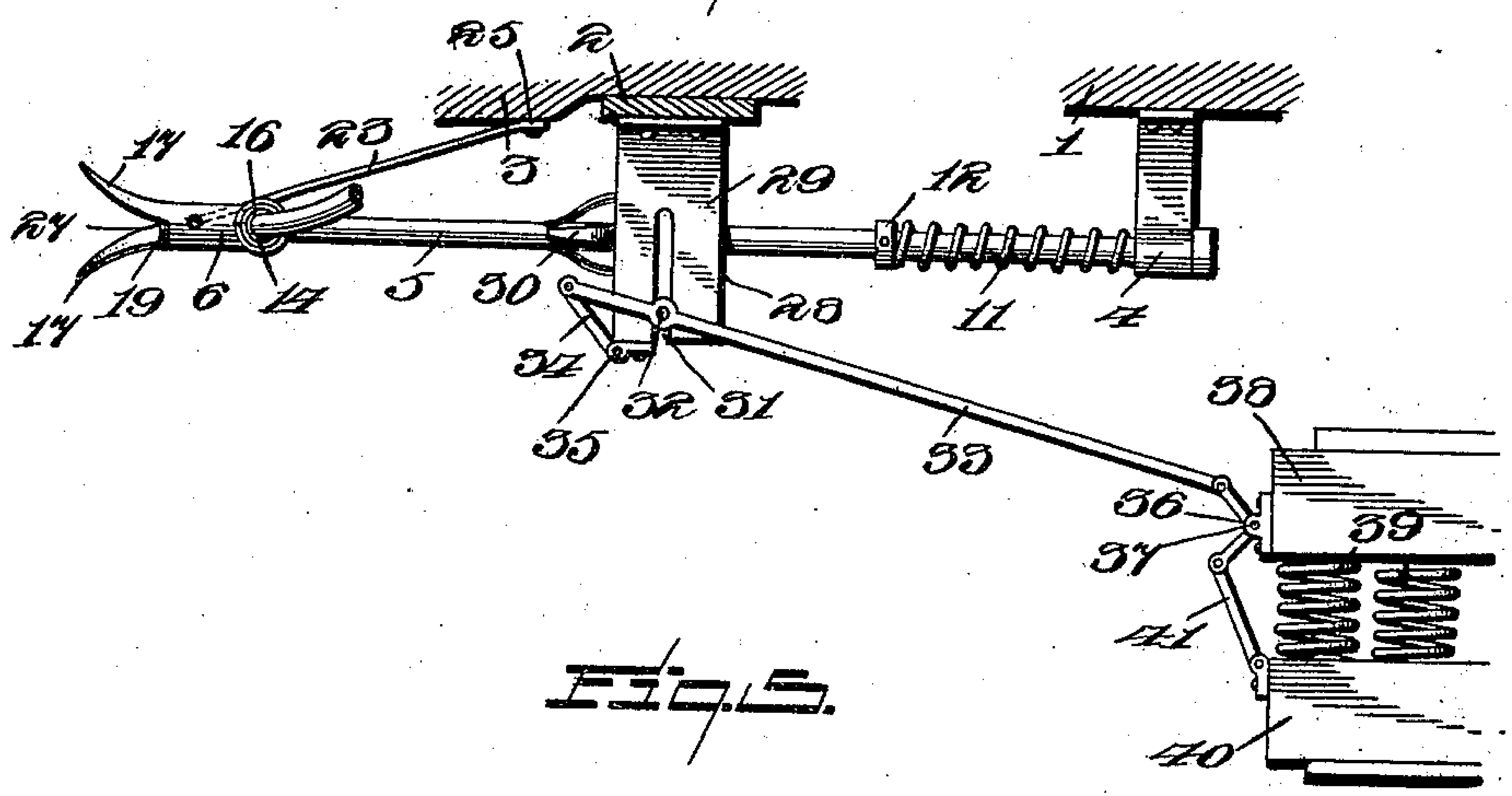
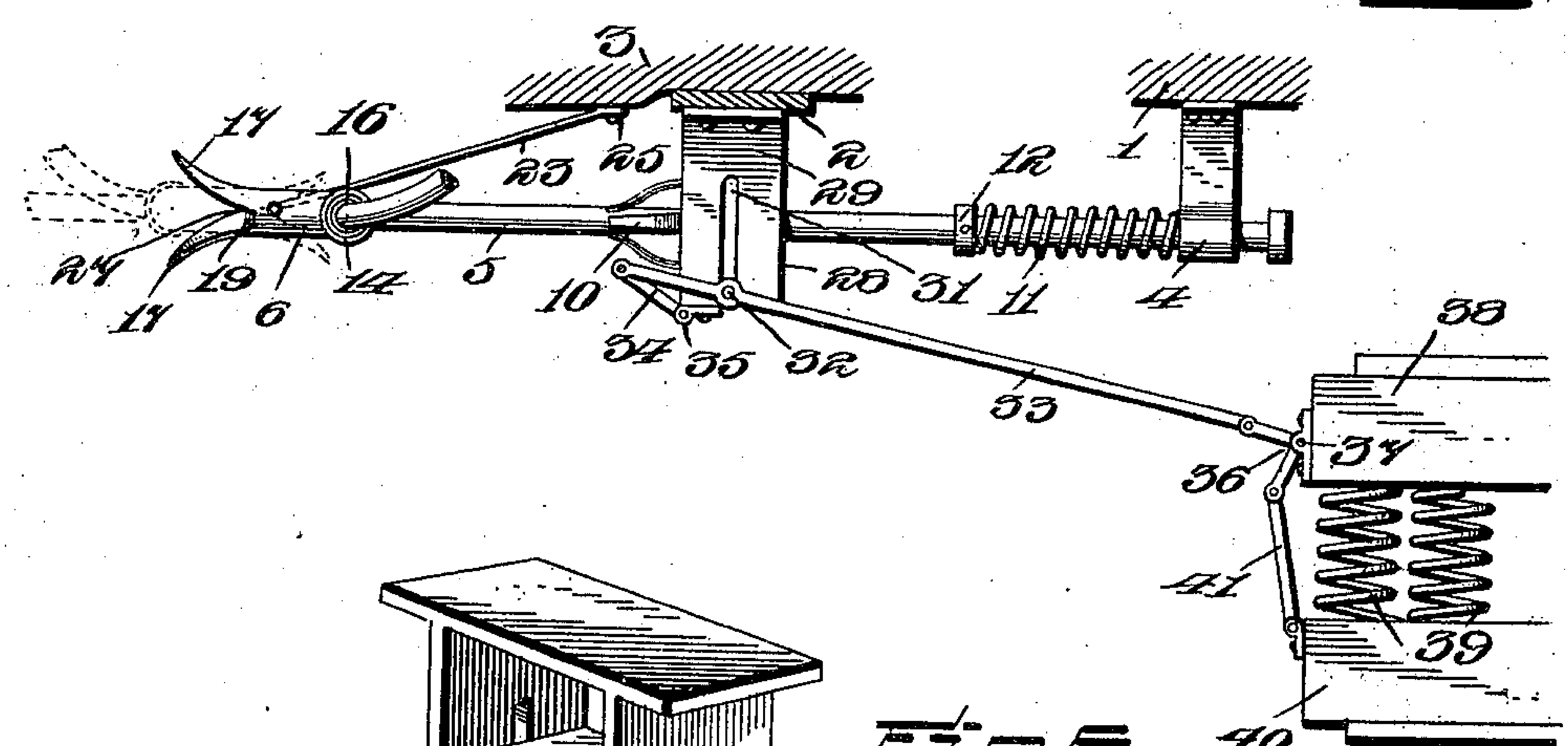


Fig. 5.



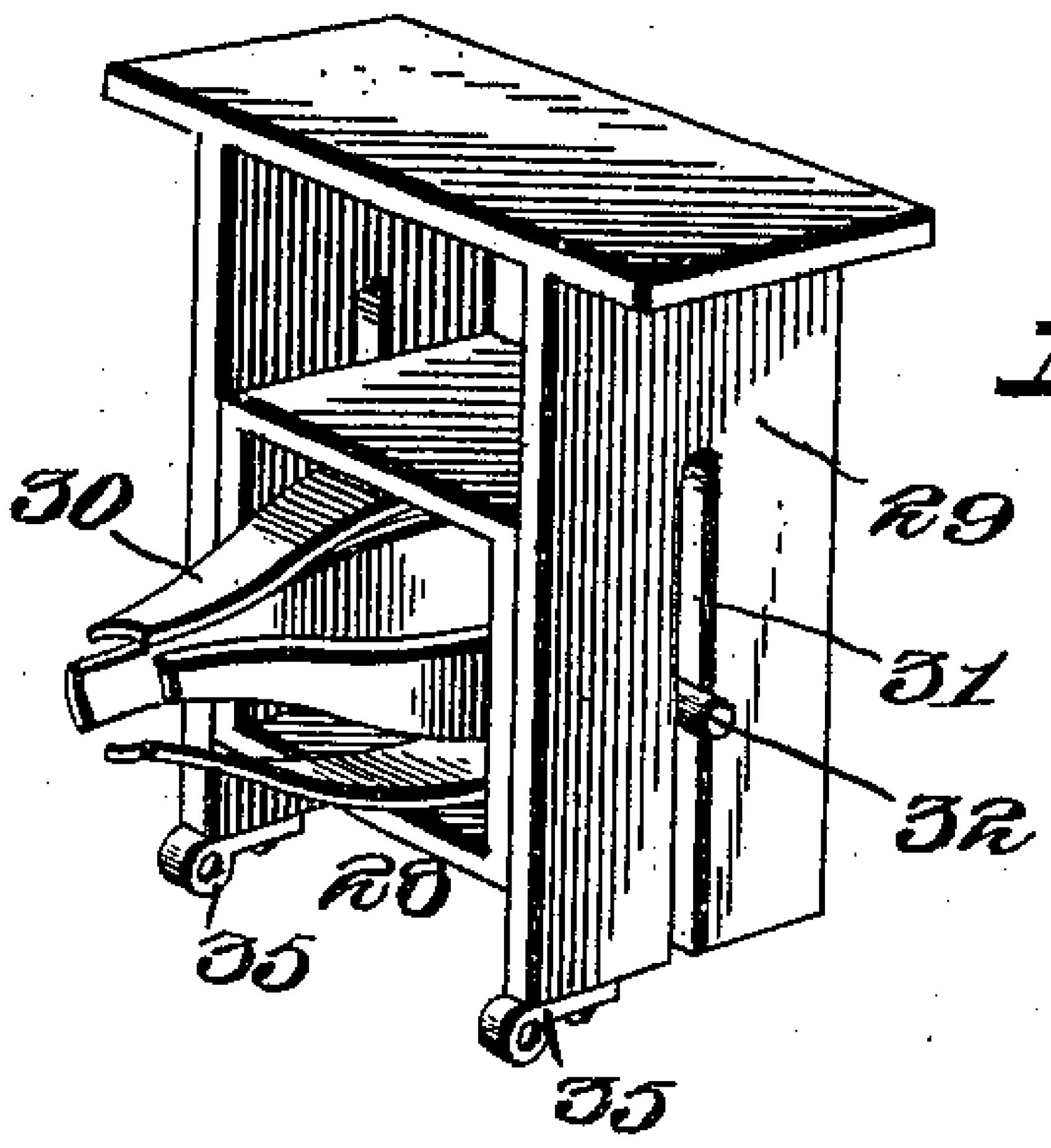


Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHN EVANS JACO, OF ROWLAND, TENNESSEE.

AIR-BRAKE COUPLING.

SPECIFICATION forming part of Letters Patent No. 685,478, dated October 29, 1901.

Application filed May 16, 1900. Serial No. 16,905. (No model.)

To all whom it may concern:

Be it known that I, JOHN EVANS JACO, a citizen of the United States, residing at Rowland, in the county of Warren and State of Tennessee, have invented a new and useful Air-Brake Coupling, of which the following is a specification.

This invention relates to air-brake couplings; and it has for its object to effect improvements in a device of this character whereby the flexible tubes or conduits of the air-brake system will be automatically coupled when cars or other vehicles equipped with the air-brake system are brought together and coupled by impact.

To this end the invention contemplates the employment of companion coupling members or heads suspended from the car structures below the draw-heads and yieldingly urged in the direction of the opposed member to effect an automatic coupling of the hose-sections when the members are brought together by the operation of coupling the cars.

The invention further contemplates the employment of valves for controlling the passage of air or other fluid, which valves are automatically opened when the coupling is effected and are automatically closed when the coupling heads or members are drawn apart by the separation of the vehicles.

The invention still further contemplates means for insuring a positive coupling irrespective of the variance in height between the cars when coupled, all as will be hereinafter fully described, illustrated in the accompanying drawings, and succinctly defined in the appended claims.

In said drawings, Figure 1 is a perspective view of one of my air-brake coupling-heads and the draw-head of a car-coupling organized as in use. Fig. 2 is a top plan view of the complete coupling, the members being shown in the coupled positions. Fig. 3 is a detail view of the spring-bearing. Figs. 4 and 5 are elevations of a modification of my coupling, comprehending means for automatically maintaining the height of the coupling member from the ground notwithstanding the elevation and depression of the car-body in accordance with the weight to which the car-springs are subjected by the loading of the car. Fig. 6 is a detail view of the vertically-movable spring-bearing employed in the structure shown in Fig. 4; and Fig. 7 is a detail sectional view through a portion of one of the coupling-heads, showing the valve therein.

Referring to the numerals of reference employed to designate corresponding parts in the several views, 1 indicates the draw-head of a car-coupling of any ordinary type carried in any suitable manner by the car structure and having its outer end supported by a transverse bar 2, located a suitable distance in the rear of the coupling-head 3, formed at the front end of the head 1. A bearing-bracket 4 is secured to the under side of the draw-head 1 a considerable distance behind the bar 2 and is designed to slidably receive the rear end of what might be termed the "draw-bar" 5 of the coupling member or head 6, designed for engagement with a correspondingly constructed, supported, and operated coupling member or head 7, which by reason of its identical character need not be described with that particularity which will characterize the description of the coupling member or head 6 and its connected parts, inasmuch as it will be understood that such description applies to both elements of the coupling, except in so far as variations may be particularly specified. The front end of the draw-bar 5 is supported by what I have chosen to term a "spring-bearing" 8, preferably comprising a rectangular or other suitably-formed frame 9, carried at the under side of the beam 2 and provided with a series of forwardly-extending converging spring-fingers 10, which bear against the bar 5 to center the latter in the bearing, but to permit such limited lateral movement of the front end of the bar as may be necessary to accommodate slight movement of the coupling member 6 during the operation of coupling. The draw-bar is constantly urged outwardly, or, more properly, its rearward movement is yieldably opposed by a stout spring 11, encircling the bar 5 and bearing at its opposite ends against the bearing-bracket 4, and a set-collar 12, carried by the bar intermediate of the bearings 8 and 4. This peculiar form of mounting or suspension of the coupling member permits it to yield inwardly under the impact of the opposed member when

the coupling is effected or laterally in any direction to facilitate the accurate alinement of the members which prior to the coupling may be located slightly out of position.

The coupling member or head 6 corresponds in general function to the hose-shoe of the ordinary air-brake systems, inasmuch as it is provided with a threaded or corrugated nipple 13, fitting into the extremity of the lag end 14 of the hose-pipe; but, unlike such shoes, it is formed with its opposite ends disposed substantially at right angles. To effect this relation for the purpose of disposing both the nipple 13 and the opposite end of the member horizontally but at right angles, I preferably cast the member 6 in the form of a tube having a longitudinal quadrantal curvature. Upon the rear or convex side of the member I cast a stout cylindrical lug 15, provided with a threaded socket 16, into which the front end of the draw-bar is screwed. Projecting from the front end of the member 6 I provide outwardly-tapering divergent guide-fingers 17, arranged to alternate with identically-constructed guide-fingers 18, projecting from the contiguous face of the opposed coupling member 7. These guide-fingers, being disposed in alternate relation, impinge against each other in the event of the members being slightly disalined and compel the alinement of the members as the cars are brought together to automatically effect the coupling of the vehicles and of those elements of the air-brake system with which each car is equipped. As the members 6 and 7 are brought into contact by the operation of coupling they are forced rearwardly against the resistance of the spring 11, which exerts a constant pressure to retain the members in close contact to prevent the escape of air between the opposed faces; but to further insure an air-tight connection between the members I prefer to provide abutment or facing rings 19, of rubber or other suitable material, seated within the outer ends of each of the members and projecting slightly beyond the contiguous faces thereof and designed to be compressed by the pressure exerted by the springs 11. When employed in connection with certain air-brake systems, the device as thus far described is complete and effective; but inasmuch as it is desirable to automatically close the passage through each member of the coupling when they are drawn apart or uncoupled I cast each of said members with a valve-casing 20, preferably midway of its ends, in which casing is located a rotary valve 21, to which is connected a valve-lever 22, operated by a valve-rod 23, connected at one end to the valve-lever 22 by a swivel connection, as indicated at 24, and having a similar connection at its opposite end with a stud 25 upon the under face of the draw-head 1. The port 26, through the valve 21, is so related to the passage 27, through the coupling member 6, that in the forward or uncoupled position of the member said port will be disposed transversely to the passage to prevent the escape of air. When the member is driven rearwardly by the impact of the opposed member in the act of coupling, the valve-rod 23, being held against rearward movement by its connection with the head 1, will cause the valve-lever 22 to be swung to bring the valve-port 26 into alinement with the passage 27, and thereby establish communication between the air-pipes of the brake system with which the several vehicles are equipped.

The construction described comprehends the preferred embodiment of my invention, inasmuch as the air-brake coupling is automatically effected through the medium of coupling members, which are so mounted that they will not be subjected to violent vibrations of the draw-head, but will be capable of such movement as may be necessary to effect the direct apposition of members which in their uncoupled positions may not be accurately alined. It may be desirable in some instances, however, to provide means for maintaining the elevation of the coupling member notwithstanding the variance in height between cars—that is to say, it may be desirable to arrange for a standard location of a coupling member in order that opposed members will not be materially disalined by the depression of a car-body when heavily loaded or by the rise of the body when the load is removed.

In Fig. 4 of the drawings I have illustrated one form of mechanism which may be employed for effecting the desired result. This means comprehends the employment of a depending bearing-frame 28, carried by the beam 2 and provided with vertical ways 29, between which slides the spring-bearing 30, identical in general construction with the fixed spring-bearing 8, (illustrated in the preceding views,) except that the bearing 30 is fitted to the ways 29. 30 indicates a vertical slot in one side of the frame 28, through which projects a stud 32, carried by the spring-bearing 30, to effect a connection between said bearing and a bearing-shifter or shifting rod 33, pivotally connected to the stud 32 and extended in front of the frame 28 for connection to a link 34, pivoted at its upper end to the shifter 33 and at its lower end to the bottom of the frame 28, as indicated at 35. The rear end of the shifter 33 is connected to the extremity of one arm of a bell-crank lever 36, fulcrumed at its angle, as indicated at 37, upon the bed-plate 38, which supports the car-body and is supported in turn upon the truck-springs 39, carried by the truck-sills 40. The opposite extremity of the bell-crank lever 36 is connected to a pendent rod 41, the lower end of which is pivotally connected to the sill 40 or some other part rigid therewith.

It will now be seen that as the bed-plate is elevated or depressed in accordance with the load carried by the car the bell-crank lever

will be swung by reason of its connection with the rod 41 to draw the shifter 33 rearwardly or to propel it forwardly, as the case may be, effecting a corresponding oscillatory movement of the link 34, which will cause the front end of the shifter to be raised or lowered to a degree corresponding with the movement of the bed-plate in the opposite direction, which will obviously serve to maintain the coupling member at a definite height from the ground by the shifting of the spring-bearing to compensate for the elevation or depression of the car-body.

From the foregoing it will appear that I have produced a simple, durable, and highly efficient automatic coupling for air-brake and other systems requiring sectional fluid-conduits and that by means of the structural embodiment of the invention herein described I am enabled to attain the various ends desired. I do not wish, however, to be understood as limiting myself to the structural details defined, as, on the contrary, I reserve the right to effect such changes, modifications, and variations as may come properly within the scope of the protection prayed.

What I claim is—

1. An air-brake coupling having a compound curvature and comprising a pair of reversely-curved coupling-heads provided with interfitting divergent fingers, means for coupling a hose to the outer end of each head, and draw-bars connected to the coupling-heads at points intermediate of the ends thereof, said draw-bars being in coaxial relation with the joint between the heads and in alinement with each other.

2. In an air-brake coupling, the combination with a coupling member and a longitudinally-movable draw-bar, of a relatively-fixed frame through which the draw-bar passes, and a series of spring-fingers secured at their outer ends to the frame and disposed longitudinally with respect to the draw-bar with their inner ends loosely opposed thereto to yieldingly sustain the bar against lateral movement in any direction.

3. In an air-brake coupling, the combination with a coupling-head, a draw-bar connected to the head, reactive mechanism opposing the longitudinal movement of the draw-bar in one direction, and a draw-head supporting the rear end of the draw-bar, of a valve located directly in the coupling-head to control the passage therethrough, a valve-lever extending from one end of the valve, and a valve-rod pivotally connected at one end to the valve-lever and having its opposite end directly connected to the draw-head at a point in the rear of the coupling-head.

4. In an air-brake coupling, the combination with a coupling member, of means for effecting the elevation and depression of the member to compensate for the elevation and depression of the car structure.

5. In an air-brake coupling, the combination with a coupling, a draw-bar, and a movable bearing for said draw-bar, of a yieldingly-supported bed-plate carrying the car structure, and means actuated by the movement of the bed-plate to move the bearing in the opposite direction.

6. In an air-brake coupling, the combination with a coupling member, a draw-bar, and a vertically-movable bearing for said bar, of a shifter connected to the bar, a truck-sill, a yielding bed-plate, a bell-crank lever fulcrumed upon the bed-plate and connected to the shifter, and a connecting-rod intermediate of the bell-crank lever and the truck-sill.

7. In an air-brake coupling, the combination with a coupling member, a draw-bar, a bearing-frame, and a bearing movable within the frame, of a link pivoted to the bearing-frame, a shifter pivoted to the link and to the bearing, a truck-sill and a yieldingly-supported bed-plate, a bell-crank lever fulcrumed upon the bed-plate and connected to the bearing-shifter, and a rod connected to said bell-crank lever and to the truck-sill.

8. An air-brake coupling having a compound curvature and comprising a pair of reversely-curved coupling-heads provided with interfitting divergent fingers, the base portions of which fingers conform to the spaces between the fingers of the opposed head and are of tapering form to wedge between the opposed fingers and thereby form a close joint around the connection between the heads, means for coupling the hose to the outer end of each head, and draw-bars secured to the coupling-heads at points intermediate of the ends thereof, said draw-bars being disposed in coaxial relation with the joint between the heads, and in alinement with each other.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN EVANS JACO.

Witnesses:
J. H. RAY,
J. M. LIVELY.