C. A. LIEB.
VEHICLE SPRING.
APPLICATION FILED APR. 27, 1909.

945,725. Patented Jan. 4, 1910.

Fig. 1.

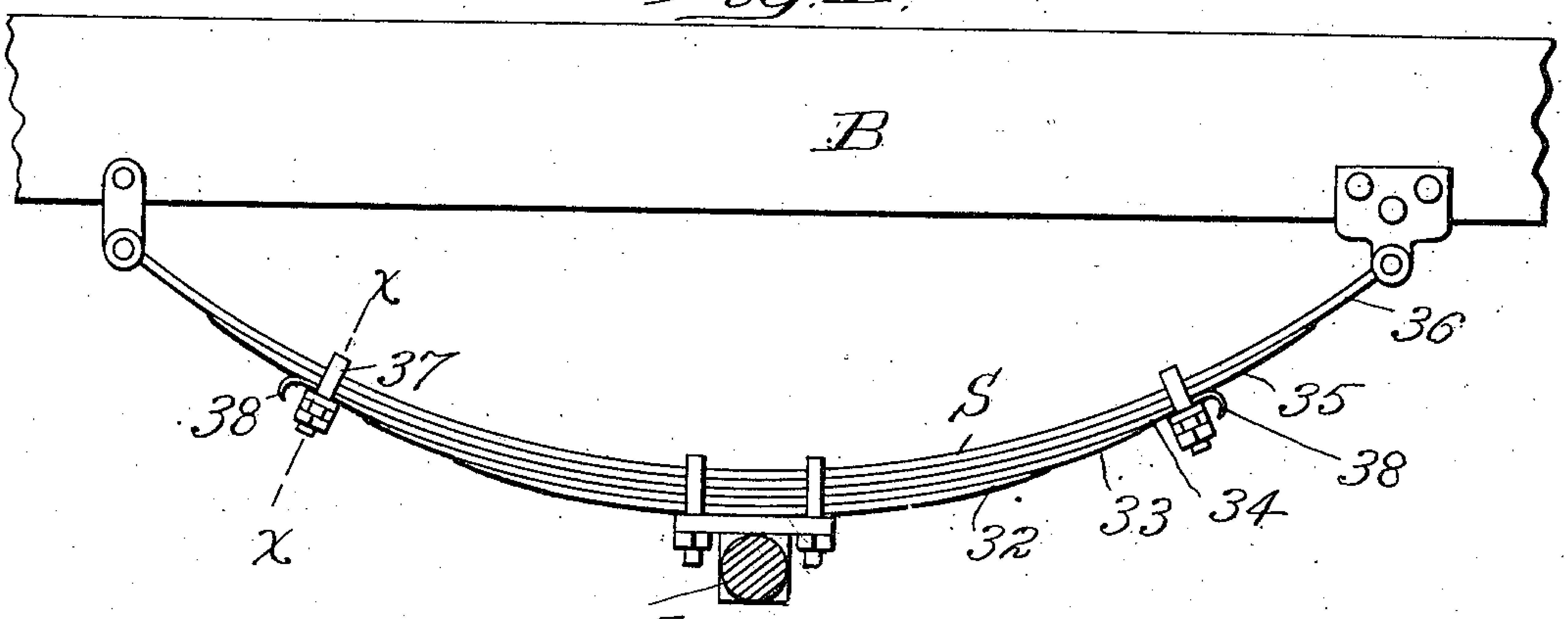


Fig. 2.

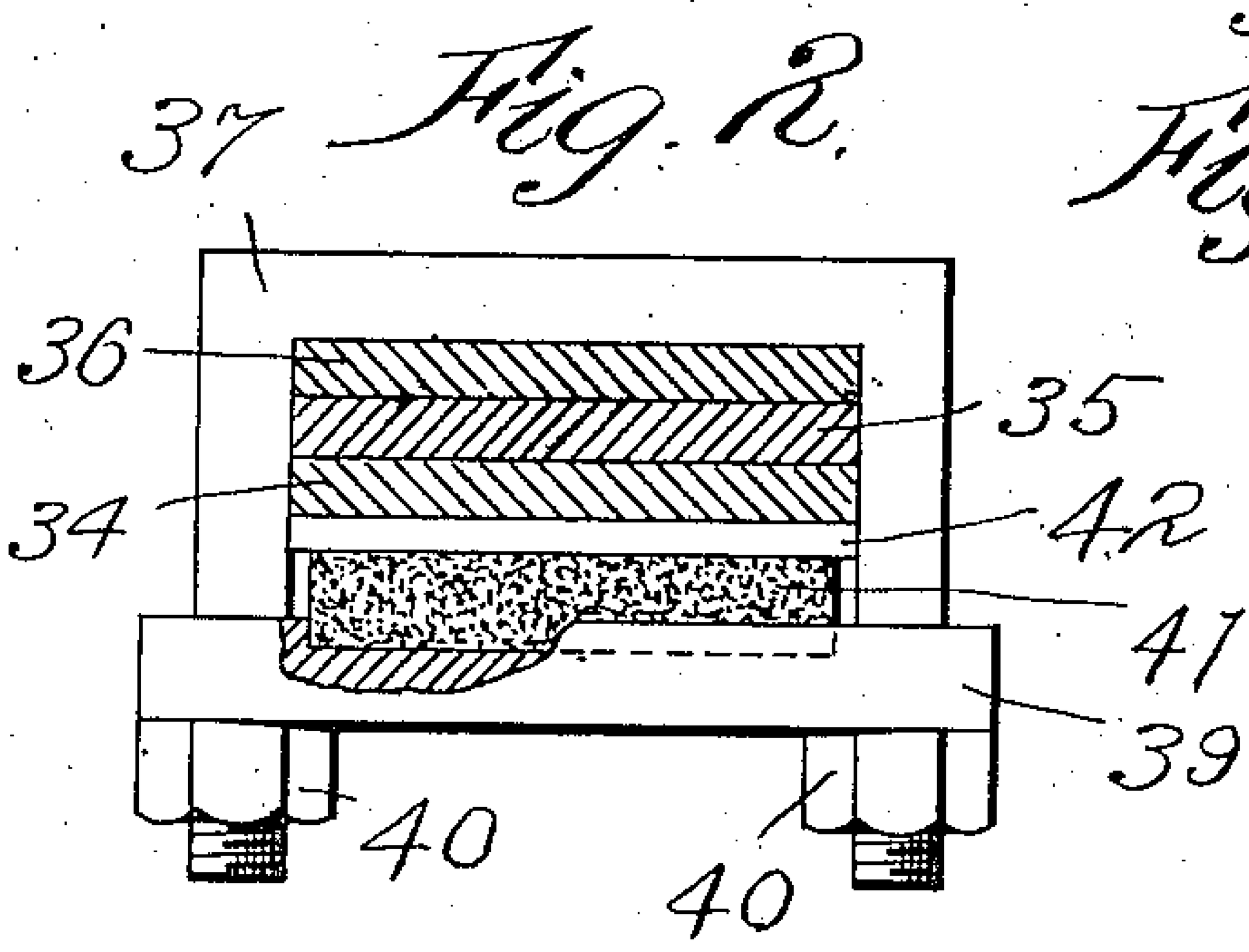


Fig. 4

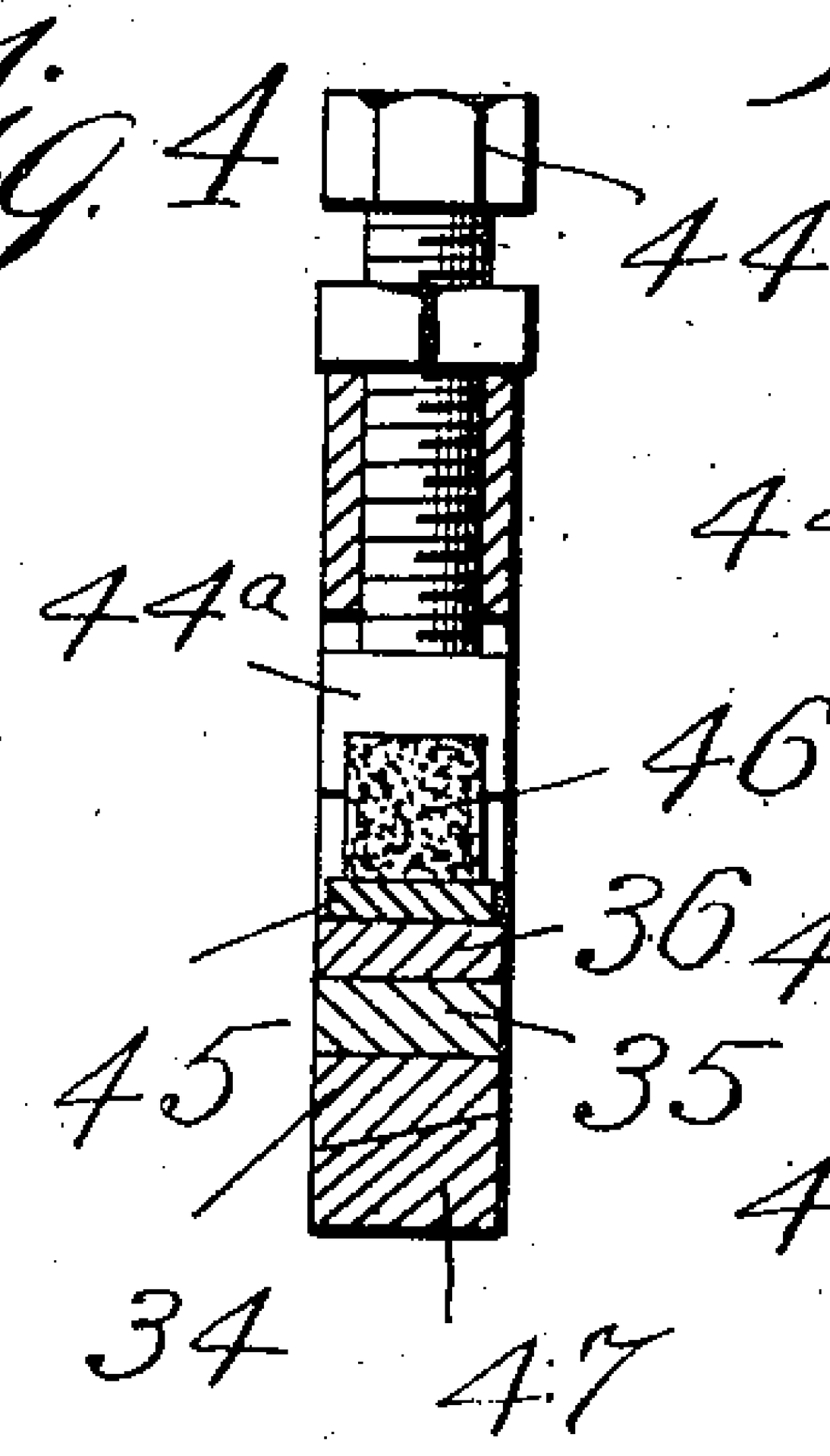


Fig. 3.

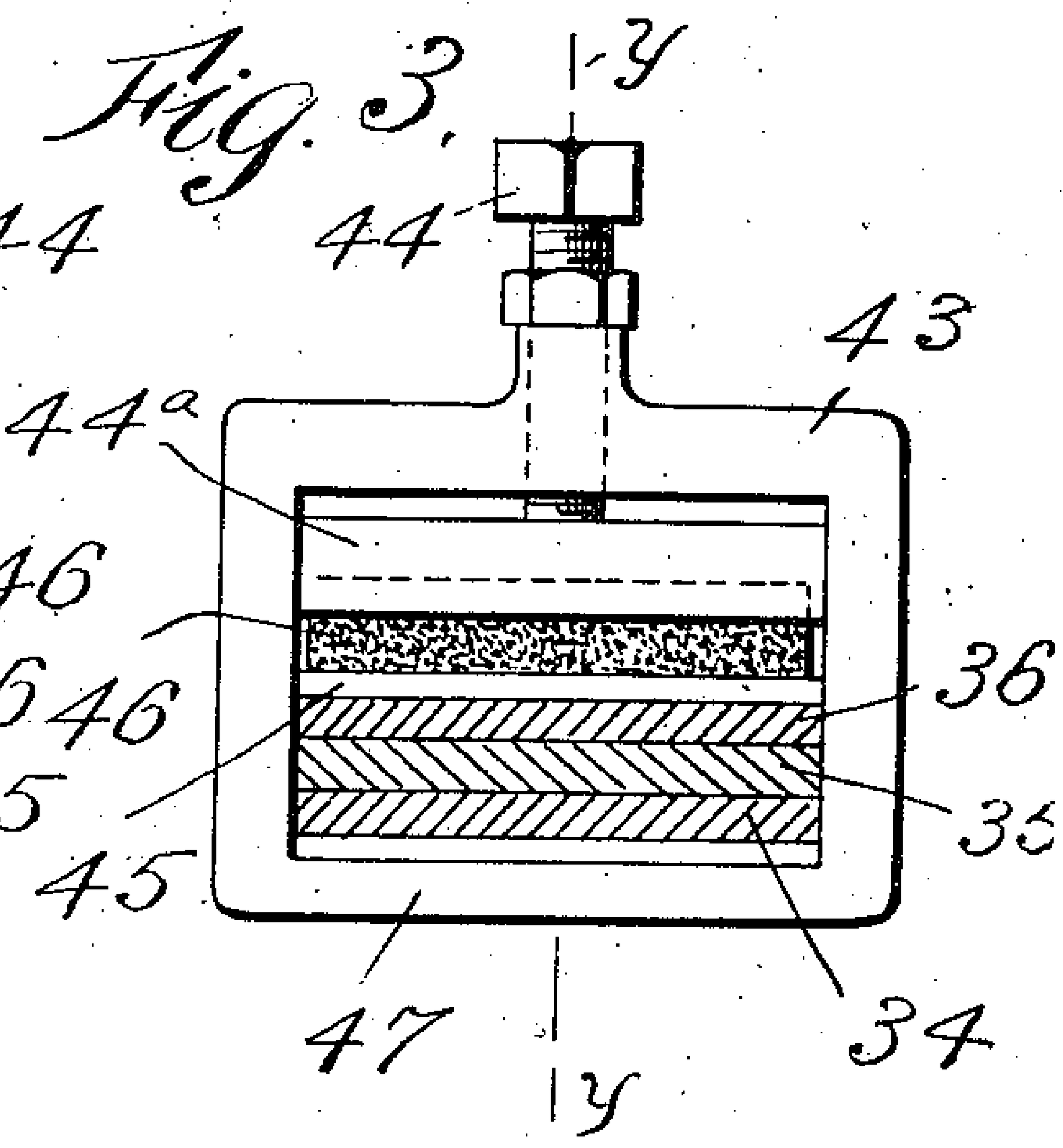


Fig. 5.

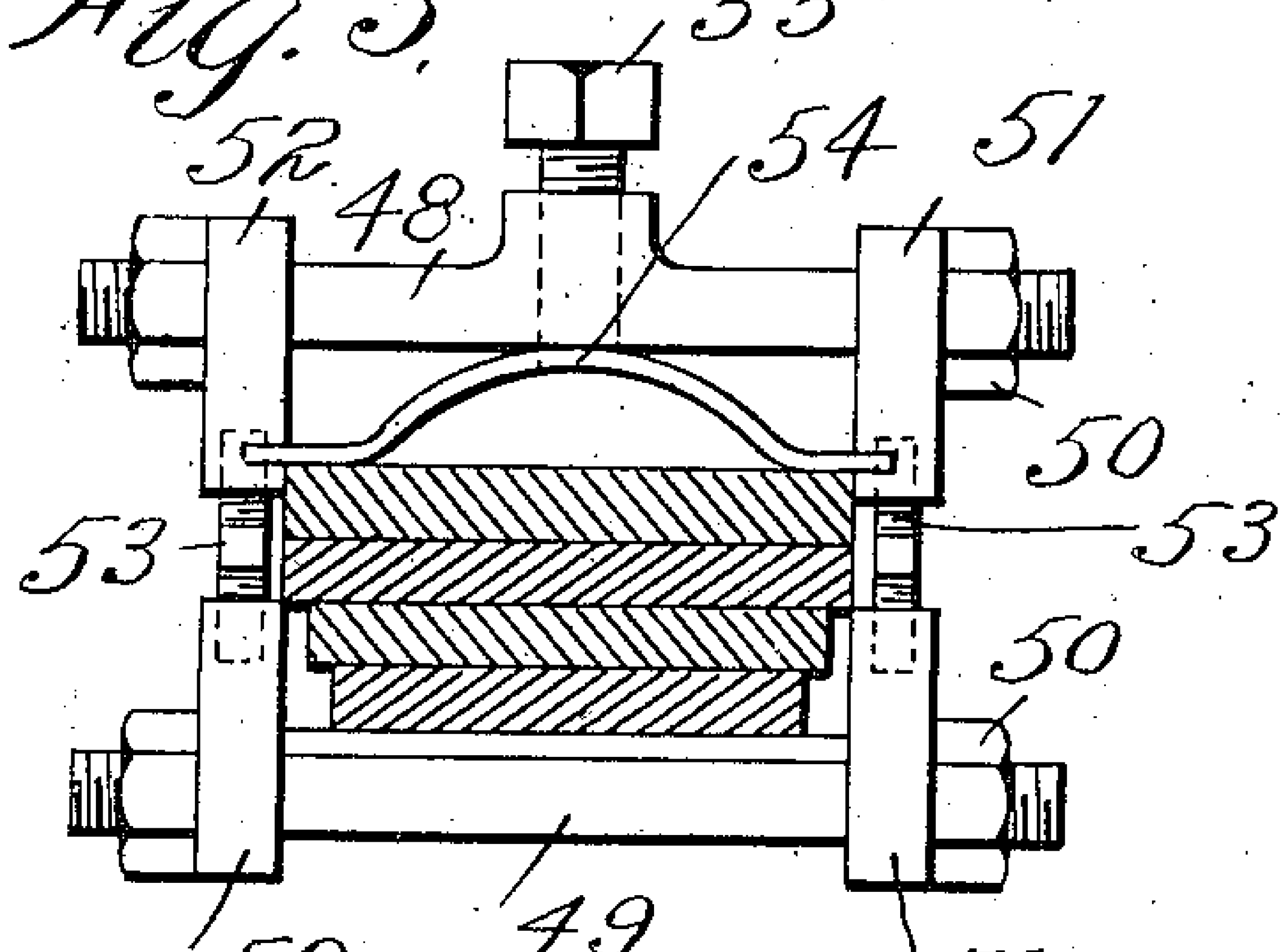


Fig. 6

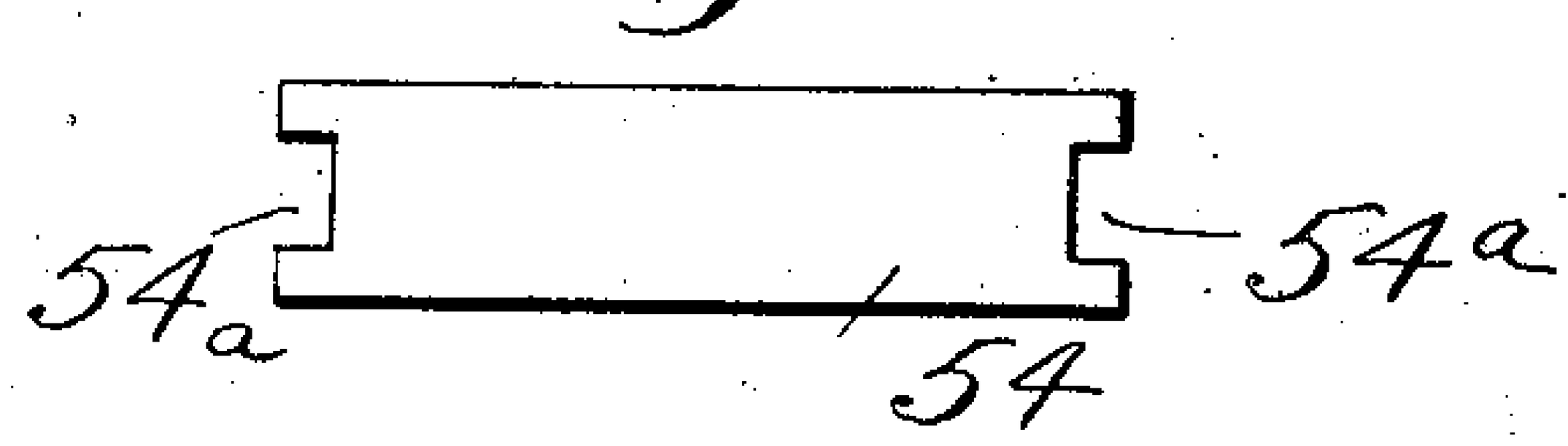


Fig. 7.

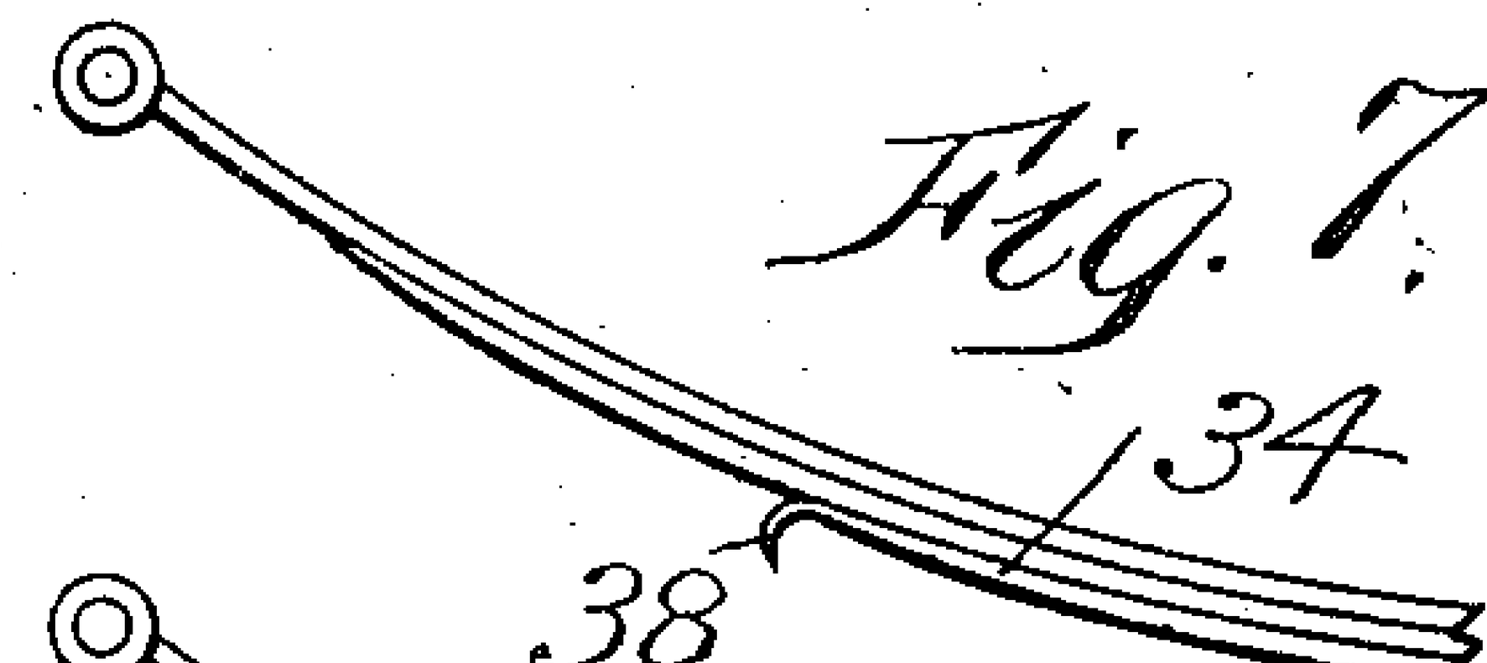
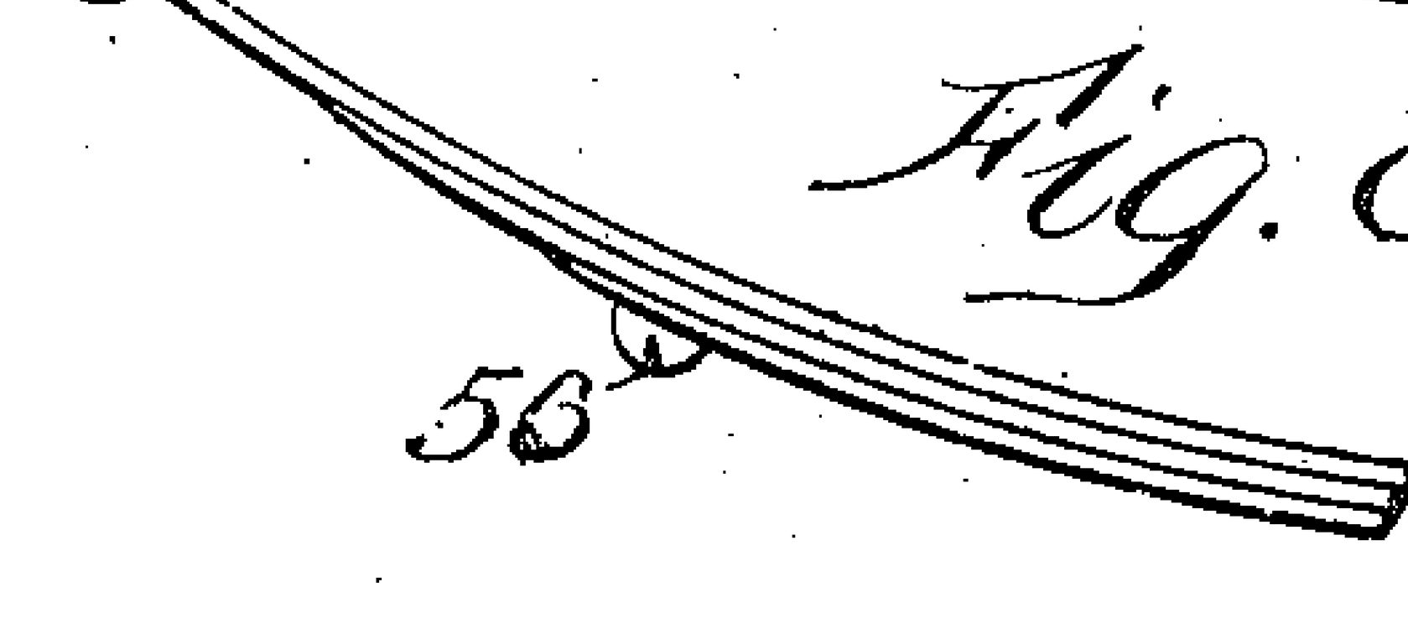


Fig. 8.



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CHARLES A. LIEB, OF NEW YORK, N. Y.

VEHICLE-SPRING.

945,725. Specification of Letters Patent. Patented Jan. 4, 1910.

Original application filed December 10, 1906, Serial No. 347,225. Renewed August 3, 1908, Serial No. 446,778. Divided and this application filed April 27, 1909. Serial No. 492,525.

To all whom it may concern:

Be it known that I, CHARLES A. LIEB, a citizen of the United States, and residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Vehicle-Springs, of which the following is a full and clear specification, the novelties of the invention being more particularly pointed out in the annexed claims.

My invention relates to an improvement in vehicle springs of the character shown and described in my application Serial No. 347,225 filed December 10th, 1906 and renewed on August 3rd, 1908 Serial No. 446,778, of which the present application is a divisional application.

In said above mentioned application, means are illustrated and described for automatically increasing the strength of a spring or its resistance to deflection as the spring is deflected in one or both directions from its normal position by reason of increased weight or pressure being applied to the spring, or by the rebound of the latter. The invention is especially applicable when a large increase of weight or pressure is suddenly applied, tending to very quickly deflect the spring, and also when such pressure is suddenly relieved, to prevent the sudden reaction or rebound of the supporting member.

My invention may be applied to advantage in any instance where it is desired to support a member upon springs, and it is particularly adapted to vehicles of all kinds, whether they run on rails, as cars or locomotives, or whether they are vehicles running on an ordinary road or street.

In the present application I have particularly described and covered by the claims the modifications illustrated in said above application in Figures 5 to 12 inclusive in which the resistance of the spring against deflection is increased by the relative movement of the spring leaves upon each other when the spring is deflected. I have illustrated in the accompanying drawings these modifications, in which—

Fig. 1 is a side elevation of a semi-elliptical spring attached to a supporting member or beam. Fig. 2 is an enlarged section on line *x—x* in Fig. 1. Fig. 3 is a modified form of the yoke shown in Fig. 2. Fig. 4 is a section on line *y—y* in Fig. 3. Fig. 5 is another modification of the form shown in Fig. 2. Fig. 6 is a plan view of the spring shown in Fig. 5, and Fig. 7 is a detail view of the construction shown in Fig. 1. Fig. 8 is a modification of the structure shown in Fig. 7.

In Fig. 1, the support B is connected with axle 5 by a semi-elliptical spring S comprising the five leaves 32, 33–36. A yoke 37 surrounds the spring adjacent each end of leaf 34 which is provided with a flaring end 38 to limit the movement of the yoke member. The yoke 37 which is illustrated in Fig. 2 in side elevation in larger scale, is provided with a bar 39 held in place by clamp nuts 40 in the threaded ends of the yoke. Means for increasing the resistance against the spring leaves moving upon each other when the spring is deflected are provided in the form of a resilient member. As will be seen from Fig. 2, a block 41 of resilient material such as leather or rubber is provided with a covering plate 42 between the block and leaf 34. The tapered form of the leaves will serve as an additional means to increase their pressure upon each other produced by the yoke when the spring is deflected downwardly.

A slight modification of the yoke member is shown in Figs. 3 and 4 in which instead of an open yoke closed by a cross bar as shown in Fig. 2, a closed frame 43 is provided with adjusting screw 44 engaging a bearing block 44^a, within which the resilient material 46 is disposed. A covering plate 45 is likewise interposed as shown in Fig. 2, between the resilient material and the springs 34, 35 and 36. If desired, the lower portion 47 of frame 43 may be provided with an inclined inner face to properly engage the tapering blades as shown in Fig. 4.

In Fig. 5, a further slight modification of the form of yoke shown in Fig. 2 is illustrated, which comprises the top and bottom members 48 and 49 having threaded ends with adjusting nuts 50 for laterally adjusting the side members 51 and 52 so as to accommodate the yoke to the various widths of leaves. The side members 51 and 52 consist each of two blocks 51—51, 52—52 having threaded bores to receive a bolt 53, the ends of which are oppositely threaded so that by rotating the bolt, the springs on each side

may be either moved together or apart. In this modification, the resilient member is shown in the form of a bowed spring 54, the tension of which may be adjusted by screw 55 in the upper member 48 of the yoke. A spring 54 is illustrated in plan view in Fig. 6 and it will be seen that in either end of the spring is provided a recessed portion 54ª within which the side members 51 and 52 are disposed, so that the spring is prevented from moving laterally in the yoke.

Instead of having the spring leaf, near the end of which the yoke is clamped to the spring, provided with flaring ends, such as are shown at 38 in Figs. 1 and 7, a rivet 56 may be provided as shown in Fig. 8 which prevents the yoke from sliding off the end of the leaf.

While I have shown in the drawings several means for holding the clamping member in place on the springs, after they have been adjusted, as a feature for preventing the shifting in position on the spring, or the slipping off endwise of the clamping member, I do not wish to limit myself to these means shown, but I wish to emphasize that such fixing means, whatever they may be, should always form a part of my structure to render it most effective.

What I claim is:—

1. In combination with a vehicle spring comprising a plurality of leaves, a compensating clamp for holding said leaves in yielding frictional contact regardless of the direction of strain on the spring.

2. In a device of the character described, in combination with a vehicle leaf spring, adjustable yielding means on said spring tending to increase the friction of the leaves against each other to increase the resistance of said spring against movement of the vehicle body.

3. In a device of the character described, in combination with a vehicle leaf spring, a yoke embracing the leaves of said spring, yielding means within said yoke bearing against the leaves within said yoke tending to increase the friction of said leaves against each other to increase the resistance of said spring against movement of the vehicle body, and means for adjusting said yielding means.

4. In a device of the character described, in combination with a vehicle leaf spring, a yoke embracing a plurality of leaves of said spring, yielding means within said yoke bearing against the leaves within said yoke and tending to increase the friction of said leaves against each other to increase the resistance of said spring against movement of the vehicle body, and means for adjusting said yielding means.

5. In a device of the character described, in combination with a vehicle leaf spring, a yoke embracing a plurality of leaves of said spring, resilient material within said yoke bearing against the leaves within said yoke and tending to increase the friction of said leaves against each other to increase the resistance of said spring against movement of the vehicle body, means for adjusting the pressure of said material against said leaves.

6. In combination with a vehicle spring comprising a plurality of leaves tapered toward their ends, a compensating clamp for holding said leaves in frictional contact, resilient material within said clamp bearing against said leaves and tending to increase the friction of said leaves when the spring is forced from its normal into compression position, said clamp and said resilient means adapted to also hold said leaves in frictional contact when the spring is forced from its normal position into a position contrary to compression, and means for adjusting the friction of said material.

7. In a device of the character described, in combination with a vehicle leaf spring, adjustable yielding means on said spring tending to increase the friction of the leaves against each other to increase the resistance of said spring against movement of the vehicle body, and means for holding said increasing means in place on said spring.

8. In a device of the character described, in combination with a vehicle leaf spring, a yoke embracing the leaves of said spring, yielding means within said yoke bearing against the leaves within said yoke tending to increase the friction of said leaves against each other to increase the resistance of said spring against movement of the vehicle body, and means for adjusting said yielding means and for holding said yoke in place on said spring after it has been adjusted.

9. In a device of the character described, in combination with a vehicle leaf spring, a yoke embracing a plurality of leaves of said spring, yielding means within said yoke bearing against the leaves within said yoke and tending to increase the friction of said leaves against each other to increase the resistance of said spring against movement of the vehicle body, and means for adjusting said yielding means and for holding said yoke in place on said spring after it has been adjusted.

10. In a device of the character described, in combination with a vehicle leaf spring, a yoke embracing a plurality of leaves of said spring, resilient material within said yoke bearing against the leaves within said yoke and tending to increase the friction of said leaves against each other to increase the resistance of said spring against movement of the vehicle body, means for adjusting the pressure of said material against said leaves,

and means on one of said leaves for holding said yoke in place on said spring after it has been adjusted.

11. In a combination with a vehicle spring comprising a plurality of leaves tapered toward their ends, a compensating clamp for holding said leaves in frictional contact, resilient material within said clamp bearing against said leaves and tending to increase the friction of said leaves when the spring is forced from its normal into compression position, said clamp and said resilient means adapted to also hold said leaves in frictional contact when the spring is forced from its normal position into a position contrary to compression, and means for adjusting the friction of said material and for holding the clamp in position on said leaves.

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