(No Model.)

W. CROUCH.

AIR BUFFER FOR CARS.

No. 259,634. Patented June 13, 1882.

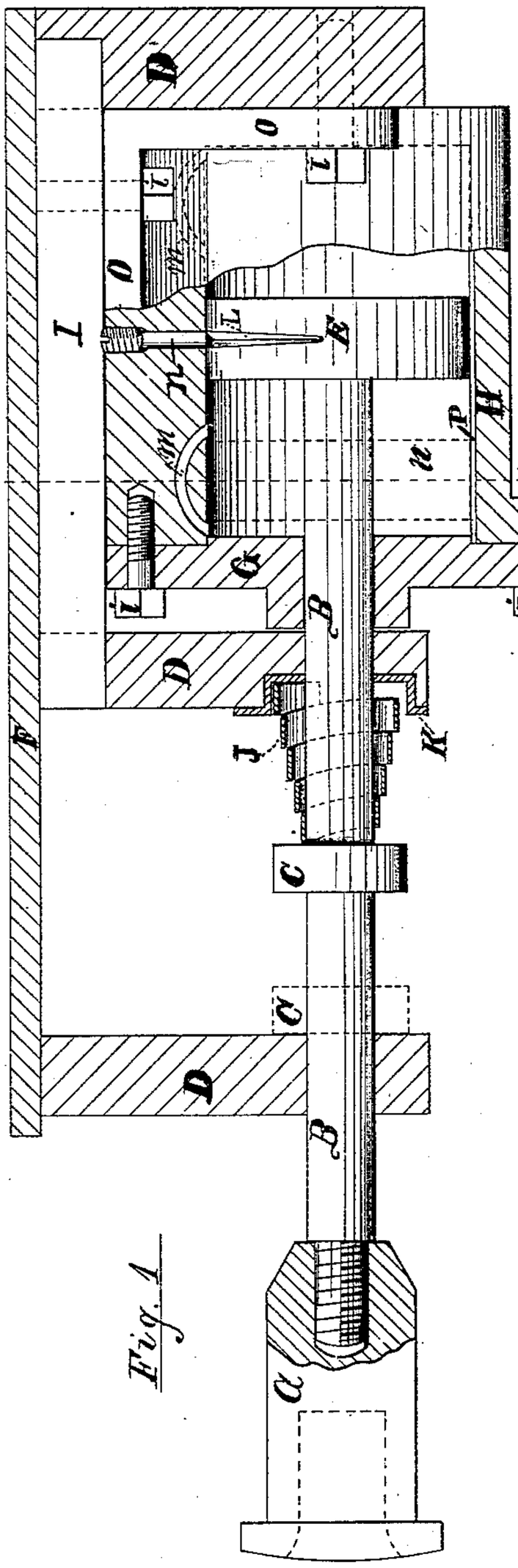

Fig. 1.

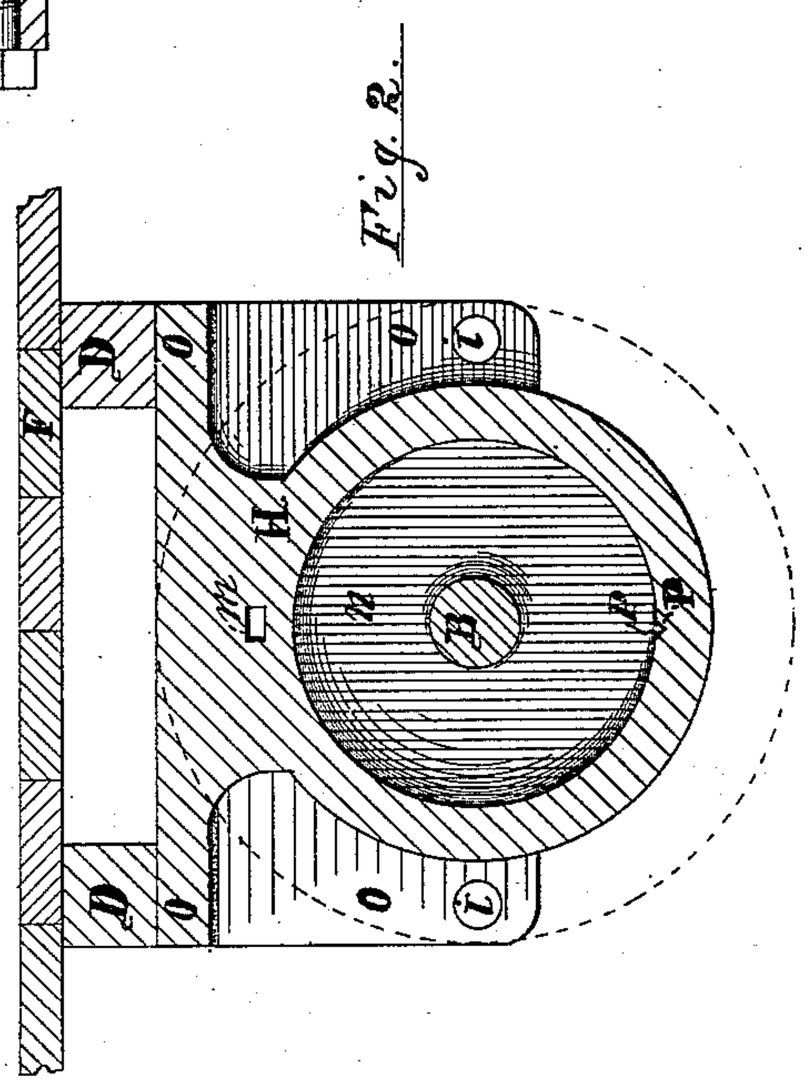

Fig. 2.

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UNITED STATES PATENT OFFICE.

WESLEY CROUCH, OF ROCHESTER, NEW YORK.

AIR-BUFFER FOR CARS.

SPECIFICATION forming part of Letters Patent No. 259,634, dated June 13, 1882.

Application filed April 21, 1882. (No model.)

To all whom it may concern:

Be it known that I, WESLEY CROUCH, of Rochester, in the county of Monroe and State of New York, have invented certain Improvements in Combined Buffers and Draw-Bars for Cars, of which the following is a specification.

My invention relates to a combined buffer and draw-bar for railway-cars, in which air is employed as a cushion to relieve the shock or concussion produced in stopping and starting a train or car.

The invention consists in the employment of a piston moving in a closed cylinder, which cylinder is furnished with ports by which the air is permitted to escape after compression from one to the other side of the piston, and the benefit of the air-cushion is thereby secured both in pushing and in drawing, and in forming a channel or passage in the piston or cylinder, by which a gradual passage from one to the other side of the piston is permitted, so that the piston may be gradually moved to its normal position by a spring provided for the purpose.

The invention further consists in certain details of construction, hereinafter fully explained.

In the accompanying drawings, Figure 1 represents a side elevation of my improved draw-bar and buffer, partly in section; Fig. 2, a vertical cross-section on the line *x x* of Fig. 1.

The purpose of my invention is to overcome the shock commonly produced in bringing cars together or in starting a train, which is accomplished by means of an air-cushion in a manner presently described.

Confined bodies of air and other compressible fluids have heretofore been employed to take up the shock produced by the meeting of cars; but so far as I am aware no one has ever before proposed to so construct a buffer and draw-bar that the elasticity of the air should be utilized both in pushing and in pulling; nor, in fact, am I aware that the air-cushion has ever been employed in connection with a draw-bar or to relieve the shock in starting a train. This double effect or action I secure by the construction shown, in which A represents the draw-head and buffer, made of essentially the usual form, and applied to or formed upon the outer end of a draw, B, which bar is furnished at its other end with a piston, E, arranged to move in a cylinder, H.

The cylinder H, together with one of its heads or ends and flanges, *o*, by which the cylinder is bolted or secured to the timbers of the car, is cast complete in one piece, and the other head or end, G, through which the draw-bar or piston-rod passes, is cast separate therefrom and bolted to the cylinder by bolts *i*, as shown in Fig. 1.

The cylinder is seated squarely against a cross-timber, D, at its rear end and bolted to the under side of the sills or longitudinal timbers of the car, as indicated, and is thereby made firm and secure.

Near each end of the cylinder there are formed passages *m*, the ports or open ends of which open into the cylinder close to the heads thereof, and at a distance therefrom equal or a little more than equal to the thickness of the piston, as clearly shown in Fig. 1, said passage permitting the air compressed on one side of the piston to escape to the other side when the piston reaches a position between the two ports or openings of either passage, as indicated by dotted lines in Fig. 1.

It will be seen that these ports only permit the passage of the air from one to the other side of the piston as the movement of the piston in either direction ceases, and therefore does not lessen the effect of the air cushion or body, and it will likewise be observed that the compressed air cannot act to force the piston back to its first position and prevent the utilization of the air-cushion to overcome the shock in pulling or drawing, because the air is permitted to pass back of the piston through the passage *m*.

It will also be observed that by the use of a closed cylinder I secure the elastic effect of the air compressed on one side of the piston and the benefit of the vacuum produced on the opposite side.

It is desirable that the piston should stand normally about the middle part of the cylinder, and that the draw-head A should be advanced in proper position to act either as a buffer or for drawing, and for this purpose I provide a spring, J, which acts to move the piston-rod or draw-bar outward.

The arrangement of the spring is susceptible

of considerable variation; but that shown in Fig. 1 is preferred. In said figure it will be seen that the piston-rod or draw-bar is formed or furnished with a collar, C, and encircled by a volute or spiral spring, J, one end of which bears against the collar and the other end of which is seated in a metal cup or socket, K, applied to a cross-timber, D, as shown.

The spring is preferably of a length sufficient to move the piston to the middle of the cylinder, as in that position it is ready to act either way to take up the shock or concussion. This spring serves both to prevent the piston from being forced against the cylinder-head when moving inward, its entire play or movement being taken up just before the piston reaches the cylinder-head, and the spring thereby forming a solid body between the shoulder C and plate K, and to gradually move the piston and draw-head outward after being forced or driven inward by the meeting of the two cars.

In order that the gradual return or outward movement may take place without producing a compression of the air on one side or a partial vacuum on the other side of the piston, I form a groove or channel, P, in the inner face of the cylinder from end to end, as shown; or, as the equivalent thereof, I form a small hole or passage through the piston from one face to the other. This channel, groove, or passage, in whichever form it may be used, is sufficiently small not to allow the air to pass with such rapidity as to perceptibly affect the action of the piston in compressing the air to take up the shock or concussion, but is merely of such size as to permit the air to gradually and slowly escape from one to the other side of the piston, and thereby enable the spring to gradually return the piston and draw-head or buffer to their normal or outward position. The passages *m* may, if preferred, be omitted, and the channel P made to serve their purpose.

The action or movement of the piston in taking up the shock or concussion is instantaneous, or practically so, and the escape of any considerable body of air through so small an opening is impossible.

To relieve the piston of any strain in drawing the car or train, a cross timber or beam, D, is arranged at a distance from plate K corresponding to the movement of the piston and slightly less than the length of the cylinder—an arrangement of parts which causes the collar C to come in contact with the rear face of said beam D, against which the collar draws, as indicated by dotted lines in Fig. 1.

For the purpose of conveniently oiling the piston when necessary, I provide an oil-hole, *n*, which is closed by a screw-plug, I.

The hole is located at the top of the cylinder, midway between its ends, and delivers oil directly into a groove, L, extending about halfway around the piston, equally on both sides of the oil-hole, as in Fig. 1.

The piston, standing normally in the position shown, is always sure to receive the oil directly in the groove, from which point it will be properly and evenly distributed.

The device, as a whole, is exceedingly cheap, simple, and efficient, and not liable to deteriorate in efficiency by long use, as is the case with springs.

While not broadly claiming air as a cushion for railway-car buffers, I am aware that a hydraulic buffer has been patented in which the liquid was permitted to pass from one to the other side of the piston throughout the entire movement of the latter, and such construction I do not claim, although to permit the return of the piston to its normal position I provide a small passage which permits such movement of the air to take place slowly and evenly after the buffer has been moved from its normal position. As above stated, however, this passage is so small as to have no perceptible or appreciable effect upon the compression of the air by the piston, which compression is practically instantaneous. I use no liquid, for the reason that, being practically incompressible, as in the case of water and most other liquids used in such apparatus, little, if any, elasticity is afforded thereby; but I make use of air, which is highly compressible and elastic, and I so construct and arrange the parts of the device that during the compression of the air, and while the buffer or draw-bar is acting to take up the shock, there is no appreciable escape of air from one to the other side of the compressing-piston; but when such action is completed the air is permitted freely to escape to the front of the piston, and thereby to prevent its sudden recoil. This transfer of the air from one to the other side of the piston is not begun until the buffing action is over, and then it takes place instantaneously, or substantially so.

Having thus described my invention, what I claim is—

1. In a pneumatic car-buffer and draw-bar, the combination of an air-cylinder and a piston fitting within the cylinder and connected with the buffer or draw-bar, said cylinder being provided with a passage opening at one end into the cylinder close to the cylinder-head and at the other end at a distance from the head slightly greater than the thickness of the piston, whereby the air between the piston and the cylinder-head is subjected to compression until the piston reaches a point between the two openings of the passage, and is then permitted suddenly to pass to the other side of the piston, substantially as and for the purpose set forth.

2. In combination with a car-buffer, a piston connected therewith and arranged to move within an air-tight cylinder, substantially as shown and described, whereby the elasticity of the compressed air on one side of the piston and the force or effect of the partial vacuum on the opposite side are both utilized to take up the concussion of the buffer.

3. In a pneumatic car-buffer and draw-bar, the combination of a cylinder filled with air and a piston fitting closely within the cylinder and attached to the buffer or draw-bar, the cylinder or the piston being provided with a small passage through which the air can slowly pass from one to the other side of the piston, but so small as to have no appreciable effect upon the compression of the air, whereby a sudden movement of the piston is caused to compress the air, but a very slow and gradual movement is permitted without compressing the air.

4. In combination with a draw-bar or buffer provided with a piston, a cylinder containing said piston, a passage through which air may slowly pass from one side of the piston to the other, and a spring applied to the draw-bar and arranged, substantially as described and shown, to return the piston to the middle of the cylinder after being forced from said position.

5. The herein-described combined draw-bar and buffer, consisting of draw-head A, draw-bar or piston-rod B, provided with collar C and piston E, cylinder H, provided with ports *m m* and channel P, beam or support D, and spring J, all combined and operating substantially as shown and described.

6. In combination with the cylinder having the oil-hole *n* and plug I, the piston E, provided with groove L, as and for the purpose explained.

7. In a car-buffer, substantially such as shown and described, the combination of an air-cylinder, a piston arranged to move within said cylinder, and a collar applied to the piston-rod and arranged to come into contact with a stop outside of the cylinder, whereby the piston is prevented from coming into contact with the cylinder-heads.

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