3 Sheets—Sheet 1.

E. H. JANNEY.
Car-Buffer.

No. 214,043. Patented April 8, 1879.

Fig. 1.

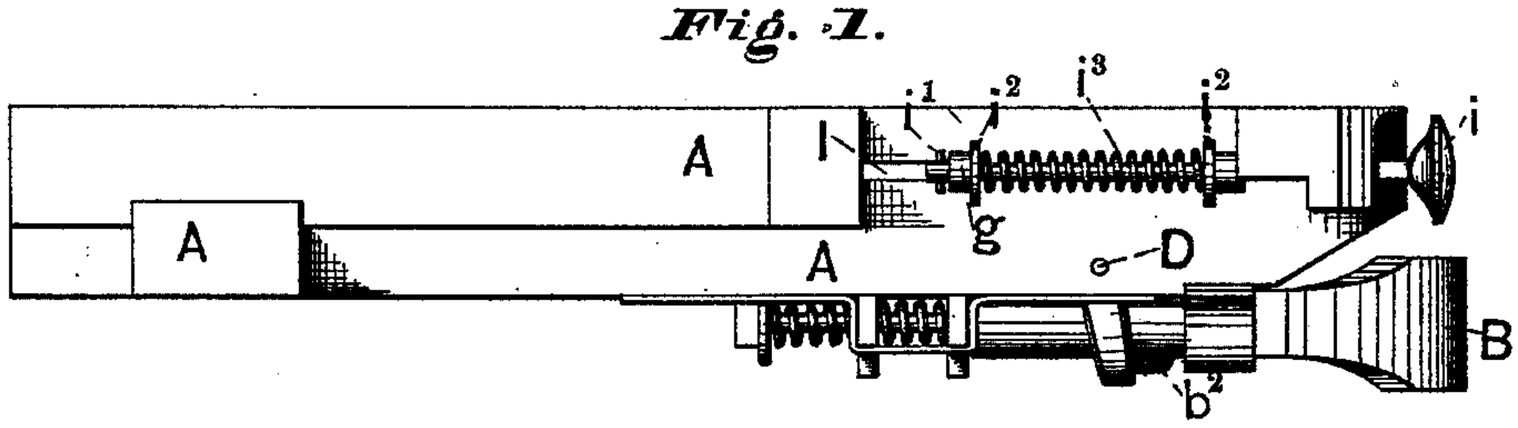

Fig. 2.

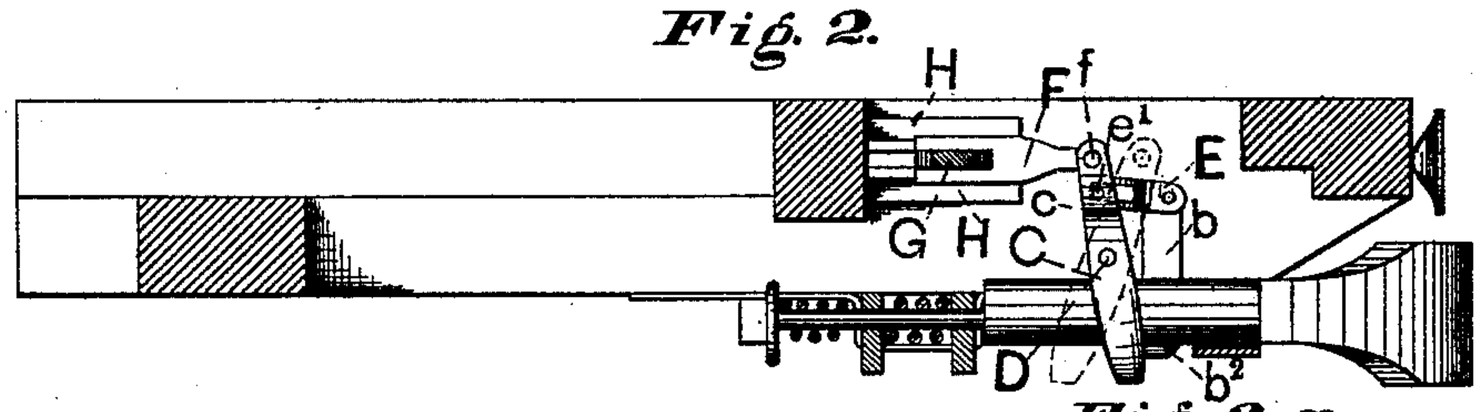

Fig. 2, a.

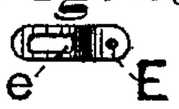

Fig. 3.

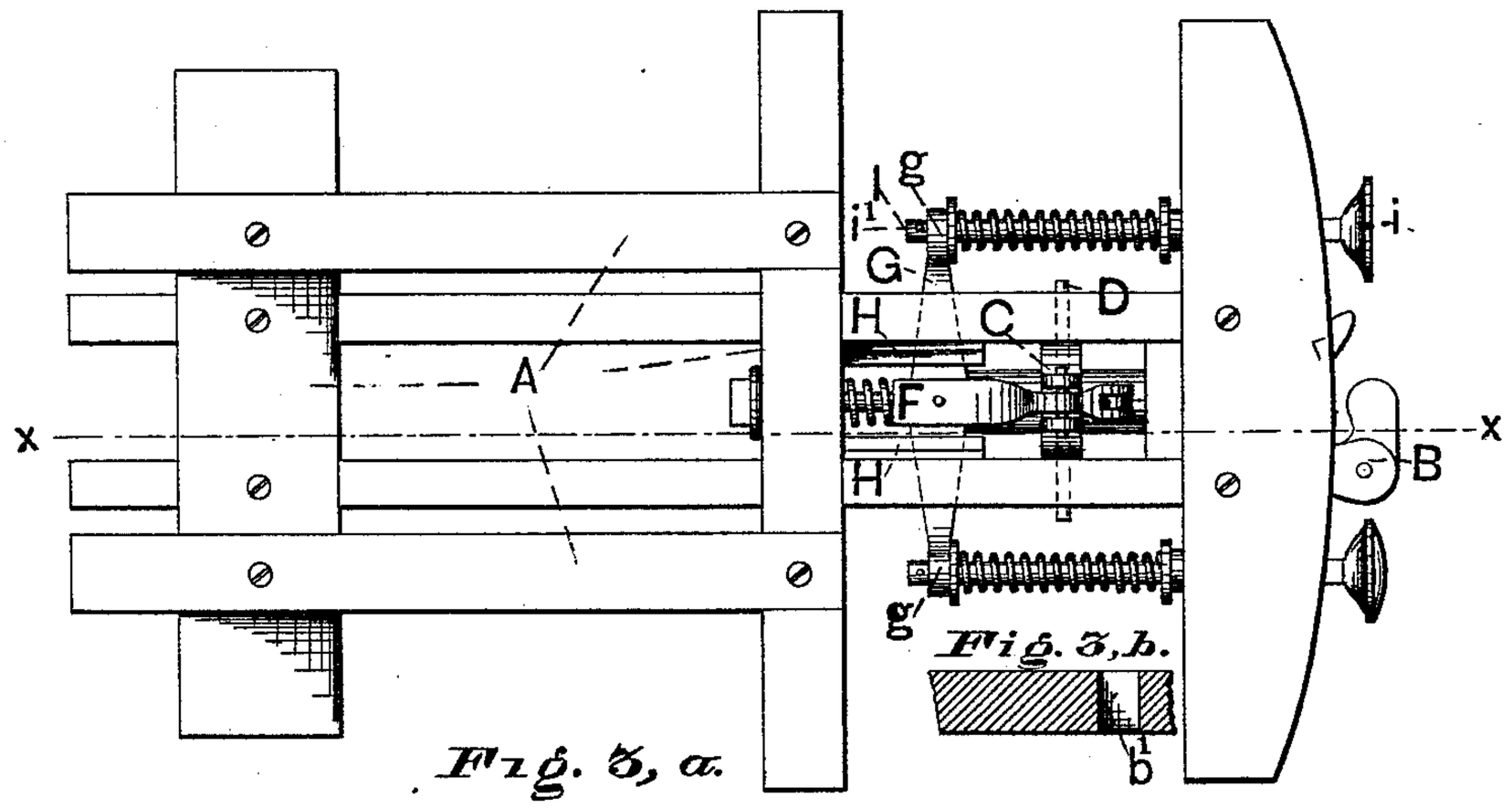

Fig. 3, a.

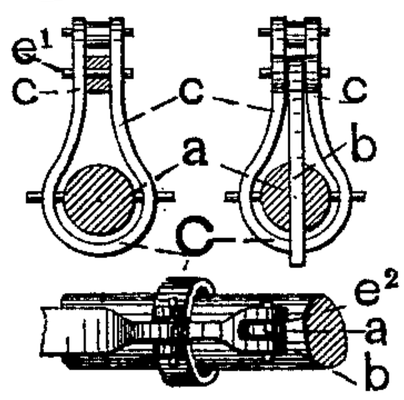

Fig. 3, b.

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Fig. 4.

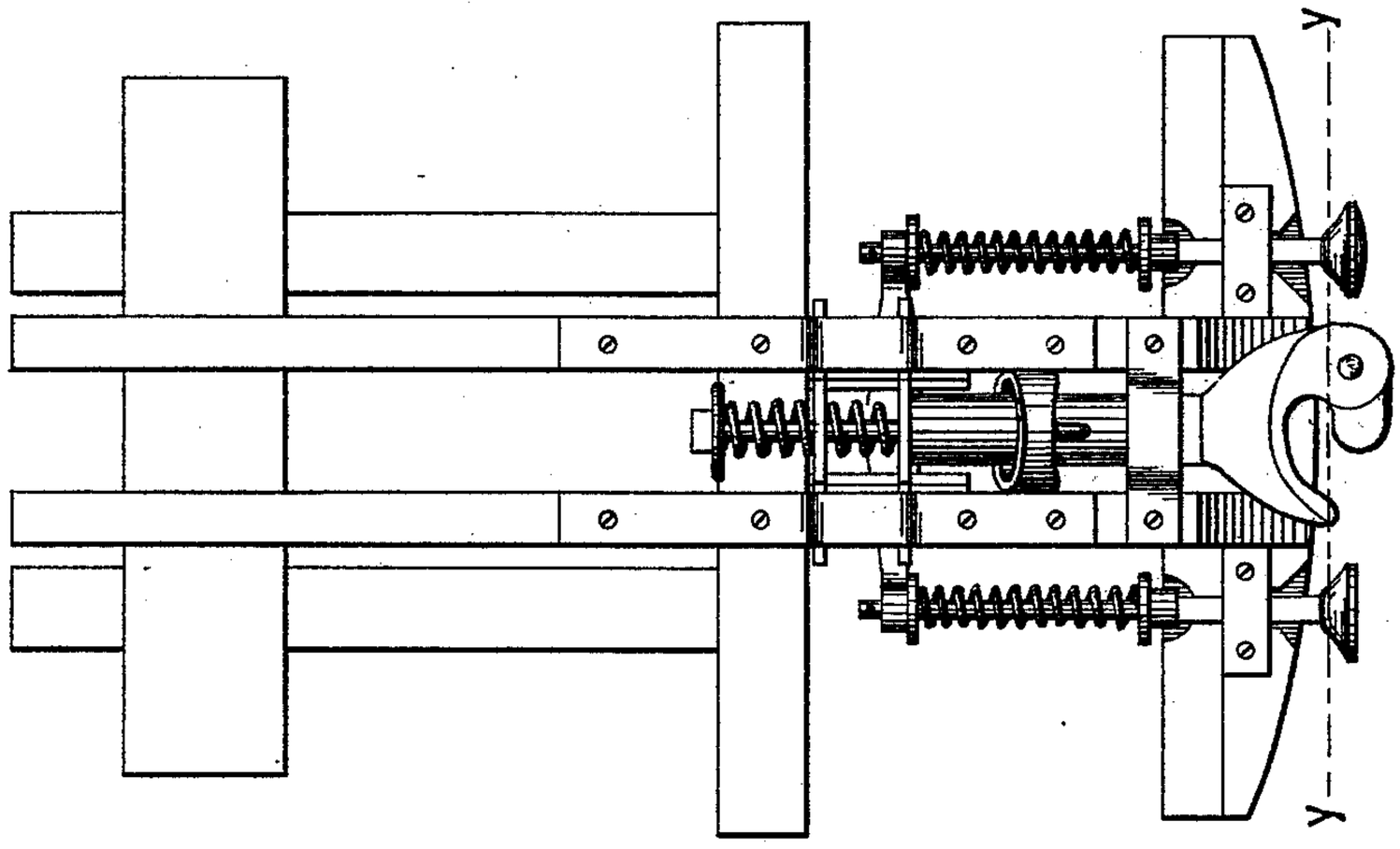


Fig. 5.

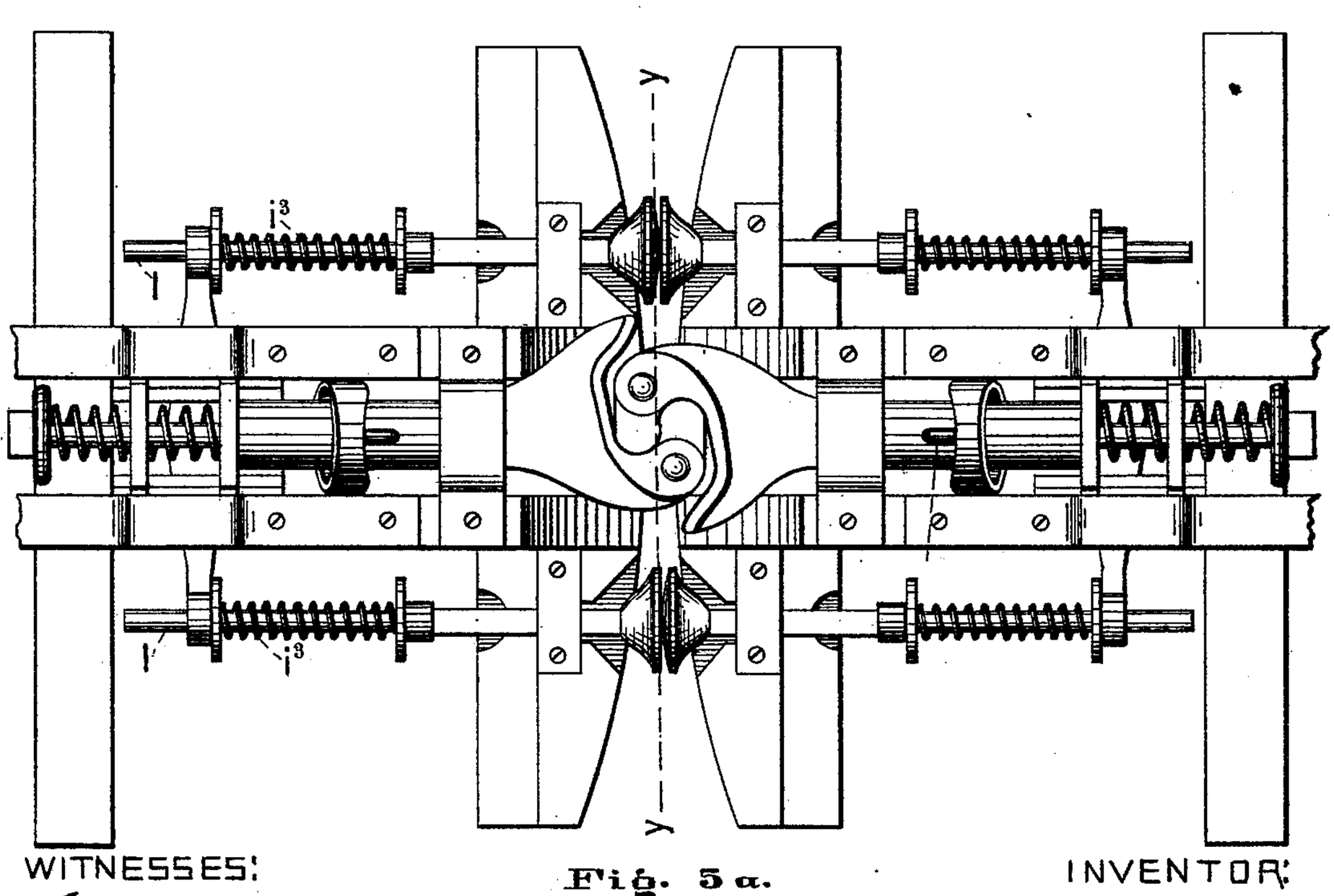
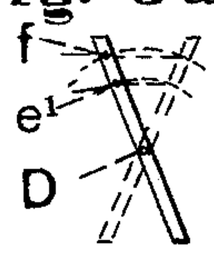


Fig. 5a.



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No. 214,043. Patented April 8, 1879.

Fig. 6.

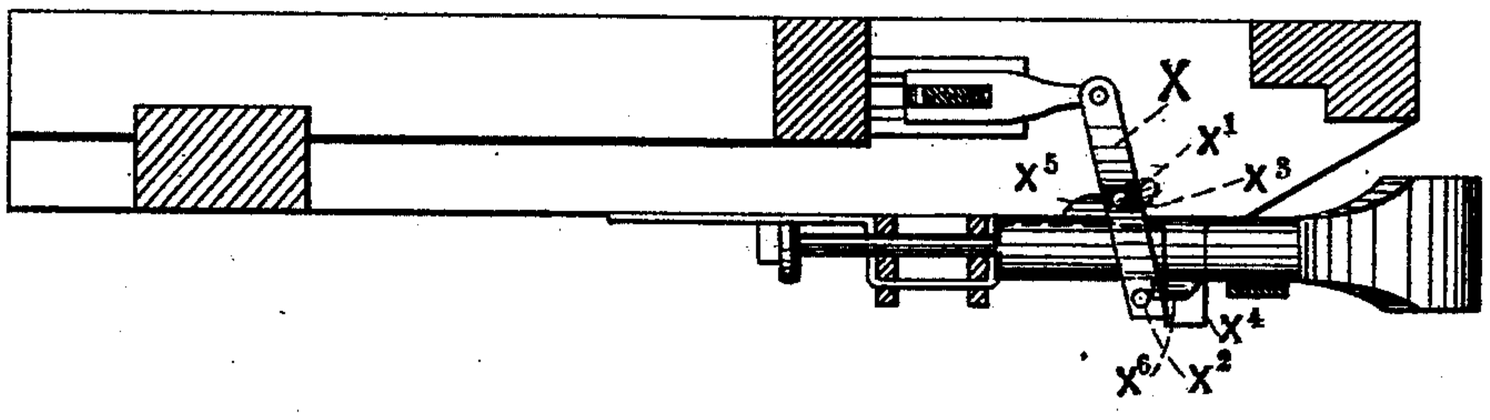


Fig. 7.

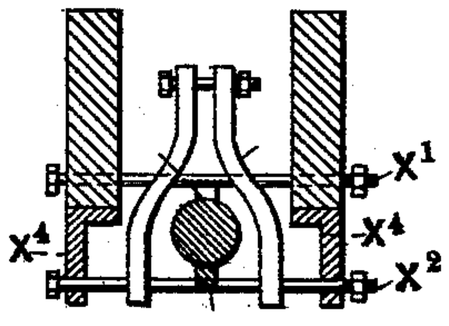
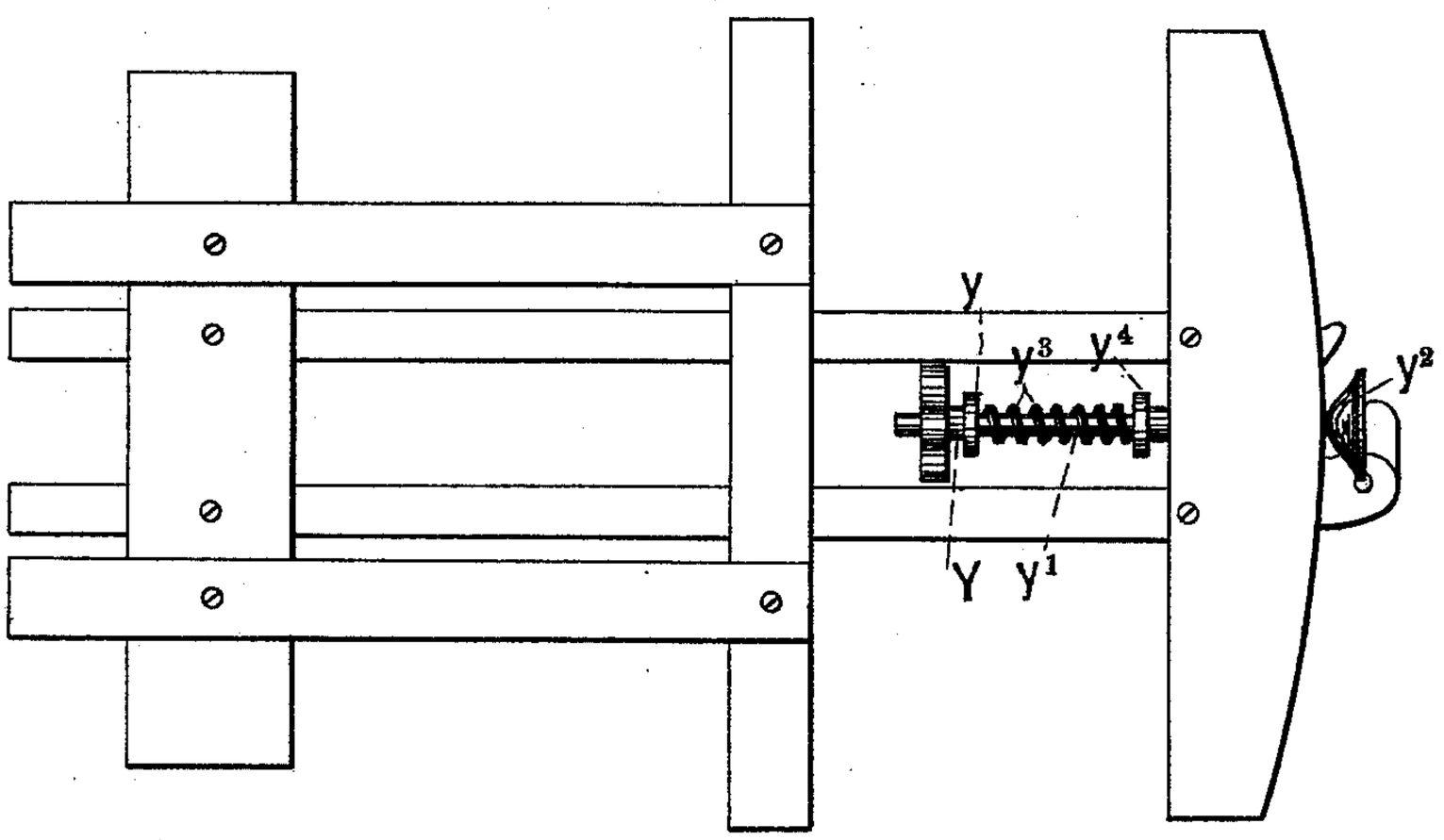


Fig. 8.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN CAR-BUFFERS.

Specification forming part of Letters Patent No. **214,043,** dated April 8, 1879; application filed February 8, 1878.

To all whom it may concern:

Be it known that I, ELI H. JANNEY, of Alexandria, county of Alexandria, and State of Virginia, have invented a new and Improved Buffer for Railroad-Cars; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention consists, mainly, in the combination of the following elements: certain suitable coupling mechanism, certain suitable buffer mechanism, and certain intermediate lever mechanism, the construction being such that the movements of the coupling mechanism are communicated through the intermediate lever mechanism to the spring of the buffing mechanism, in such manner that the latter, in forward movements of the coupling, is caused to move at its rear end a greater distance forward than the coupling, and in rearward movements of the coupling in a forward direction also, in consequence of which the buffer-springs, when the cars are coupled, are caused always to exert a pressure against each other, and thus prevent the shocks which ordinarily result in the running of trains from the independent movement of individual cars.

It consists, further, in certain details of construction, all of which will be fully described hereinafter.

In the drawings, Figure 1 represents a side elevation of my invention; Fig. 2, a sectional view through the line *x x*, Fig. 3; Fig. 3, a top-plan view; Fig. 4, a bottom-plan view; Fig. 5, a bottom-plan view of two coupled platforms; Figs. 6 and 7, side and front sectional elevations of one modification of the lever mechanism; and Fig. 8, a plan view of another modification, in which a single buffer is employed.

To enable others skilled in the art to make and use my invention, I will now proceed to describe fully its construction and manner of operation.

A, Figs. 1 and 3, represents the car-platform, which may be constructed in any proper manner. B represents the coupling, of any suitable construction, but, preferably, that covered by my patents of 1873 and 1874, which is secured to the platform in any proper manner and provided with any suitable arrangements of springs at its rear end.

C, Figs. 2, 3, and 3ª, represents a lever-yoke, consisting of a nearly oval ring of metal encircling the shank *a*, Fig. 3ª, of the draw-head, and terminating above in the vertical ears or standards *c c*, Figs. 2 and 3ª, as shown.

D, Figs. 1, 2, and 3, represents a transverse shaft, extending through the sides of the yoke above the draw-head, and also through the platform-beams, as shown in dotted lines, Fig. 3, which serves to support the yoke properly in place, and also to furnish a pivot or fulcrum for the same to turn upon, as will be hereinafter explained.

E, Figs. 2 and 2ª, represents a bar or rod of any suitable construction, and proper size and length, which is provided at its rear end with an elongated slot, *e*, Fig. 2ª, by means of which and a proper pin, e^1, it is loosely connected to the lever-yoke above the pivot-shaft, as shown.

e^2, Fig. 3ª, represents a vertical recess formed in the front end of the rod E, in which is pivoted the upper end of a stud, *b*, Figs. 2 and 3ª, rising from the coupling, as shown.

b^1, Fig. 3ᵇ, represents a proper slot extending vertically through the coupling, in which the stud *b* is secured by a fastening-pin or other proper means.

b^2, Figs. 1 and 2, represents an extension of the stud *b*, projecting through the slot b^1 on the lower side of the coupling, the purpose of which will be hereinafter explained.

F, Figs. 2 and 3, represents a fork-piece, the shank or front end of which is pivoted between the ears *c c* of the lever-yoke, near their upper ends, as shown.

G, Figs. 2 and 3, represents an equalizing-bar, pivoted in the recess of the rear end of the fork-piece, which extends laterally across the platform-frame through proper openings in the same, as shown.

H H represent guide-pieces located on the inner sides of the central platform-beams, which serve to properly direct the fork-piece in its longitudinal movement, and also to hold the equalizing-bar against lateral movement.

I I, Figs. 1 and 3, represent buffer-rods extending through proper openings in the buffer-beam, which are provided at their front

ends with the buffer-heads *i i*, one of which is provided with a flat face and the other with a convex one, as shown in Fig. 3.

g g, Figs. 1 and 3, represent eyes formed in the ends of the equalizing-bar G, which have proper openings, through which pass the rear ends of the buffer-rods, as shown.

i^1 i^1, Fig. 1, represent pins or other fastening devices, by means of which the rods are properly connected to the equalizing-bar without being rigidly attached to the same.

i^2 i^2 represent washers located upon each rod, one of which is limited in its movement in a rearward direction by the equalizing-bar, and the other in a forward direction by the rear face of the buffer-beam.

i^3 represents a spiral spring located upon each rod, between the washers, as shown.

The operation will now be described.

A general statement may be made, as follows: The parts hereinbefore described are preferably so arranged relatively to each other that when the yoke-levers are in the position shown in full lines, Fig. 2, the buffer-heads on each car, before a coupling is effected, are caused to project beyond the transverse line Y Y, Fig. 5, which is reached by them when the cars are coupled and standing still, the distance of about one inch, as indicated in Fig. 4. When, therefore, the cars come together to effect a coupling, each pair of buffer-rods will be carried backward the distance of one inch, as shown in Fig. 5, by the projection of the rear ends of the buffer-rods I through the equalizing-bar, and be caused, consequently, to exert upon each other that amount of pressure which results from the compression of the buffer-springs to that extent, the quantity, of course, depending upon the power of the springs employed. When, however, the train is set in motion, and the traction-springs of the couplings yield under the strain and permit the cars to separate to a certain extent, the pressure of the buffer-heads, instead of being diminished by the greater distance between the cars, is increased in a ratio exceeding that which would compensate simply for the movement of the coupling. For example, the pressure upon the buffer-heads when the cars are coupled and standing still is that which is produced by the compression of the springs upon each car the distance of one inch. When, however, the train is started and each coupling moves forward from the car, say, the distance of two inches, the equalizing-bar will not only be moved this distance to compensate for this movement, but also will be carried forward, according to the preferred proportion, the further distance of one inch.

In consequence of this movement of the equalizing-bar, the normal pressure upon the buffer-heads will not only be retained as the platforms separate, but an increase of pressure will be given by the additional compression of the springs resulting from the continued movement of the equalizing-bar.

The construction is such, it will be understood, that the buffer-heads always exert a pressure upon each other when the cars are coupled, this action resulting from the compression of the springs i^3, as shown in Fig. 5, which is effected in coupling the cars by forcing the buffer rods or shanks through the eyes of the relatively-fixed equalizing-bar, the latter being held from movement at this time by the contact of the yoke-lever with the stud b^3 of the coupling, and by the stud *b*, as will be hereinafter described.

The pressure, it will be understood, is least when the cars are standing still, and is increased in definite proportions when the cars are separated by draft-strain, or are brought together in buffing, the pressure in the latter case being the greatest, as will be hereinafter described.

The operation in buffing, however, is substantially the same, the ratio of pressure being increased in the same manner by the action of an intermediate lever, but by different mechanism upon the coupling, when the latter moves backward, as will be hereinafter described.

The operation, having been set forth in general terms, will now be described in detail. Before the coupling is effected, the buffer-heads, as before stated, project forward beyond the position occupied by them when the cars are coupled and standing still about the distance of one inch, as indicated in Fig. 4. When the coupling is effected, consequently, the buffer-heads and the rods attached thereto are forced backward the distance of one inch, as indicated in Fig. 5, the springs i^3 being compressed to this extent to permit the movement. The buffer-heads then, when the cars are coupled and standing still, exert against each other that amount of pressure which results from the tendency of the compressed springs i^3 to react. As this amount is never diminished while the cars are coupled, it may be termed the "normal pressure." When the train is set in motion, the traction-springs of the couplings yield under the strain and permit the couplings to move independently of the platform to a certain extent, in the usual well-known manner. This movement of the coupling is communicated, by means of the intermediate rod, E, Fig. 2, to the yoke-lever C, and from it by means of the fork-piece F to the equalizing-bar G.

The movement of the coupling, it will be observed, is communicated to the lever C at a point, e', between the pivot-shaft D and the point *f*, from which latter the power is transferred to the equalizing-bar. From this arrangement of parts it necessarily follows that the fork-piece and equalizing-bar will move at a greater speed than the coupling and rod E, because the former, being farther from the pivot-point than the latter, necessarily moves in the arc of a larger circle. This will appear clear from the diagram, Fig. 5^a, in which the movement of the points e' *f* of the lever to

which the rod E and fork-piece are attached is indicated in dotted lines.

It will be observed that the point *f* necessarily travels in the same period of time a greater distance than the point *e'*.

The relative amount of movement may be varied at will by changing the position of the fork-piece and rod E relative to the pivot-point of the yoke-lever, it being understood that the nearer the end of the rod E is placed to the pivot-shaft the greater will be the movement of the fork-piece relative thereto. When the cars come together in buffing, the rod E becomes inoperative as far as its action on the yoke-lever is concerned, because, in consequence of the slot *e*, its movement is not communicated thereto. The stud b^2, however, on the lower face of the coupling, now comes in contact with the lower portion of the yoke-lever and rocks the same on its shaft to give movement to the fork-piece and equalizing-bar, in the manner previously described.

The relative movement of the equalizing-bar and the coupling in buffing will depend, of course, upon the position of the acting parts relatively to each other, and these may be varied at will, according to the necessities of the case.

The arrangement preferred in buffing is to make the upper and lower arms of the yoke-lever equal. When thus arranged, if the coupling, when the cars are standing still, is forced backward one inch, the equalizing-bar consequently will be moved forward one inch, so that the buffers will receive the pressure resulting from compression of the springs two inches, and if the normal pressure before buffing was one inch the entire pressure will be three inches.

It should be understood that the buffer-heads, when the cars are coupled, are always in close contact, and hence no movement can take place on their part, excepting that which coincides with the movement of the coupling, the excess of movement of the equalizing-bar over that of the coupling being taken up by the springs i^3, and by them transferred to the buffer as increased pressure.

It should be understood, also, that although the coupling and the buffer mechanism are united by the intermediate lever mechanism, yet, nevertheless, the draft-spring of the coupling is entirely independent of the buffing-springs, and is wholly unaffected by the pressure which they exert. This independence of the draft-spring results from the interposed lever mechanism, which, when the coupling is effected, acts to lock, as it were, the coupling in such manner that none of the buffing-strain is communicated to the draft-spring.

The locking action may be understood by inspecting Figs. 1 and 2.

When the buffers are forced in a rearward direction in the act of coupling, the pressure resulting from the compression of the springs i^3 will be exerted upon the equalizing bar G, the fork-piece F, connected thereto, and the upper end of the lever C, to which the fork-piece F is attached, as shown.

From the lever the pressure will then be transmitted to the coupling to which it is connected. This pressure, however, is divided by the lever, and is transmitted to the coupling in two distinct portions—one through the bar E and stud *b*, which tends to move the coupling in a rearward direction, and one through the stud b^2, which tends to move the coupling in a forward direction. By the action of the lever E, then, it will be understood that the pressure resulting from the compression of the buffing-springs is transmitted to the coupling both in a forward and rearward direction, and hence that no movement of the same is possible. If no movement of the coupling takes place, it follows that the draft-spring is not affected at all by the tension of the buffing-springs, but simply remains in its normal position.

When the coupling is drawn out in starting the train, the buffer-springs are still further compressed; but the draft-spring is not affected thereby, it receiving only that normal strain which is incidental to starting the train.

When the coupling is forced backward in buffing, the buffer-springs are still moved in a forward direction and compressed beyond their normal condition; but the draft-spring is not affected thereby, it receiving only that normal strain which is incidental to buffing.

By means of the employment of lever mechanism, also, the buffer-springs i^3 serve, in fact, as draft-springs—that is, their tendency in action is to return the coupling to its normal position when the same has been drawn out, while the ordinary buffer-springs, on the other hand, tend to draw out the coupling from its normal position.

The coupling, it should be understood, owing to its peculiar construction, is without lost motion, and hence all its movements, whether in a forward or backward direction, are directly communicated to the lever mechanism.

The coupling has no lost motion, as have those hook-couplings which are capable of slipping by each other when the cars are brought together in buffing, because such movement past one another is absolutely prevented by the encircling draw-head, which serves also as a buffer, as described in my former patents before referred to.

Some of the advantages of the described construction are as follows:

The individual cars are held apart by elastic connections, which are always under tension, and hence lost motion is impossible under any circumstances, and the violent contact of one car with another cannot occur.

By means of this combination, also, the parts of the train are so united together as to form a single structure, which, when running at uniform speed, is rigidly connected together so far as lateral and longitudinal movement is concerned.

By the interposition of the lever mechanism,

also, the draft-spring is wholly unaffected by the tension upon the buffer-springs, and hence the same may be perfectly adapted to resist the normal pulling and buffing strain.

By making the draft-spring independent of the buffing-springs, also, it is not necessary to compress the draft-spring in coupling, as is usually done, and hence the cars may be brought together in the act of coupling with much less violence than is otherwise necessary.

I do not limit myself to the precise construction before described.

In Figs. 6 and 7 is represented a modification of the intermediate lever mechanism.

X represents the lever, provided above with the fork-piece, by means of which connection is made with the equalizing-bar, near its center and at its lower end, with pivot studs or shafts x^1 x^2, as shown. x^3 represents an elongated slot in the frame-beams of the platform, in which is held the pivot-shaft x^1, as shown. x^4 represents any proper projection extending from any fixed part of the platform, by means of which the movement of the lower end of the lever in a forward direction is limited. x^5 x^6 represent lugs upon the coupling, located one in front and the other in rear of the lever, and one above the coupling-shank, and the other below the same as shown.

The operation is as follows: When the coupling is drawn out under draft-strain, its movement is communicated to the lever X by means of the upper lug, x^5, the lower pivot-shaft, x^2, bearing against the fixed projection x^4, and forming the fulcrum, and the slot x^3 permitting the necessary play.

When the coupling is moved backward in buffing, movement is communicated to the lever by the lower lug, x^6, the upper shaft, x^1, forming the fulcrum upon which the lever turns.

In Fig. 8 is represented another modification, in which a single central buffer is employed instead of two side buffers.

Y represents the lever-end, which is actuated in a similar manner to those previously described. y represents a washer interposed between the lever end and the spring, as shown. y^1 represents the buffer-rod, having the head y^2, the spring y^3, surrounding the rod, and washer y^4, arranged in a similar manner to the corresponding parts (buffer-rods) previously described.

The operation is similar to the construction first described, with the exception that the movement of the lever, instead of being communicated through the equalizing-bar to two side buffers, is communicated direct to a single central buffer.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the following elements: coupling mechanism, substantially as described, buffer mechanism, substantially as described, and intermediate lever mechanism, substantially as described, the construction being such that the movements of the coupling mechanism are communicated through the intermediate lever mechanism to the spring of the buffing mechanism in such manner that the latter in rearward movements of the coupling is caused to move in a forward direction.

2. In combination with coupling and buffing mechanism, substantially as described, a single lever, substantially as described, adapted to give a forward movement to the equalizing-bar when the coupling moves either in a forward or backward direction.

3. The combination of the following elements: coupling mechanism, substantially as described, buffing mechanism, substantially as described, an equalizing-bar having buffer-shanks connected thereto, and lever mechanism, substantially as described.

4. In combination with a coupler and elastic buffer, an intermediate lever, C, substantially as described, having connecting-pieces E and F, substantially as described, the points e' f of which are adapted to move in arcs of different circles, one of which pieces is united to the buffer by an elastic connection, substantially as described.

5. In combination with the coupling B and the connecting-rod E, attached thereto, the lever-yoke C, substantially as described.

6. In combination with the coupling B, the connecting-rod E, and lever-yoke C, the fork-piece F and equalizing-bar G, substantially as described.

7. In combination with the lever-yoke C and fork-piece F, the coupling having the studs b b^2, as described.

8. In combination with a coupling which is itself provided with a buffing-surface, independent buffing mechanism, and independent lever mechanism, substantially as described, uniting the two together.

This specification signed and witnessed this 6th day of February, 1878.

ELI H. JANNEY.

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