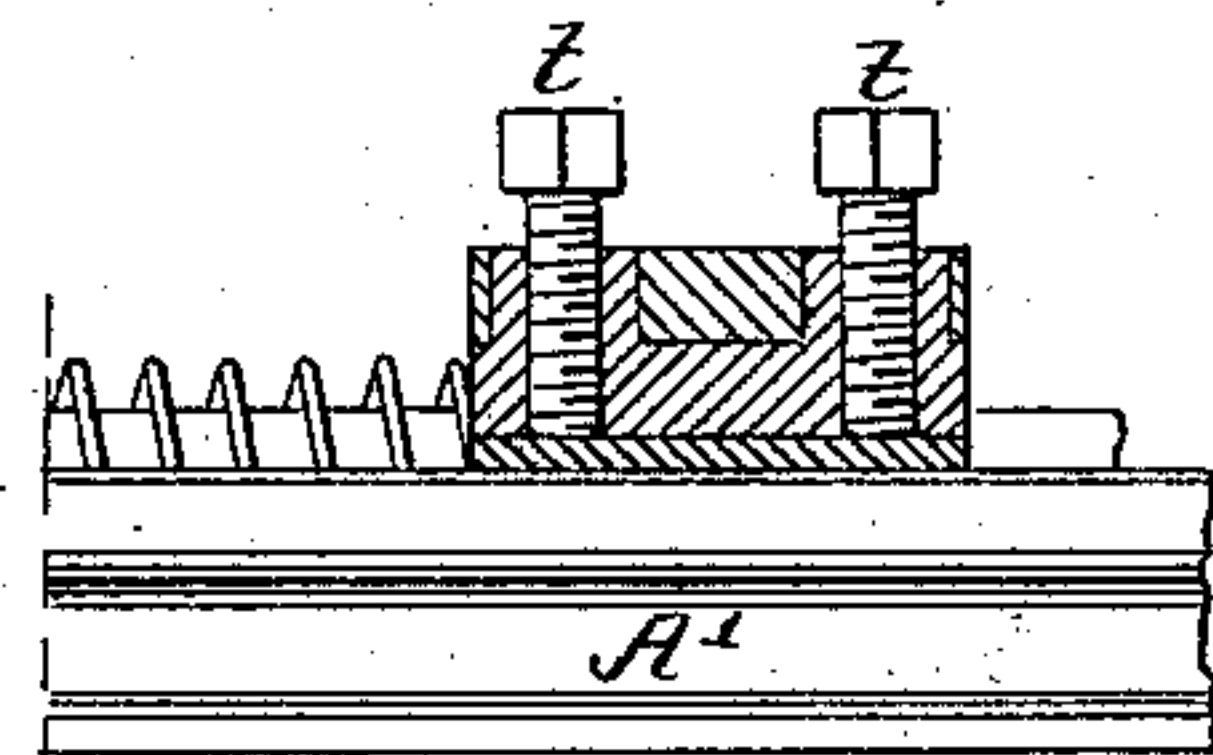
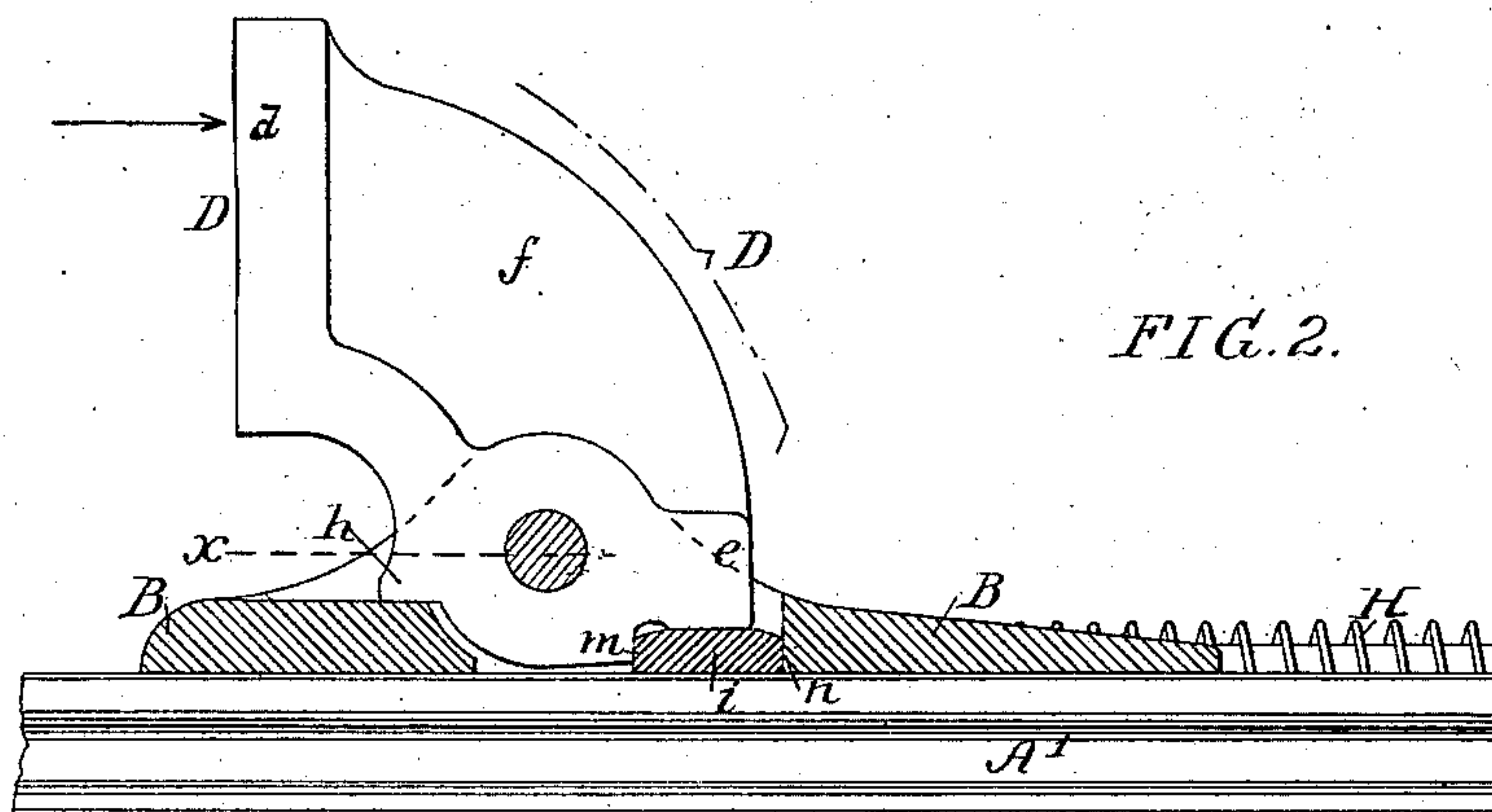
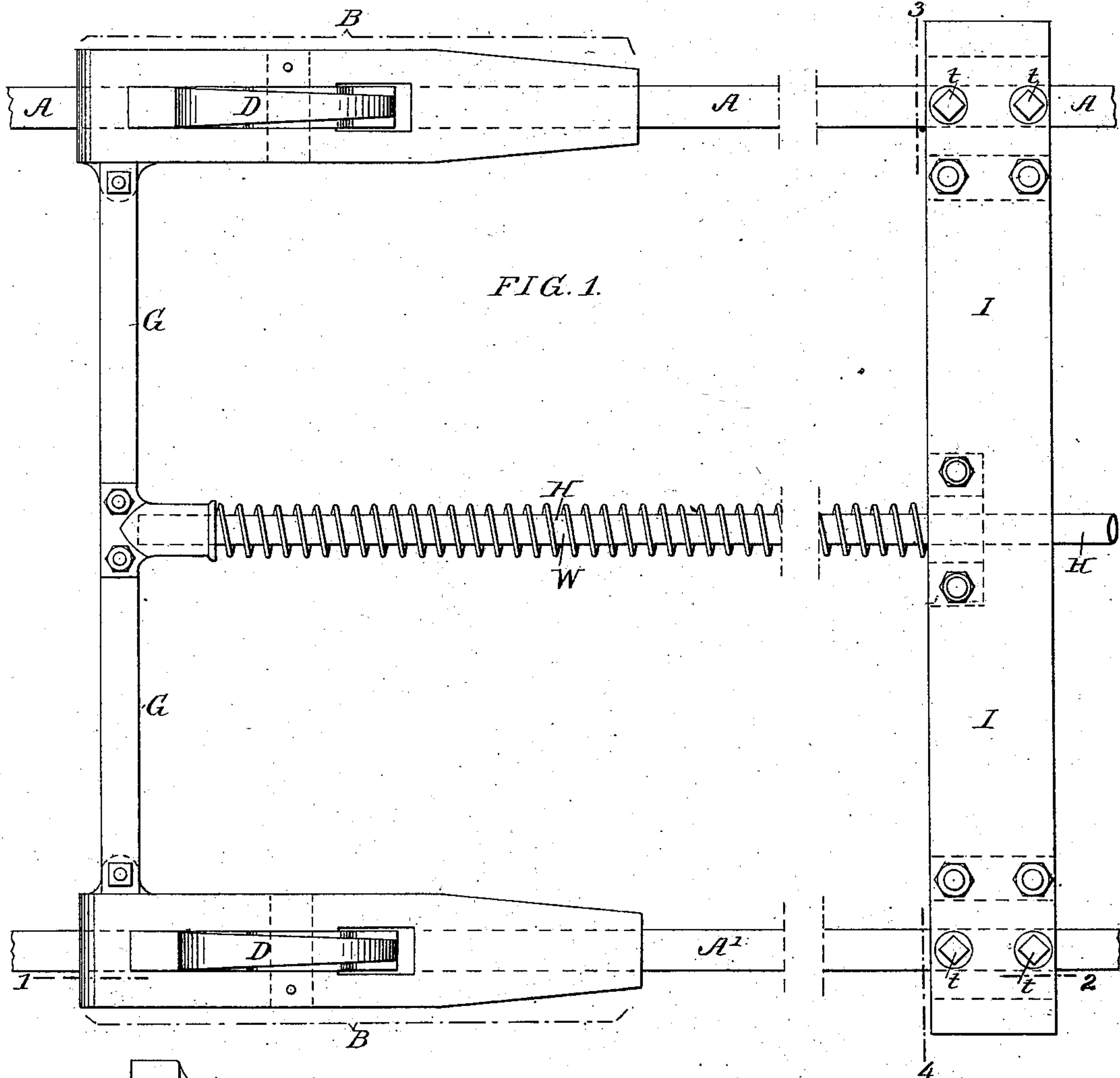


M. F. BONZANO.

DEVICE FOR ARRESTING LOCOMOTIVES AND CARS.

No. 293,846.

Patented Feb. 19, 1884.



WITNESSES:
Harry Drury
John M. Clayton.

INVENTOR:
M. F. Bonzano
by his Attorneys
Howe & Sons

(No Model.)

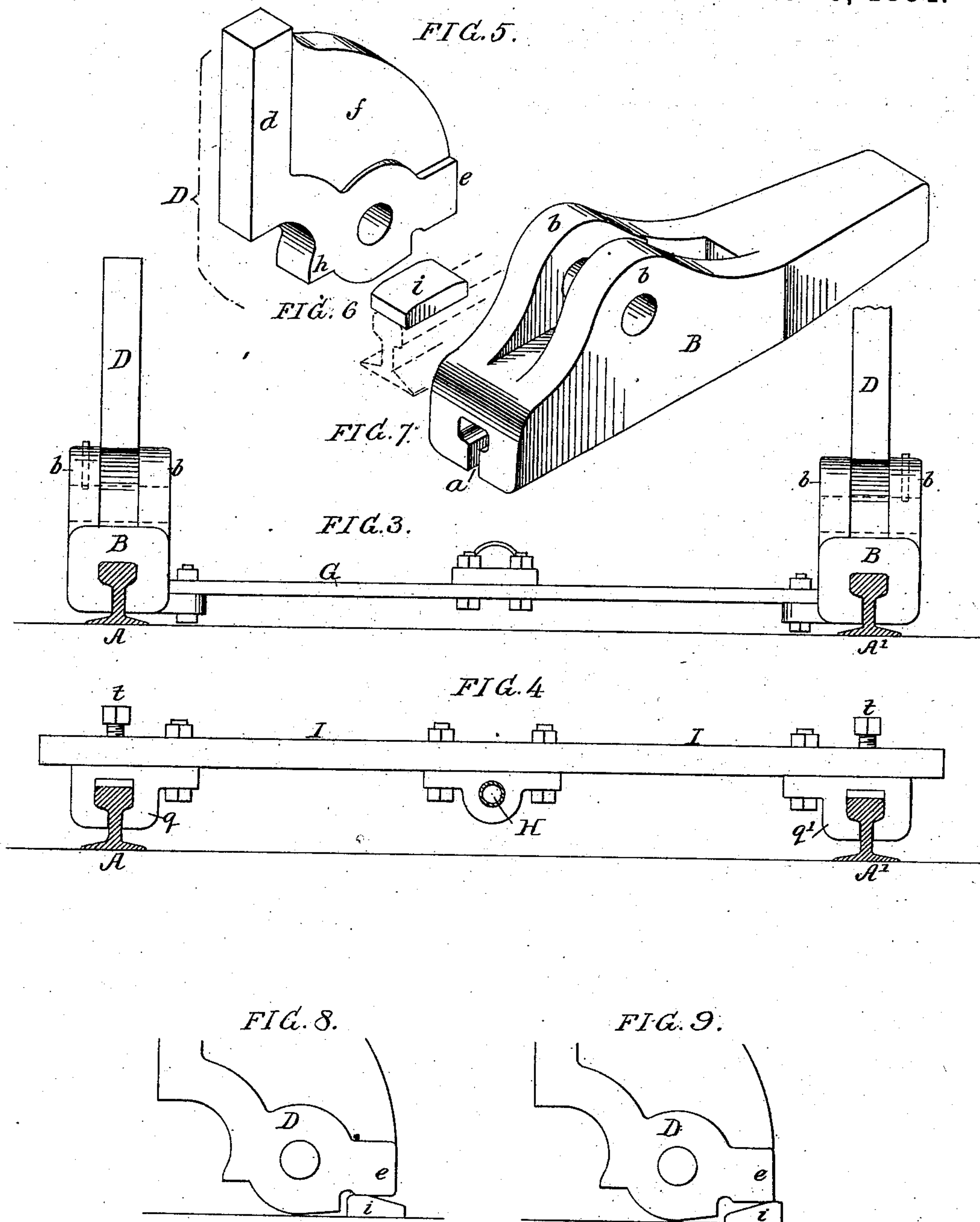
2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

MAXIMILIAN F. BONZANO, OF PHILADELPHIA, PENNSYLVANIA.

DEVICE FOR ARRESTING LOCOMOTIVES AND CARS.

SPECIFICATION forming part of Letters Patent No. 293,846, dated February 19, 1884.

Application filed November 21, 1883. (No model.)

To all whom it may concern:

Be it known that I, MAXIMILIAN F. BONZANO, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented a Device for Arresting Locomotives and Cars, of which the following is a specification.

My invention relates to a device for gently arresting a locomotive or car as it is approaching the terminus of a track, in place of the cumbersome fixed bumper-frames which are in common use, and by violent contact with which locomotives and cars are often more or less damaged; and my invention consists of a device, fully described hereinafter, whereby the momentum of a locomotive or car is caused to impart such friction to a rail or rails as will gradually absorb the said momentum, the friction ceasing when the locomotive has backed from the device.

Other objects of my invention are too fully explained hereinafter to need preliminary description.

In the accompanying drawings, Figure 1, Sheet 1, is a plan view of the device for arresting locomotives and cars; Fig. 2, a sectional elevation on the line 1 2; Fig. 3, Sheet 2, an end view of the device, the rails being in section; Fig. 4, a transverse section on the line 3 4, Fig. 1; Figs. 5, 6, and 7, perspective views, illustrating parts separated from each other; and Figs. 8 and 9 diagrams illustrating a feature of my invention.

Referring to Figs. 1 and 4, inclusive, A and A' are portions of the two rails of a track, and on each rail is a shoe, B, which has in the under side a T-groove, *a*, (best observed in the perspective view, Fig. 7,) the groove being adapted to the rail, as shown in Fig. 3, so that while the said shoe is at liberty to be moved freely on the rail, under the circumstances explained hereinafter it can have no other movement independently of the said rail.

To lugs *b b* on each shoe is pivoted a lever, D, one arm, *d*, of which extends upward, the other arm, *e*, being horizontal or nearly so, and the two arms being connected together by a substantial web, *f*, forming part of the lever. A toe, *h*, on each lever is arranged to bear on the shoe, and the arm *e* of the lever is above a block, *i*, which rests on the rail, as shown in Fig. 2, the said block being arranged to slide

on the rail with the shoe and lever, as it is loosely confined between a projection, *m*, on the latter and the end *n* of a slot in the shoe.

The operation of this device may be explained as follows: When the wheel or any other part of a locomotive or car strikes the arm *d* of the lever D, the latter, together with the shoe, will yield and slide on the rail; but at the same time such pressure will be exerted on the rail through the medium of the block *i* as will cause friction enough to absorb the momentum of the locomotive or car without the damaging shock which they often receive when brought into violent contact with the usual fixed bumper-frames. In other words, the locomotive or car is gently arrested by friction due to its own momentum. After the locomotive or car has backed from the arm *d* of the lever the block *i* will be relieved from pressure, the toe *h* of the lever resting on the shoe, which, with the lever, can be moved back from the position to which it has been pushed.

It will be seen that the friction-block *i*, so far as regards its functions, is simply a removable part of the arm *e* of the lever D. The arm, indeed, might bear directly on the rail but for the wear to which it is subjected, whereas, when the friction-block has become unduly worn it can be readily removed and a new one inserted in its place. There is, however, this further advantage of the removable block: Under a given force applied to the arm *a* of the lever D the pressure applied to the block will be proportionate to the difference between the lengths of the two arms of the lever—the shorter the arm *e* the greater the pressure. The effective length of the arm *d* will be the distance from the point where the arm is struck and a line, *x*, drawn through the center of the pivot-pin of the lever, and the effective length of the arm *e* will be the distance between the said center and the point where the arm bears on the block. Hence, by blocks differently formed at the top, different leverages and different degrees of friction may be obtained. The use of a block of the character shown in Fig. 9, for instance, would be equivalent to the shortening of the arm *e* of the lever, and the block, Fig. 10, would be a lengthening of the arm.

While a single arresting device like that above described might be used, especially if

adapted to a special rail in the center of the track, I prefer two arresting devices—one for each of the usual rails—and to connect them together by a cross bar or bars, G; or the arms *d* of the two levers may be carried upward and connected together by a cross-beam for the beam of the engine to strike against, and there may be one or more intermediate arresting devices adapted to special rails.

10 In using the term "rail" I wish it to be understood that the term is intended to include any fixed bar or plate with which a shoe and lever may be combined, substantially in the manner described. The shoe and lever may be
15 fixed to the track and a rail bar or plate constructed to be struck by a locomotive or car may slide in the shoe. It is not essential, moreover, that the lever and shoe should be constructed precisely as shown.

20 Another feature of my invention consists in making the arresting device or devices self-restoring to the position from which they have been moved by the locomotive or car after the backing of the latter. This may be done by a
25 counter-balance either in the form of a spring or springs or a weight contained in a pit below the track and suspended to a rope or chain passing over guide-pulleys to the cross-bar G; for it must be remembered that after the le-
30 vers have been relieved from the pressure of the locomotive or car there is no longer sufficient friction on the rails to prevent the easy restoration of the arresting devices to their normal positions.

35 The counterbalancing device shown in the drawings consists of a coiled spring, W, surrounding a rod, H, and interposed between a cross-bar, I, secured to the rails in any suit-

able manner, and the cross-bar G, the spring yielding when the arresting devices are moved 40 in the direction of the arrow, but being sufficiently rigid to return the devices to their normal positions when the locomotive or car has backed from them.

The rod H may be attached to the cross-bar 45 G and arranged to slide in the cross-bar I, or may be secured to the latter and arranged to slide in the cross-bar G.

I claim as my invention—

1. The combination of a shoe, B, adapted to 50 a rail, with a lever, D, pivoted to the shoe, and serving with the same as a medium by which a locomotive or car will cause friction on the rail, substantially as set forth.

2. The combination of the shoe and its lever 55 with counterbalancing mechanism, substantially as specified.

3. The combination of the shoe B, adapted to the rail, and the lever D, pivoted to the shoe, with a removable block, *i*, interposed between 60 the arm *e* of the lever and the rail, substantially as specified.

4. The combination of the shoe B with the lever D, having a toe, *h*, for limiting the move- 65 ment of the lever, as set forth.

5. The combination of two or more shoes, B, adapted to rails on a track, and each shoe hav- 70 ing a lever, D, with a bar or bars for connecting the shoes together, substantially as described.

In testimony whereof I have signed my name 70 to this specification in the presence of two subscribing witnesses.

M. F. BONZANO.

Witnesses:

HARRY SMITH,
HUBERT HOWSON.