

Nov. 17, 1953

E. O. HERMAN
ADJUSTABLE BRACE

2,659,319

Filed Nov. 28, 1949

4 Sheets-Sheet 1

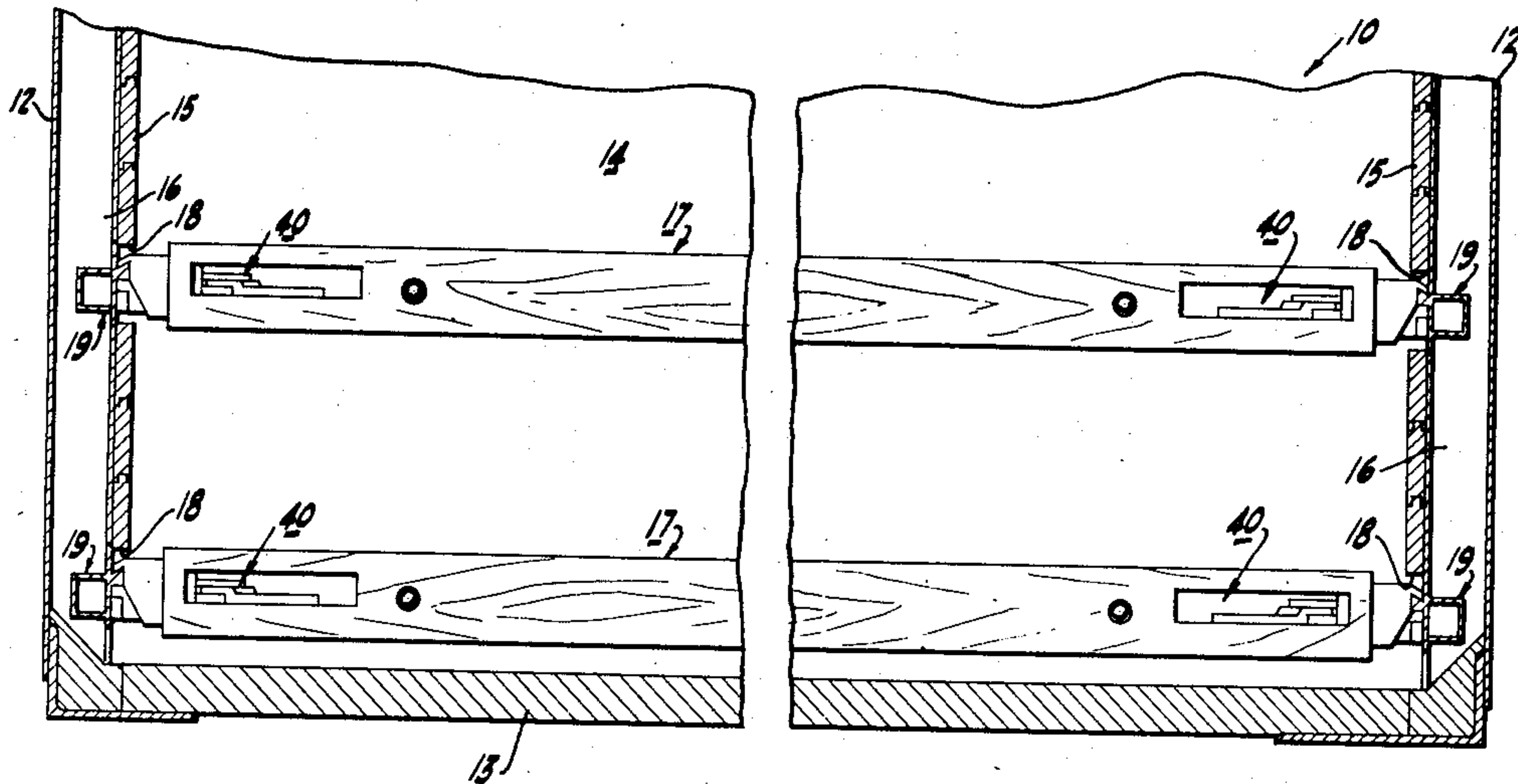


FIG. 1

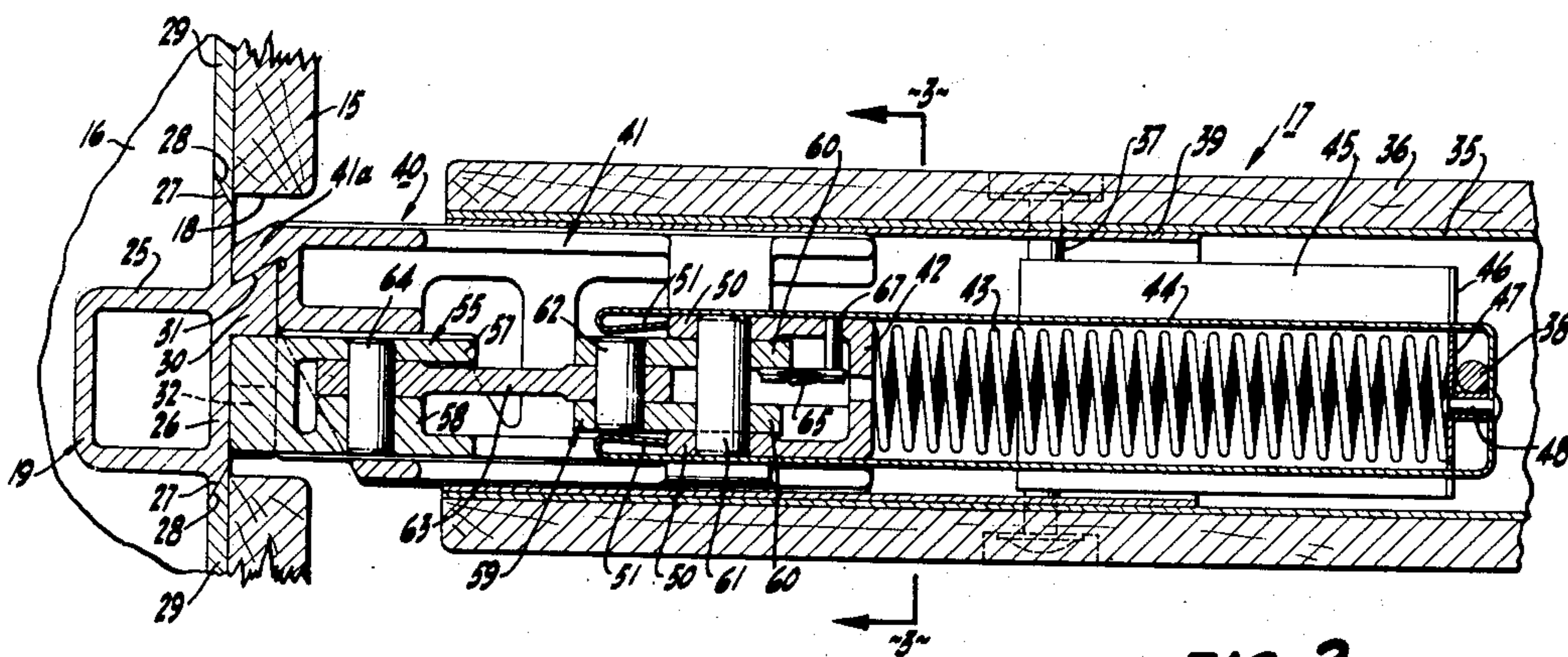


FIG. 2

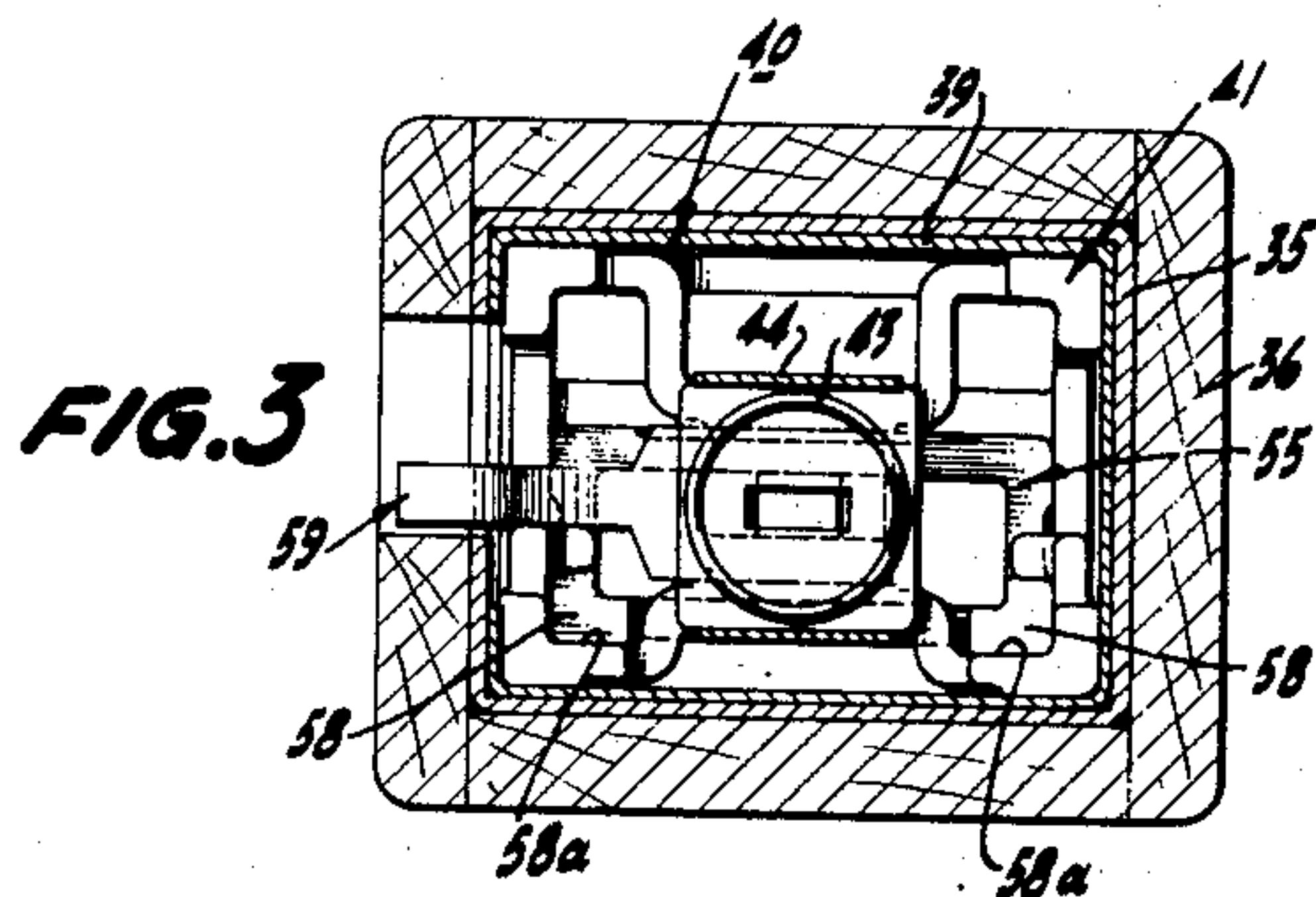


FIG. 3

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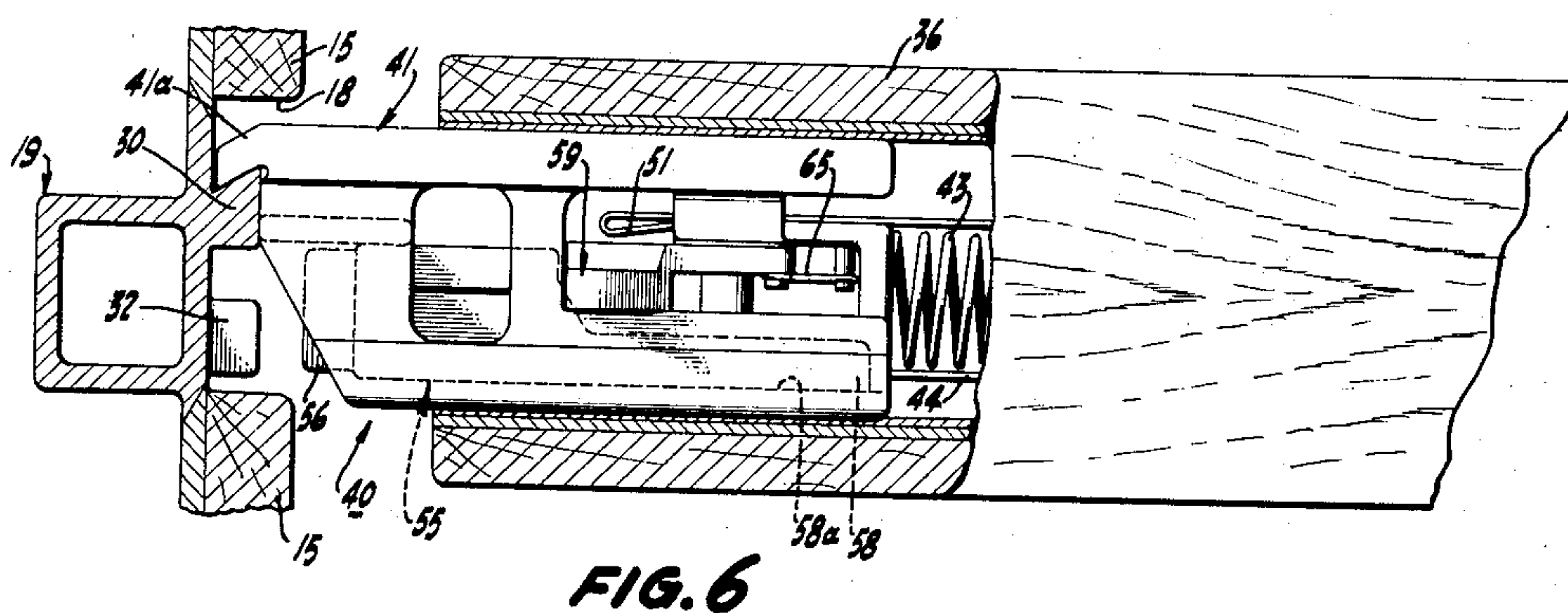
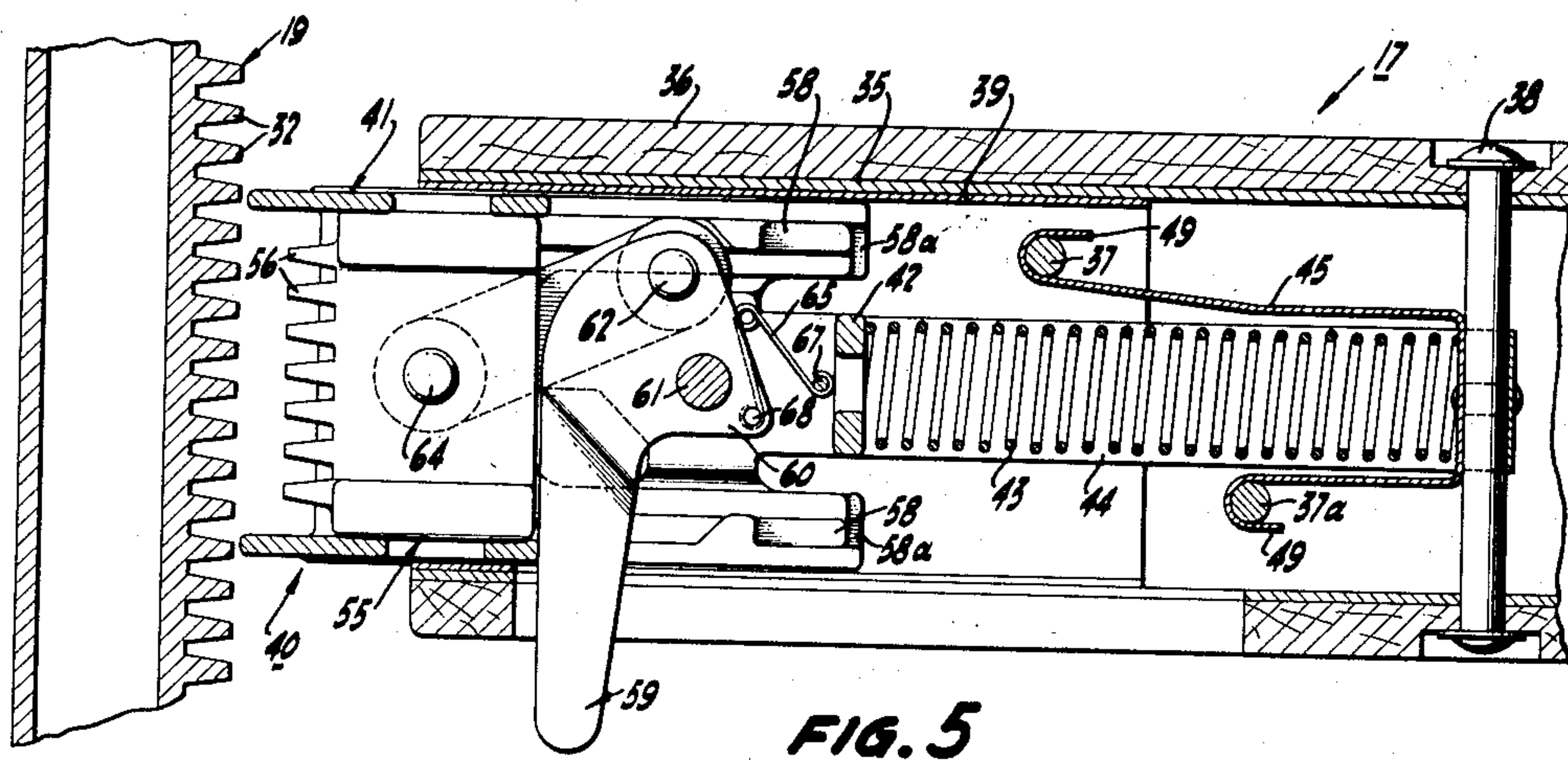
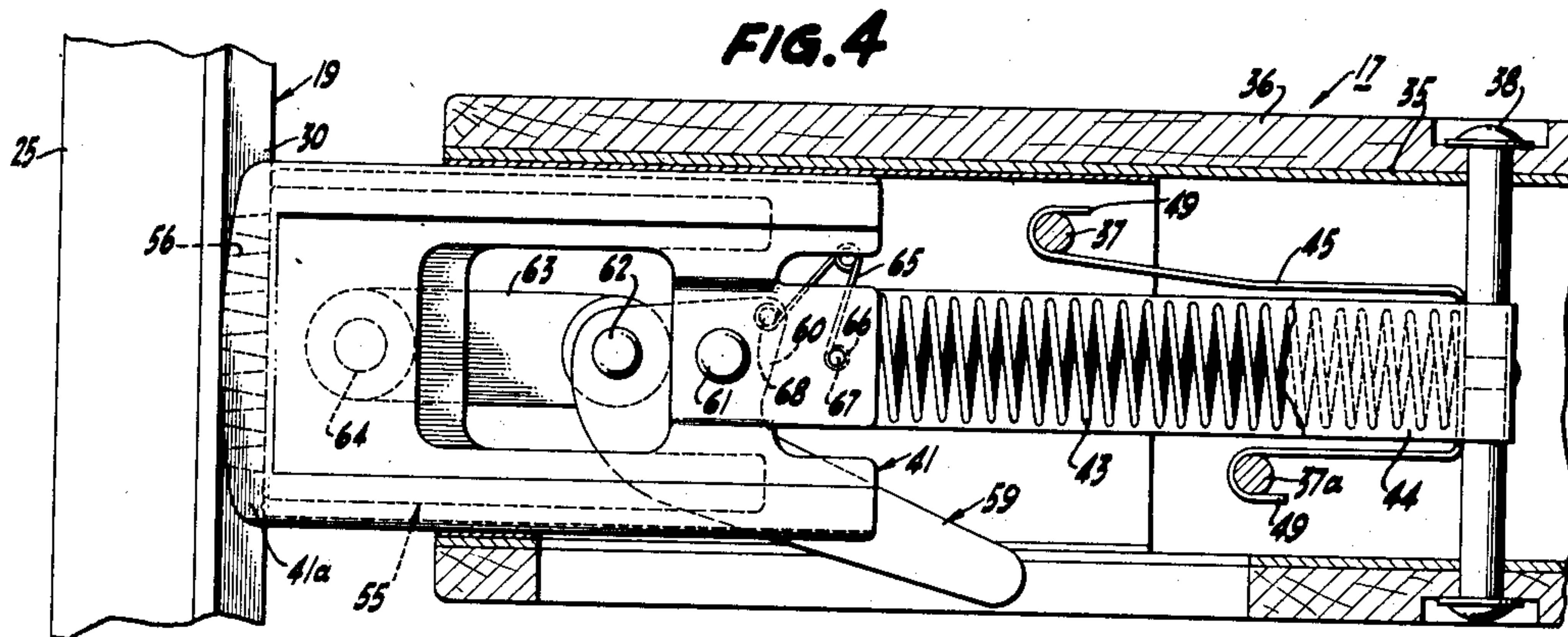
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FIG. 7

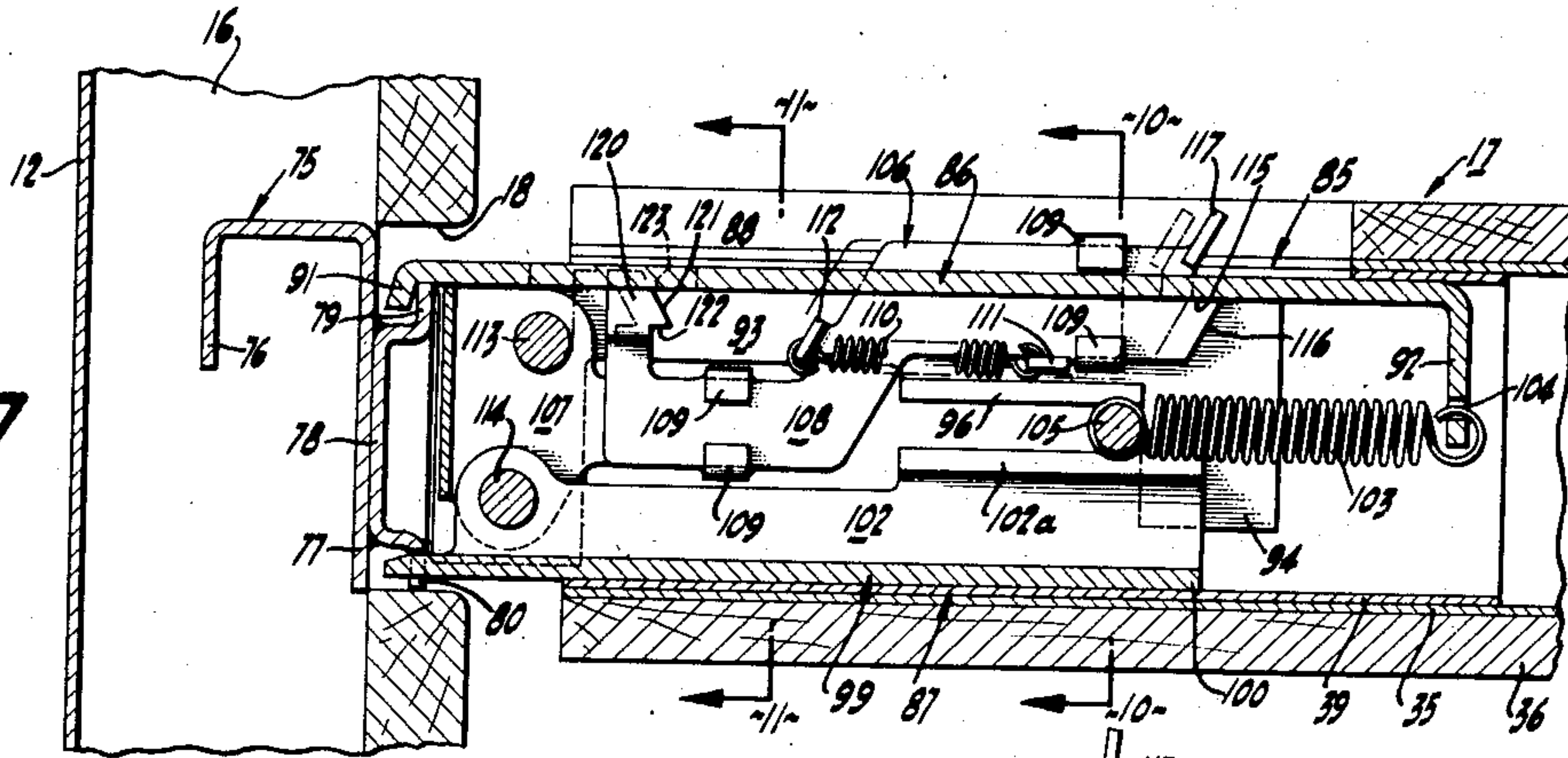


FIG. 8

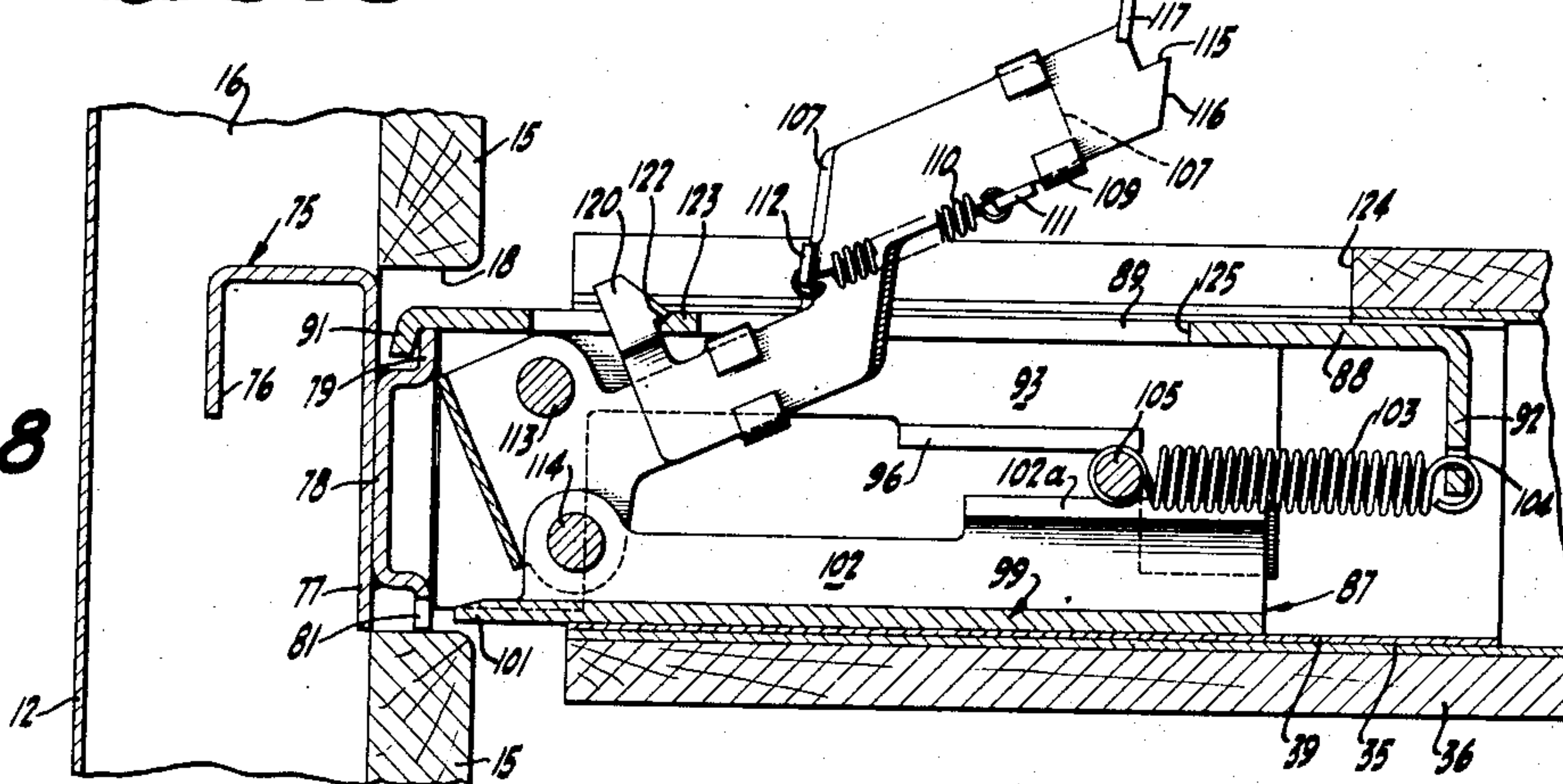
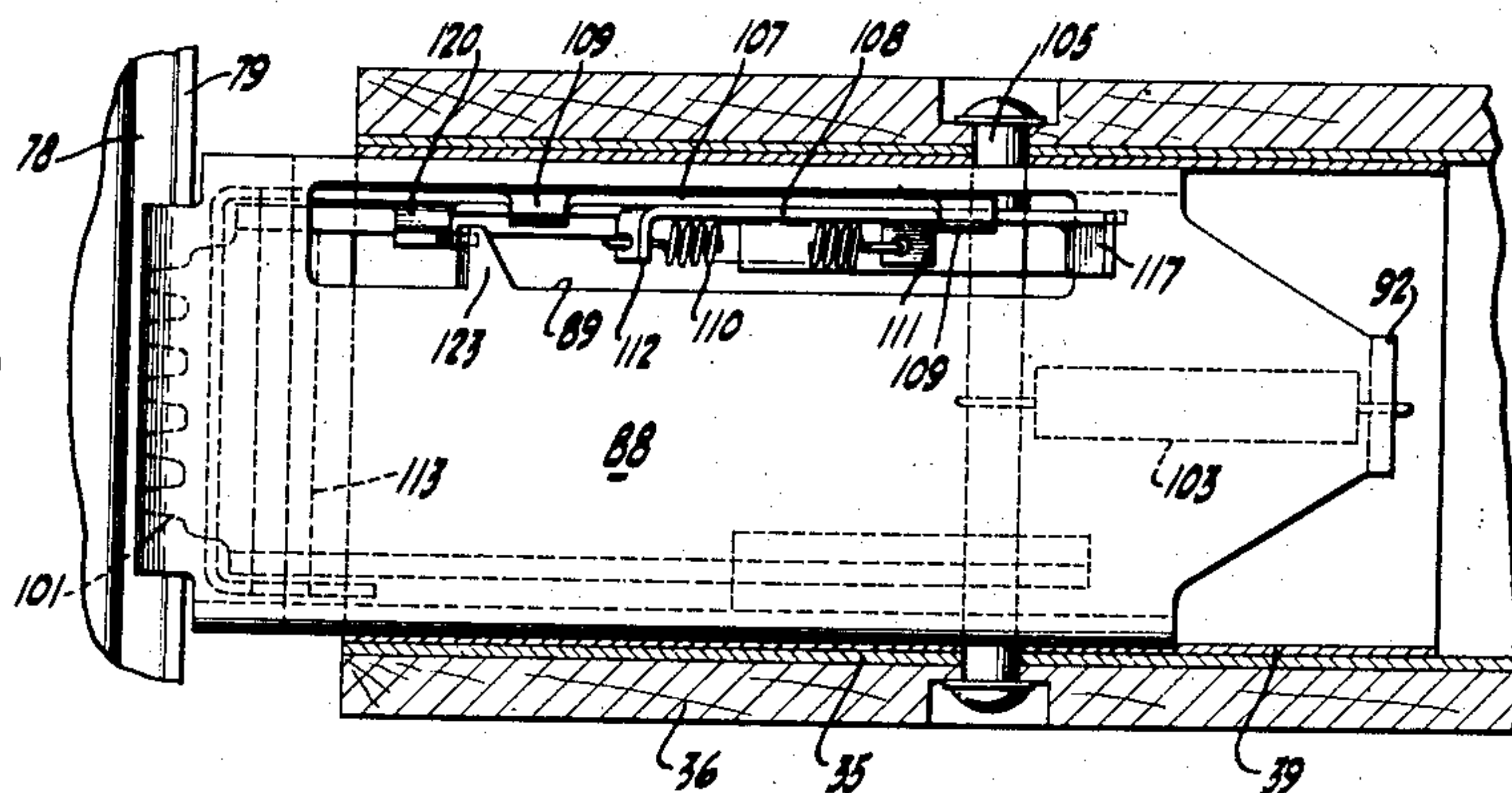


FIG. 9



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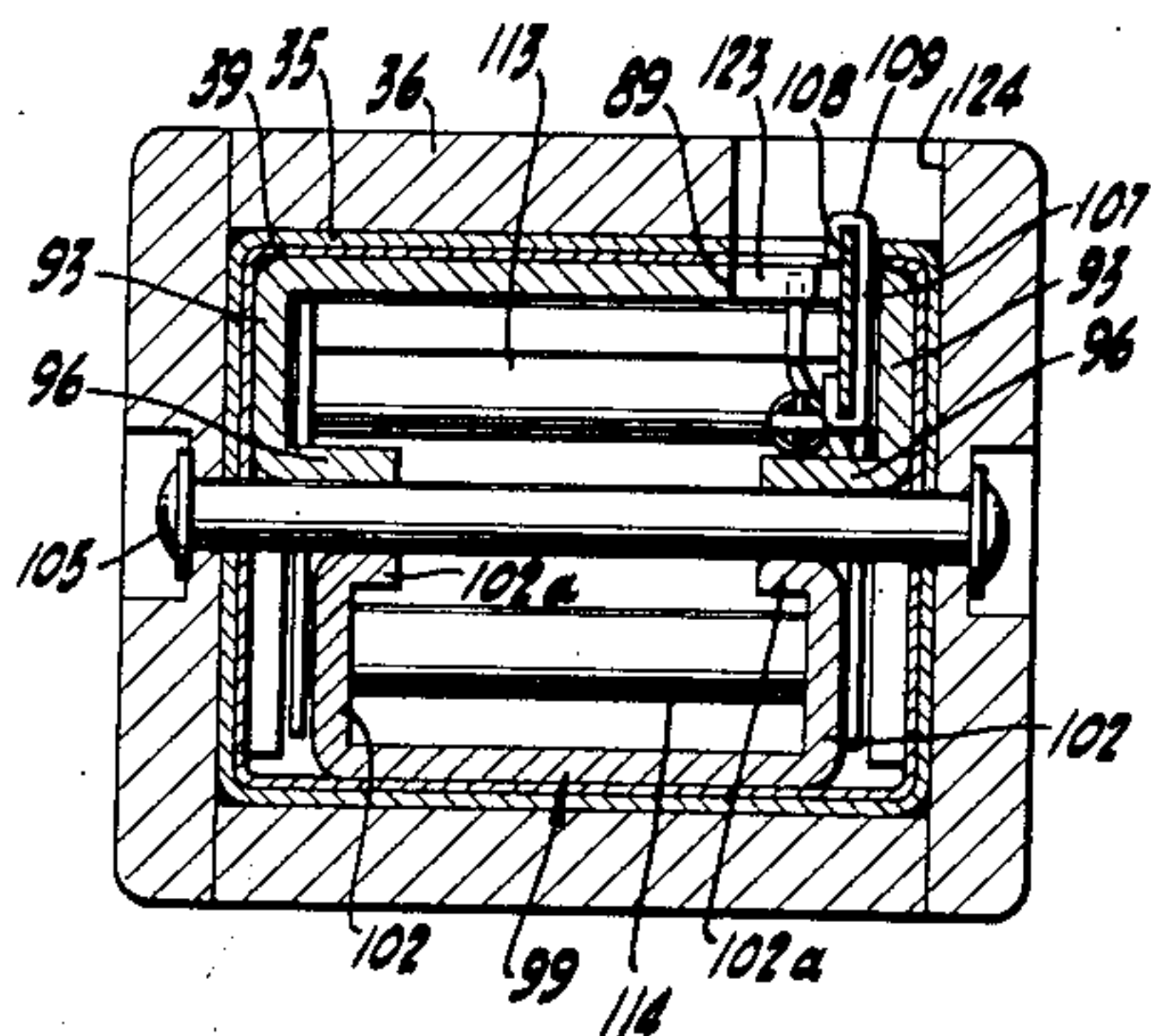


FIG. 10

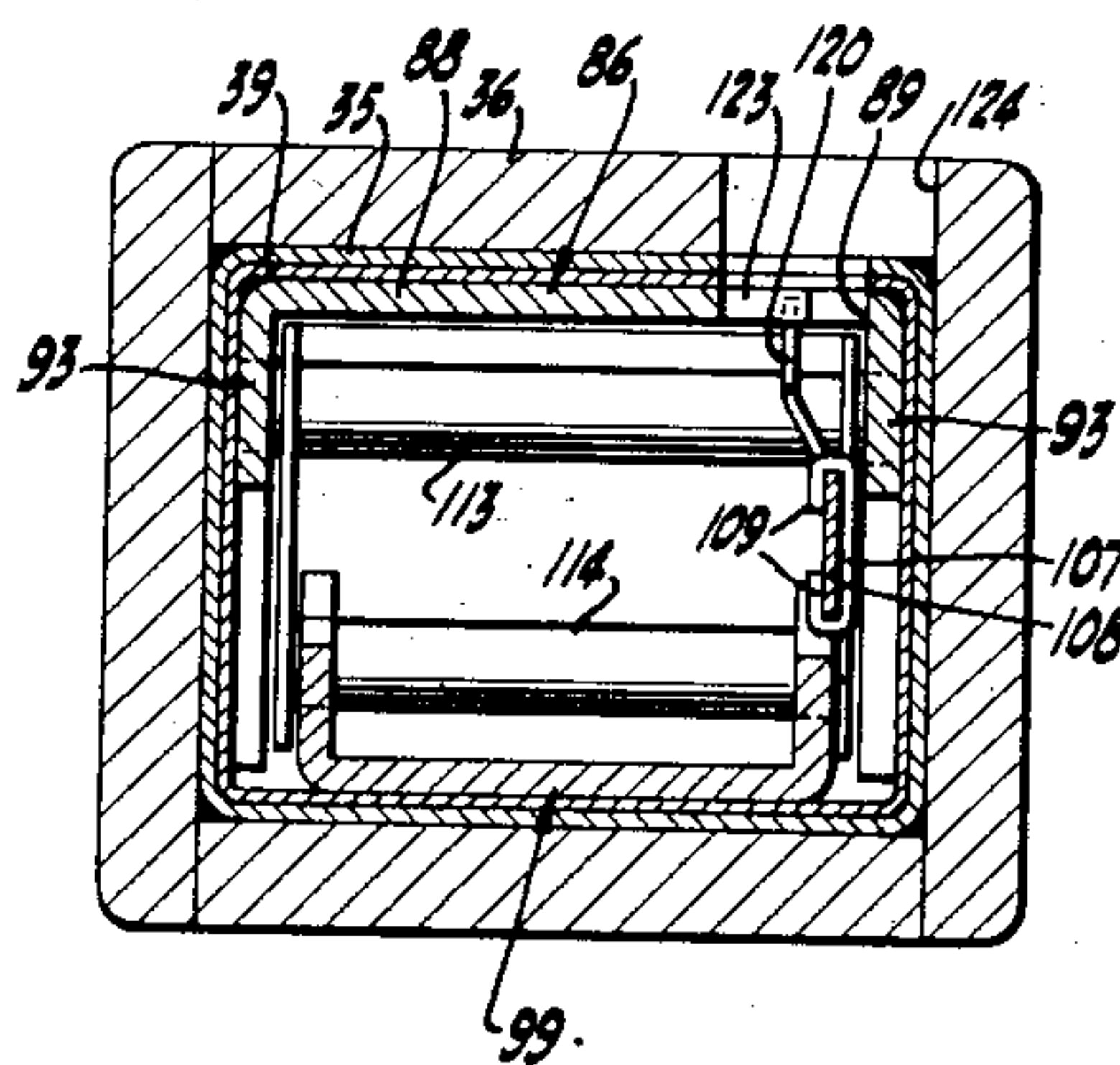


FIG. 11

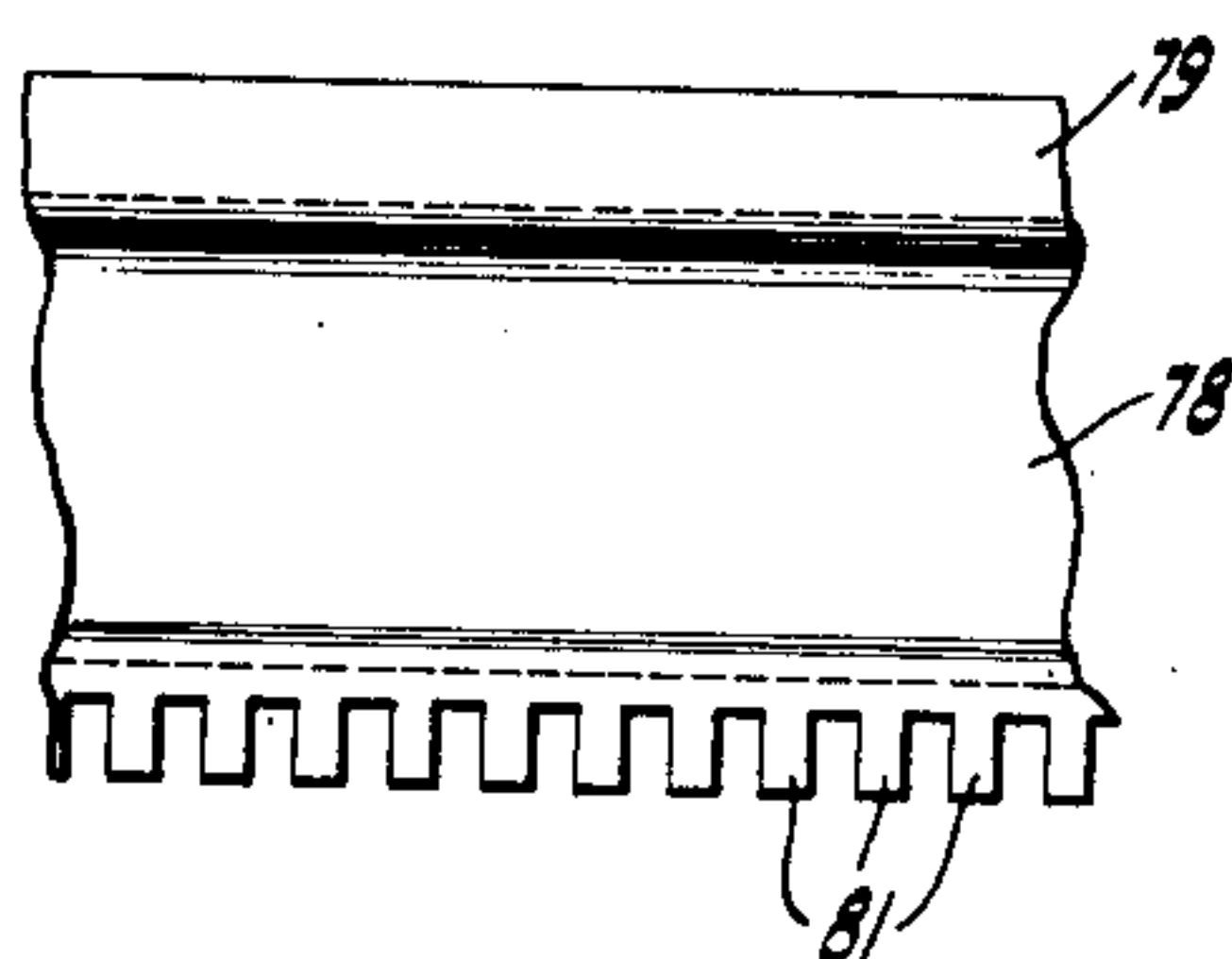


FIG. 12

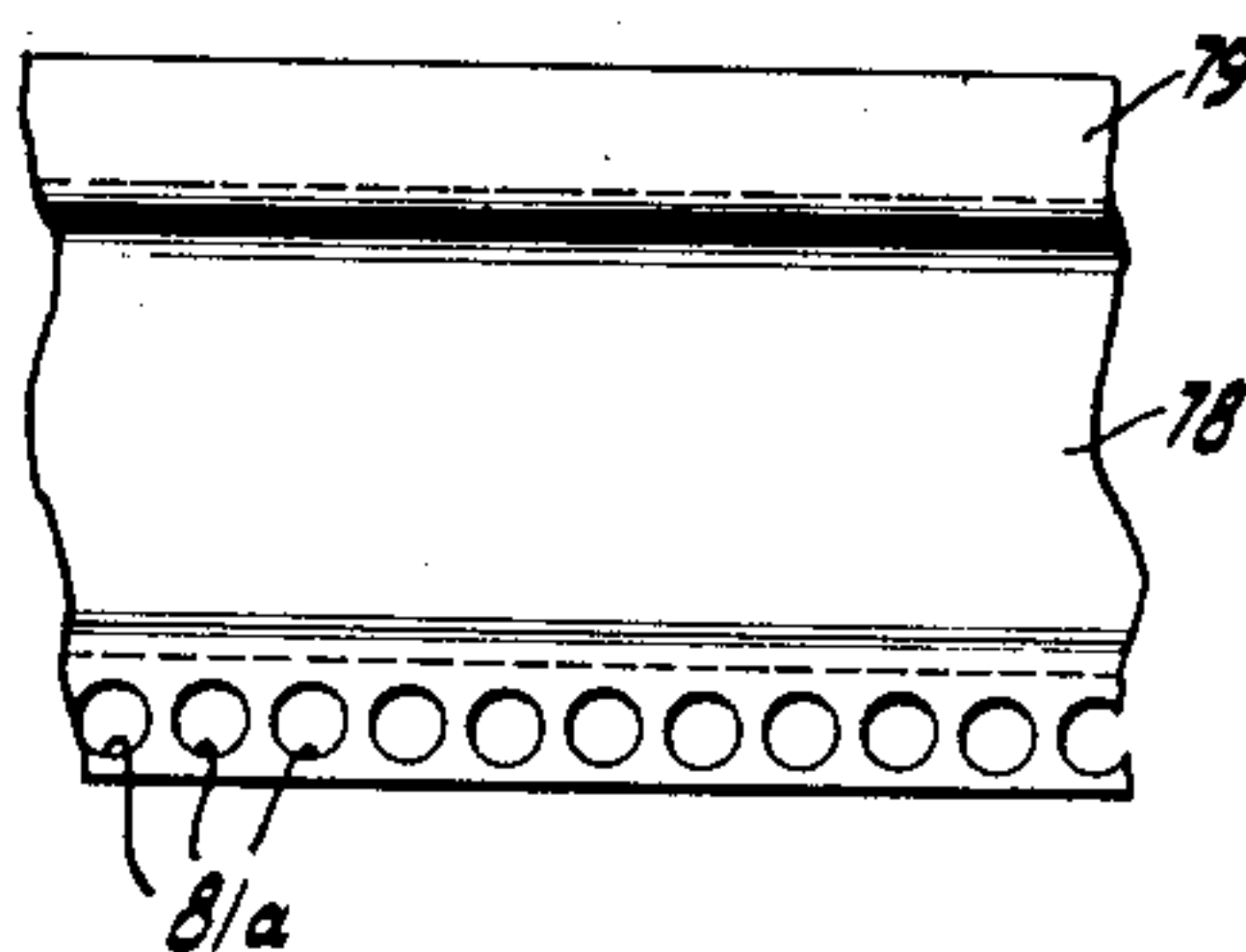


FIG. 13

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UNITED STATES PATENT OFFICE

2,659,319

ADJUSTABLE BRACE

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Application November 28, 1949, Serial No. 129,832

5 Claims. (Cl. 105—369)

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This invention relates to an adjustable brace or beam for employment in railway boxcars, van type highway trucks and the like, to brace the cargo or support platforms or decks in the boxcar or truck. It also relates to a novel type of track for supporting the braces.

In my Patents Nos. 2,354,861 entitled "Cargo Brace for Freight Vehicles" granted August 1, 1944, and 2,425,875 entitled "Cargo Brace" granted August 19, 1947, there are shown two types of adjustable brace and co-operable track means for employment in freight cars, van type trucks and the like. By these means the lading can be braced against endwise shifting in the vehicle, or temporary platforms or decks can be erected to carry portions of the lading, or, when arranged in the same vertical plane, the braces subdivide the load into separate units according to the character of the commodity or destination.

It is an object of the present invention to provide an improved form of adjustable brace or beam of the general character described in my above mentioned patents.

It is a further object of the invention to provide an adjustable brace of the character described which permits closer adjustment, which has simpler and safer locking means and which is generally of simpler design and lends itself more readily to fabrication from extruded or stamped parts.

More specifically, it is the object of this invention to provide a cargo bracing mechanism for freight vehicles wherein a pair of opposed horizontal beams are mounted on the opposed walls of a freight vehicle, these beams being provided with bearing surfaces for the ends of a bracing bar and with serrations for interdigitation with mating fingers or serrations slidably mounted on the ends of the bracing member and wherein said mating fingers or serrations can be selectively moved from retracted unlocked positions to extended locked positions by spring biased lever operated toggle links cooperatively connected to said fingers.

These and other objects of the invention will be apparent from the ensuing description and the appended claims.

The invention is exemplified in the following description and illustrated by way of example in the accompanying drawings in which:

Fig. 1 is a fragmentary, vertical transverse section taken through a freight car showing two of the adjustable brace members of the invention in operative position;

Fig. 2 is a fragmentary longitudinal section through one end of a brace member;

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Fig. 3 is a transverse section taken along the line 3—3 of Fig. 2;

Fig. 4 is a view partly in horizontal section and partly in top plan of one end of the brace member of Figs. 2 and 3;

Fig. 5 is a view generally similar to that of Fig. 4 but showing the parts in different operative positions;

Fig. 6 is a view generally similar to that of Fig. 2 but showing the latch member disengaged.

Fig. 7 is a vertical longitudinal section through one end of an adjustable brace constituting another embodiment of the invention;

Fig. 8 is a view similar to that of Fig. 7 but showing the latch member disengaged;

Fig. 9 is a view partly in horizontal section and partly in top plan showing the parts in the positions of Fig. 7;

Fig. 10 is a transverse section taken along the line 10—10 of Fig. 7;

Fig. 11 is a transverse section taken along the line 11—11 of Fig. 7;

Figs. 12 and 13 are fragmentary elevational views of two different forms of track to be employed in conjunction with the brace of Fig. 7.

Referring now to Figs. 1 to 6 and more particularly to Figs. 1 and 2, a freight car generally designated as 10 is illustrated in fragmentary, vertical transverse section, the said freight car having side walls 12, a floor 13, and an end wall 14. The car is also provided with the usual wooden lining 15 and the usual vertical posts 16 which serve to brace the lining 15 and to space it from the outer walls 12. Two adjustable brace members 17 are shown in Fig. 1, these being located in the same vertical plane but at different levels. It will be understood that any desired number of braces 17 will be provided as necessary, as many being located at selected levels as may be required. Planks or other suitable means (not shown) may be laid over the brace members 17 to provide a horizontal deck or decks to support portions of the lading. Alternatively, planks may be laid against two or more brace members 17 arranged in a vertical plane, to subdivide the load or prevent endwise shifting. The brace members 17 may also be used to brace or support a load directly.

Referring now more particularly to Fig. 2, it will be seen that the wooden lining 15 is formed on both sides of the car with longitudinal grooves or channels 18, the said channels being arranged in pairs on opposite sides of the car, each pair being in the same plane and there being as many pairs as may be desired. Track member 19 is provided which is preferably an extruded alumi-

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num alloy. It comprises a longitudinally extended channel portion 25 of square section which is suitably recessed at intervals to receive the posts 16. Each track member 19 is mounted in registry with a channel 18 by means of a face plate 26 having tapered edges 27 which seat against tapered edges 28 formed in retainer members or plates 29 which are fixed to the posts 16 by any suitable means (not shown).

As is also shown in Fig. 2, each track member 19 is formed with a track 30 extending the length of the track member 19, the track 30 being formed with an inwardly and downwardly tapering surface 31 which is spaced somewhat below the upper edge of the channel 18. The track member 19 is also formed near the bottom of the channel 18 with teeth or serrations 32 forming a rack and which are spaced somewhat below the track 30. As will be apparent the track 30 and teeth 32 are spaced outwardly from the inner face of the wooden lining 15 so that these metal parts cannot come into contact with the lading.

The brace member 17 is formed by a rectangular metal hollow beam 35 and it is faced with a wood lining 36 which is fixed thereto as by means of countersunk pins 37 and 38. The beam 35 provides adequate mechanical strength and the provision of a wood lining and countersinking the assembly pins prevent contact between the lading and any metal members.

At each end of the beam 35 there is provided a metal sleeve 39 having a machined or other suitable anti-frictional interior surface to slidably receive a locking assembly 40. The locking assembly 40 comprises a main cast casing 41 of generally rectangular tubular construction and it is formed at its forward end with a hook or track engaging bearing member, lip or 41a to seat upon and slidably engage the track 30. At its rearward end the casing 41 is formed with an upstanding abutment member 42 to bear against one end of an expansion spring 43. The expansion spring 43 is received within a U-shaped retainer member 44 whose closed inner end abuts the pin 38 which thereby prevents outward displacement of the retainer. The retainer member 44 is interlocked with another U-shaped retainer member 45 which is disposed at right angles thereto, and the member 45 is recessed at 46 to receive the retainer member 44 and to interlock therewith as is illustrated in Fig. 2. As will be seen, the retainer member 45 provides an abutment surface 47 for the rear or inner end of the expansion spring 43, and the two retainer members 44 and 45 are fixed together by means of a rivet 48. At its forward or outer end the retainer member 45 is fixed to pins 37 and 37a as at 49.

It will be apparent that the expansion spring 43 will urge the locking assembly 40 outwardly thus retaining the hook 41a firmly in engagement with the track 30. The several parts are held in properly aligned position, and inadvertent or accidental removal of the locking assembly 40 is prevented, by in-turned flanges 51 formed on the retainer 44 which bear against forward portions or wings 50 of the abutment member 42. To disassemble the several parts, it is necessary only to remove the pins 37, 37a and 38 and to pull out the locking assembly 40 and the sleeve 39. Assembly of the several parts is reversely and simply accomplished and the parts are fixed in properly assembled relationship by means of the pins 37, 37a and 38.

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A latch member 55 is provided which, like the main casting 41 of the locking assembly 40, is itself a cast article. The latch 55 is formed at its forward end with teeth, fingers or detents 56 to mesh with the teeth 32 formed on the track member 19 (see Figs. 4 and 5). The latch 55 is bifurcated rearwardly of the teeth 56 to provide a rearwardly extending upper arm 57 and rearwardly extending lower arms 58. The latter arms 58 extend rearwardly a considerable distance and are guided by tracks 58a formed in the casting 40.

The latch 55 is operated by means of a bell crank lever 59 which is bifurcated to provide upper and lower arms 60 and it is fulcrumed on a stud 61 passing through the arms 60 and received in the forwardly extending arms 50 of the abutment member 42. The lever 59 is pivotally connected at 62 to one end of a link 63 the other end of which is rotatable on a pin 64 extending through and received within the arms 57 and 58 of the latch 55, thus providing a toggle joint. A torsion spring 65 is provided which is fixed at 66 to a pin 67 fixed to the abutment member 42 and at 68 to the lever 59. It will be seen from an inspection of Figs. 4 and 5 that the relationship between the anchor points 67 and 68 and the axis of the pivot stud 61 are such that the spring 65 opposes movement of the lever from left to right or from right to left, thus operating to retain the latch 55 in either the advanced, latched position shown in Fig. 4 or the retracted, unlatched position shown in Fig. 5.

To manipulate a brace 17 the latches 55 at both ends of the brace are first retracted by means of the levers 59 to the positions shown in Figs. 5 and 6. The clearance provided between the upper edge of the channel 18 and the track 30 suffices to allow insertion of the hooks 41a in the channels to seat them on the tracks as shown in Figs. 1 and 2. The hooks 41a ride freely on the tracks 30; therefore the brace 17 can be pushed longitudinally of the freight car to the desired position. Then the lever 59 will be moved counter-clockwise from the position shown in Fig. 5 to the position shown in Fig. 4, thereby engaging the teeth 56 of the latches 55 with the teeth 32 of the track members 19, thus securely locking the brace 17 in selected longitudinal position. The expansion springs 43 will, of course, operate to hold the locking assembly 40 in firm locking engagement with the track 30 and the springs 65 will operate to hold the latches 55 in firm engagement with the track teeth 32.

It will be apparent from an inspection of Fig. 2 that a vertical load placed upon the braces 17 will be transmitted to the hooks 41a and thence to the tracks 30 while a horizontal load will be borne by the latch teeth 56 and transmitted to the track serrations 32. It will also be apparent that a displacement of hooks 41a from the tapered track surface 31 is prevented by the top surface of latch teeth 56 contacting the bottom surface of track 30. This clamps the locking assembly 40 securely to the track member 19 even if this track member or the posts 16 should be distorted.

Referring now to Figs. 7 to 12, and more particularly to Figs. 7 and 8, there is shown another embodiment of the invention. In this embodiment each brace or beam 17 is similarly formed of a metal channel member or hollow beam 35 of rectangular section which is lined on all four sides by means of a wood lining 36 and at each end the beam 35 is fitted with a machined sleeve 39, as in the case of the em-

ment illustrated in Figs. 1 to 6 and described hereinabove. A track member 75 is provided which can be fabricated by stamping as can, indeed, the operating parts of the latching and locking assembly described hereinafter.

The track 75 comprises channel shaped reinforcing members 76 extending between posts 16 and each having a longer leg 77 to which is welded a track-forming channel member 78. The channel 78 is continuous the entire length of the car walls 12 and it is secured to the posts 16 by any suitable means (not shown). Channel member 78 has an upright flange 79 to provide a track and an oppositely disposed flange 80 formed with teeth 81.

A locking assembly generally designated as 85 is provided, the said locking assembly comprising a locking member or track-engaging member 86 and a latching member 87, both of which may be stamped from sheet metal of sufficiently heavy gauge or from metal plates. The locking member 86 is of generally U-shaped cross section and it comprises a top portion 88 which is slotted at 89 and which terminates at its outer or forward end in a hook 91 for engaging the track 79. At its inner or rearward end the locking member 86 is formed with a down-turned rear portion or bracket 92 and it is also formed with side walls 93 which at their ends are integral with downwardly extending guide tabs 94. The side walls 93 are also formed with flanges 96. The latching member 87 comprises a slide member 99 which is of generally U-shaped transverse cross section and it is formed with a bottom portion 100 which is slidable on the bottom portion of the sleeve 39 and which is formed at its forward end with teeth 101 for engaging the track teeth 81. The latching member 87 is also formed with upstanding, parallel side walls 102 which are formed at their rearward ends with flanges 102a, which, together with the flanges 96, define a trackway for guiding the locking member 86 and latching member 87 in the manner described hereinafter.

A tension spring 103 is fixed at one end, at 104, to the bracket 92 and at its other end it is fixed to a pin 105 which extends through the entire locking assembly and the ends of which are countersunk in the wooden lining 36 as shown in Fig. 9. It will be apparent that the tension spring 103 will urge the locking member 86 forwardly so as to maintain the hook 91 in engagement with the track 79.

A latch 106 is provided, such latch being constructed in two parts comprising a lever 107 and a slide bar 108, these parts being slidably connected by means of tabs 109 which are integral with the lever 107 and which slidably engage the slide bar 108. The slide bar 108 is urged rearwardly by means of a tension spring 110 which is fixed at one end to a tab 111 integral with the lever 107 and at its other end to a tab 112 integral with the slide bar 108. The lever 107 is fulcrumed on the locking member 86 by means of a shaft 113 and it is pivotally connected at 114 to the slide member 99.

It will be apparent that the tension spring 110 acts to urge the slide bar 108 rearwardly or toward the right as viewed in Figs. 7 and 8. At its rearward end the slide bar 108 is formed with a notch 115 and a sloping cam surface 116 and also with a finger hold 117. At its forward or outer end the latch bar 108 is formed with an upstanding bracket 120 having a sloping cam

surface 121 and a notch 122 for engaging a latch bar 123.

The slide bar 108 is in registry with slots 124 formed in the wooden lining 36 and other fixed elements of the brace 17 and with the slot 89 in the locking member 86.

Referring now briefly to Figs. 12 and 13, the track member 75 shown fragmentarily in Fig. 12 is the same as shown in Figs. 7, 8 and 9 and, as will be seen, teeth 81 are punched out of the channel 78. In the form shown in Fig. 13, holes 81a are punched instead of teeth. Both forms of track, as will be readily apparent, are easily fabricated by stamping heavy gauge sheet-metal or metal plates, thus greatly reducing manufacturing costs.

In operation, the device of Figs. 7 to 12 functions as follows:

Assuming that the latch bar 108 is in the up position illustrated in Fig. 8, a brace or beam 17 will be seated with its hooks 91 on the tracks 79 in the same manner as described above with reference to the brace 17 of Figs. 1 to 6. That is to say, the brace will be lifted to the selected channels 18 and the hooks 91 inserted therein and lowered so as to rest upon the tracks 79. It will be noted that the slide bar 108 will be latched in its up position by means of the notch 122 engaging the latch bar 123. To unlatch the slide bar 108 and lever 107 the finger hold 117 will be forced to the left against the force of the tension spring 110 to disengage the notch 122 from the latch bar 123, thus permitting the slide bar 108 and lever 107 to swing downwardly until the notch 122 is clear of the latch bar 123. As the latch 106 continues to swing downwardly the cam surface 116 will engage the end of slot 89 at 125, thus forcing the slide bar 108 inwardly until the notch 115 is positioned below the top portion 88 of locking assembly 86. The slide bar 108 will then spring rearwardly or to the right as viewed in Figs. 7 and 9 to seat the notch 115 underneath the top portion 88, thereby latching the slide bar 108 and the entire latch assembly 87 in the forward or latching position with the teeth 101 in engagement with the track teeth 81. During movement of the locking member 86 and the latching member 87, the flanges 96 and 102a act as a moving track or guide, riding on pin 105. The several parts are thereby maintained in properly spaced and properly aligned relationship.

It will thus be apparent that an adjustable brace or beam for freight cars, van type trucks and the like is provided in two different forms. In both forms the brace is constructed inexpensively and the parts thereof are readily fabricated by extrusion, casting and/or stamping operations. The several parts are readily assembled and disassembled, placement, locking and latching of the brace is simple, and unlatching and unlocking for the purpose of adjusting or removing the beam is likewise an easy operation to effect.

While I have shown the preferred form of my invention, it is to be understood that various changes may be made in its construction by those skilled in the art without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A device of the character described comprising a beam having a hollow end portion, a slide member slidably received within said end

portion and having a track-engaging member at its outer end for slidably engaging a track, a spring disposed within said end portion bearing against the inner end of said slide member to urge it outwardly, and means encompassing and guiding said spring comprising a pair of interlocking U-shaped retainers disposed 90° apart and connected at their inner ends, one of said retainers having means at its outer end for engaging said slide member and restraining its outward movement, and pins extending between the walls of said end portions for supporting said retainers.

2. An adjustable beam or brace of the character described comprising a metal tubular member of extended length, a wood lining affixed to the exterior of said channel, a sleeve fixed within each end portion of the tubular channel and having an antifrictional interior surface, a locking member slidable within each said sleeve and having at its outer end a track-engaging member for slidably engaging a track member, a latching member slidable within each sleeve and having means at its outer end for engaging teeth or the like formed on said track member, lever means for operating the latching member, spring means disposed between said locking member and said lever and operating to hold the latching member in outward latching position or inward unlatched position, a compression spring fixed to said tubular member and bearing against the inner end of said locking member to urge it outwardly, and retainer means disposed within said tubular member comprising a spring retainer formed by a pair of U-shaped members each having a base and side portions, said U-shaped members being arranged 90° apart with their bases adjacent and interconnected and their side portions extending forwardly, pins extending through said tubular member and countersunk in said wood lining for retaining said U-shaped members, one of said U-shaped members being formed at its forward end with means for engaging said locking member and restraining its outward movement, said spring being encompassed by said U-shaped member.

3. Cargo bracing means for freight vehicles comprising: parallel horizontal tracks mounted on opposite walls of the vehicle; a horizontal rack associated with each of said tracks; a hollow-ended cargo bracing bar extending between said tracks; a lock assembly casing slidably mounted within each end of said bracing bar and protruding therefrom, the outer end of each casing being provided with a lip arranged to overlie and slide on one of said tracks; spring means fixed within each end of said bracing bar and operating on its associated casing for outwardly biasing said casing to an extended position with the lip thereof overlying one of said tracks; a latching member slidably disposed within each casing and provided at its outer end with fingers arranged to interlock with one of said racks; a lever operated toggle linkage operatively mounted between each casing and its said latching member for sliding said latching member within

its casing from a retracted unlocked position to an extended locked position; and spring means mounted on each casing and operating against its associated toggle linkage for selectively biasing its associated latching member to either its retracted or extended position.

4. Cargo bracing means for freight vehicles comprising: a hollow-ended cargo bracing bar; a lock assembly casing slidably mounted within each end of said bracing bar and protruding therefrom, the outer end of each casing being provided with a track engaging member; spring means fixed within each end of said bracing bar and operating on its associated casing for outwardly biasing said casing to an extended position; a latching member slidably disposed within each casing and provided at its outer end with rack engaging fingers; a lever operated toggle linkage operatively mounted between each casing and its associated latching member for sliding said latching member within its casing from a retracted unlocked position to an extended locked position; and spring means mounted on each casing and operating against its associated toggle linkage for selectively biasing its associated latching member to either its retracted or extended position.

5. Cargo bracing means for freight vehicles comprising: a hollow-ended cargo bracing bar; a lock assembly casing slidably mounted within one end of said bracing bar and protruding therefrom, the outer end of said casing being provided with a track engaging member; spring means fixed within said bracing bar and operating on said casing for outwardly biasing said casing to an extended position; a latching member slidably disposed within said casing and provided at its outer end with a rack engaging finger; a lever operated toggle linkage mounted between said casing and said latching member for sliding said latching member within said casing from a retracted unlocked position to an extended locked position; and spring means mounted on said casing and operating against said toggle linkage for selectively biasing said latching member to either its retracted or extended position.

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