

April 27, 1965

J. C. NASH

3,180,001

TENTER CHAINS AND CLIPS

Filed Dec. 11, 1961

2 Sheets-Sheet 1

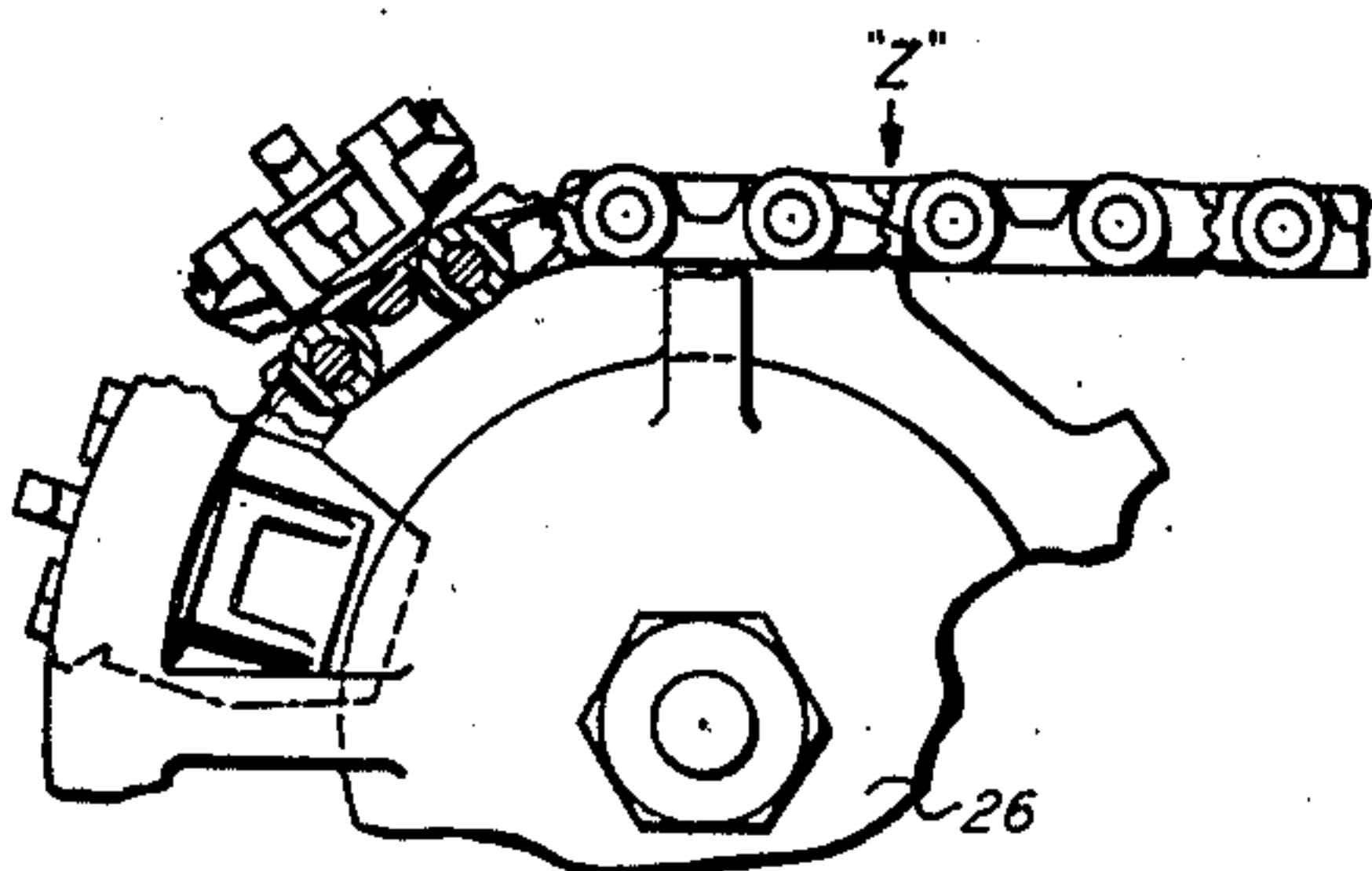
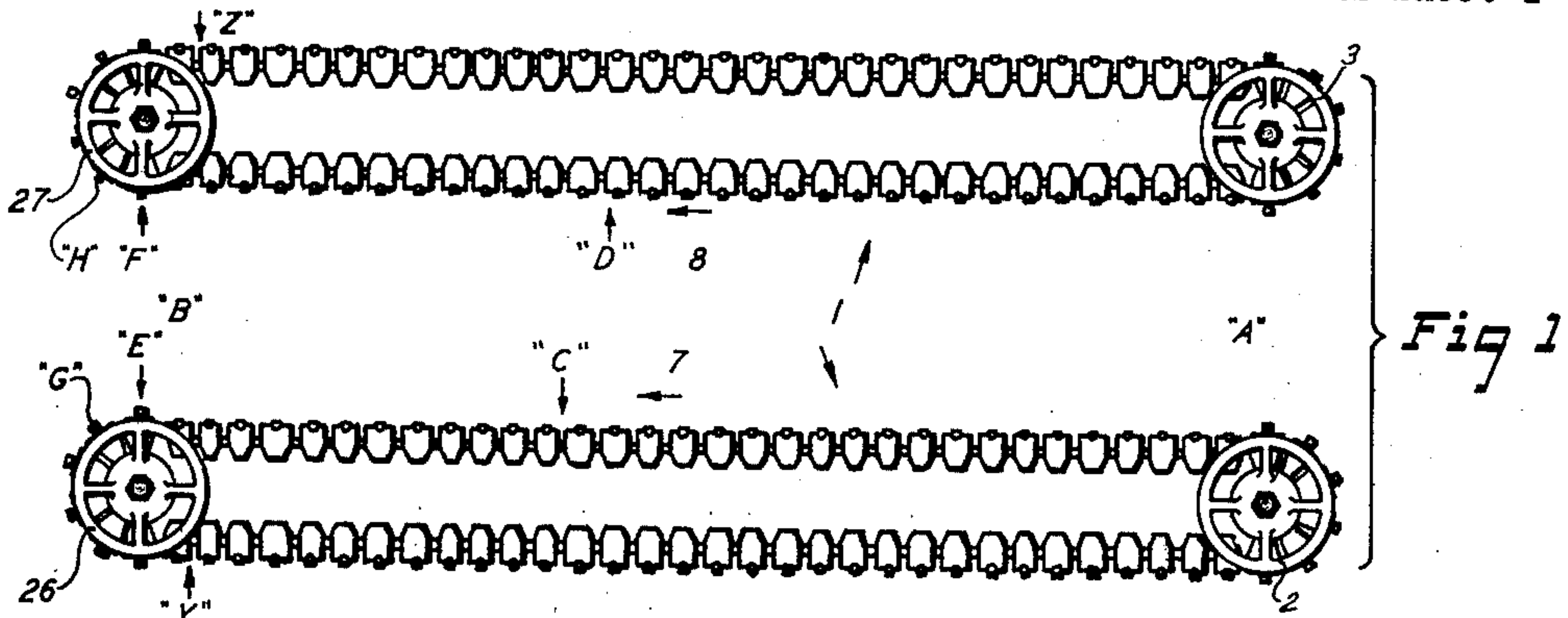


Fig 2

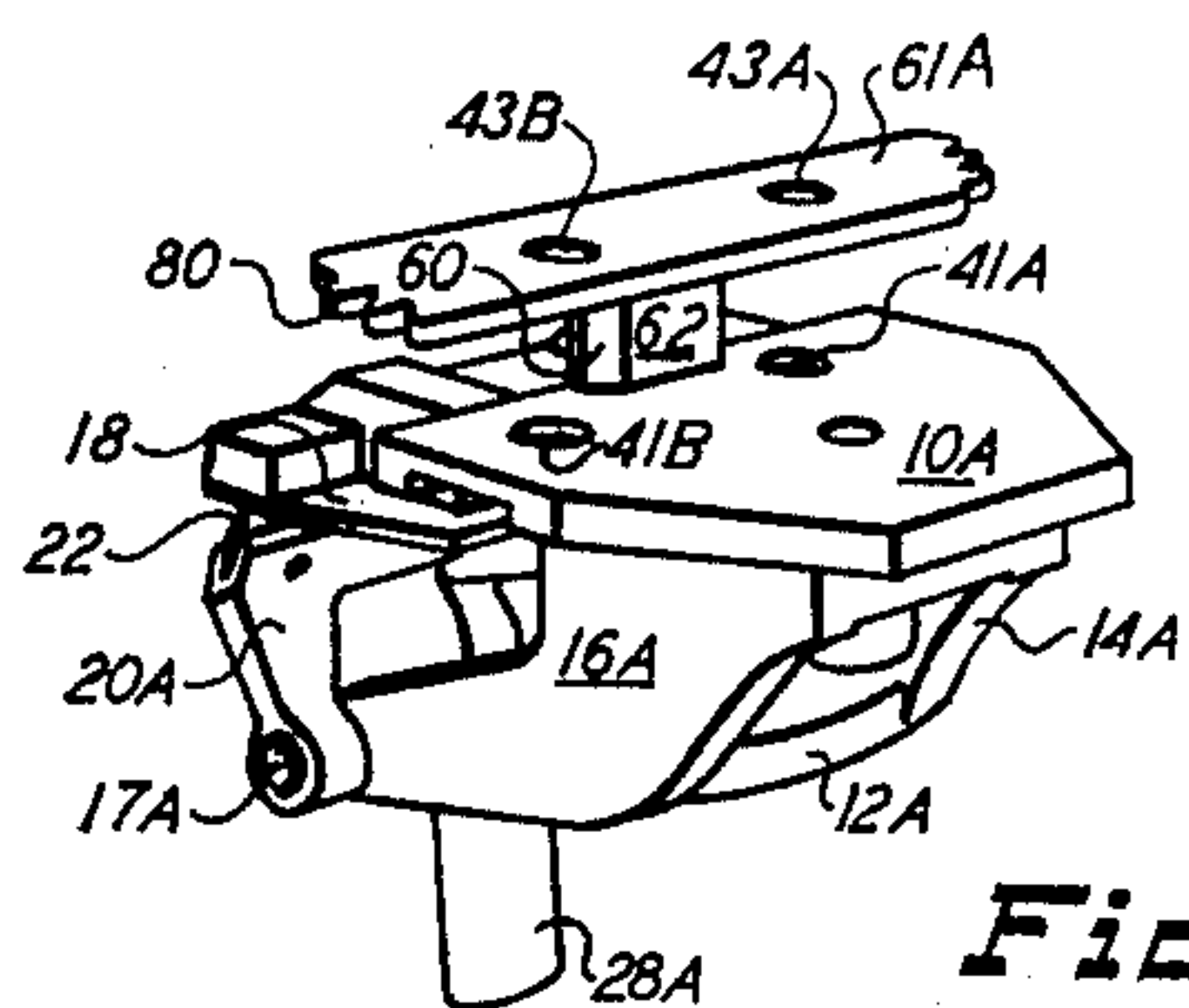


Fig 4

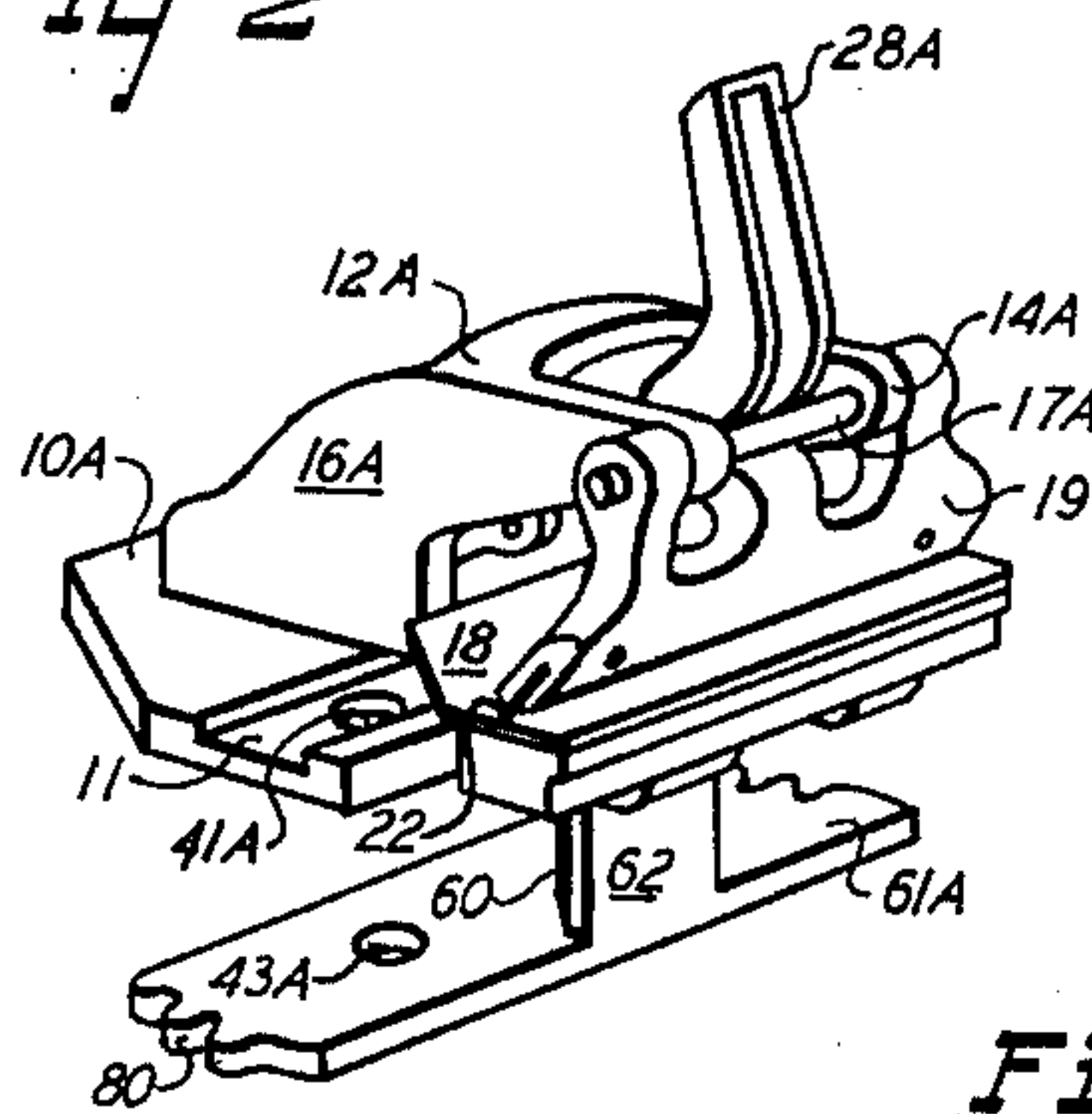


Fig 3

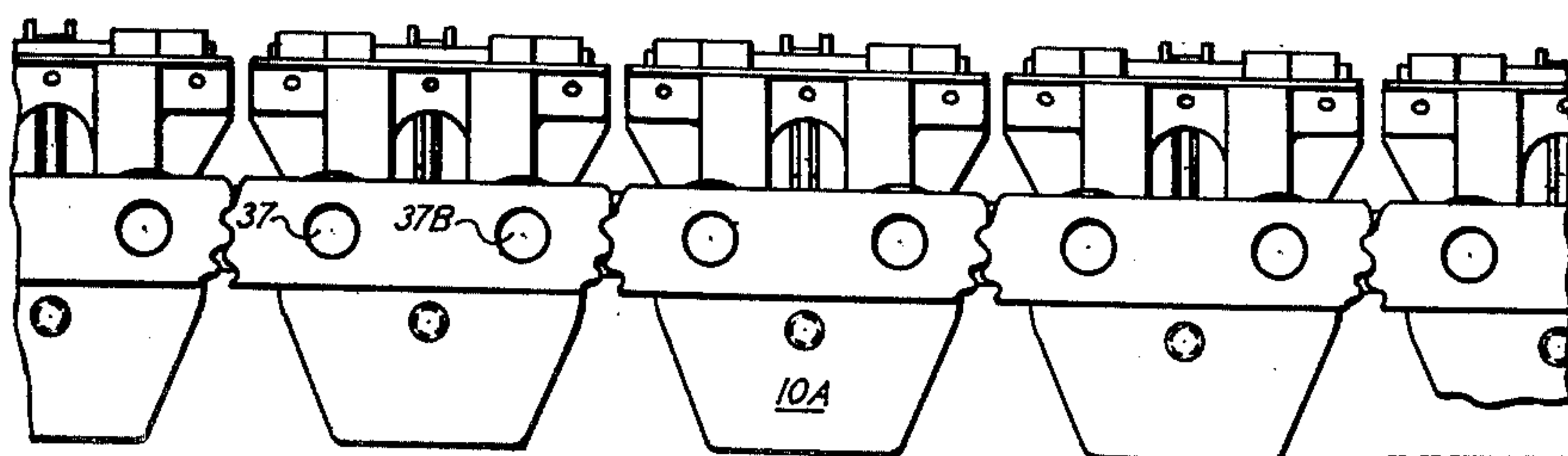


Fig 5

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2 Sheets-Sheet 2

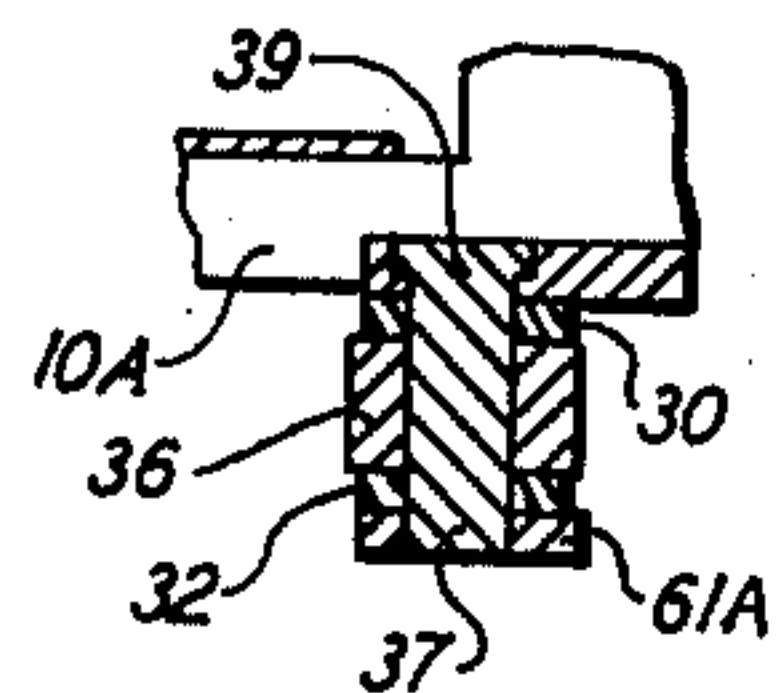


Fig 7

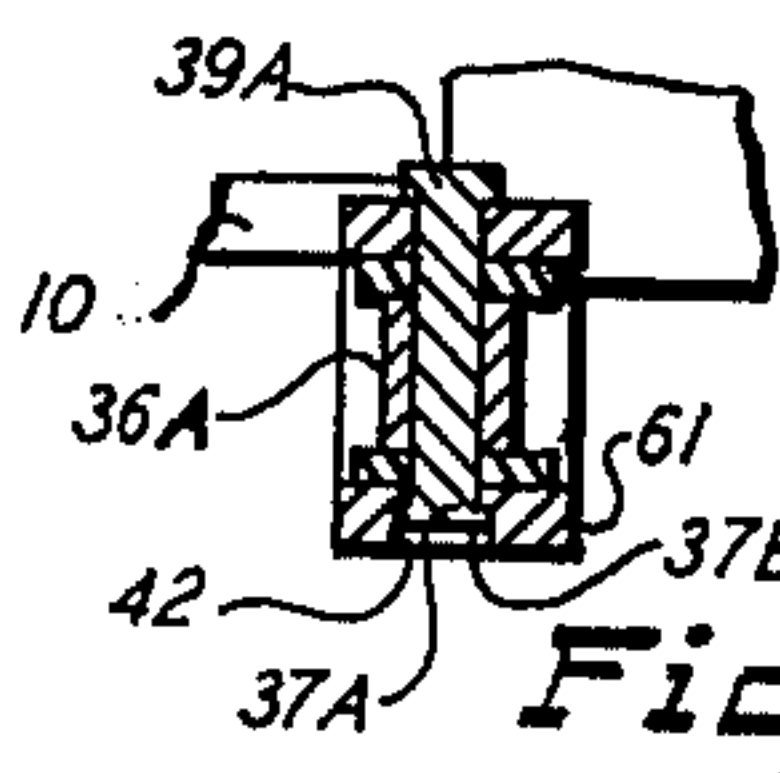


Fig 11

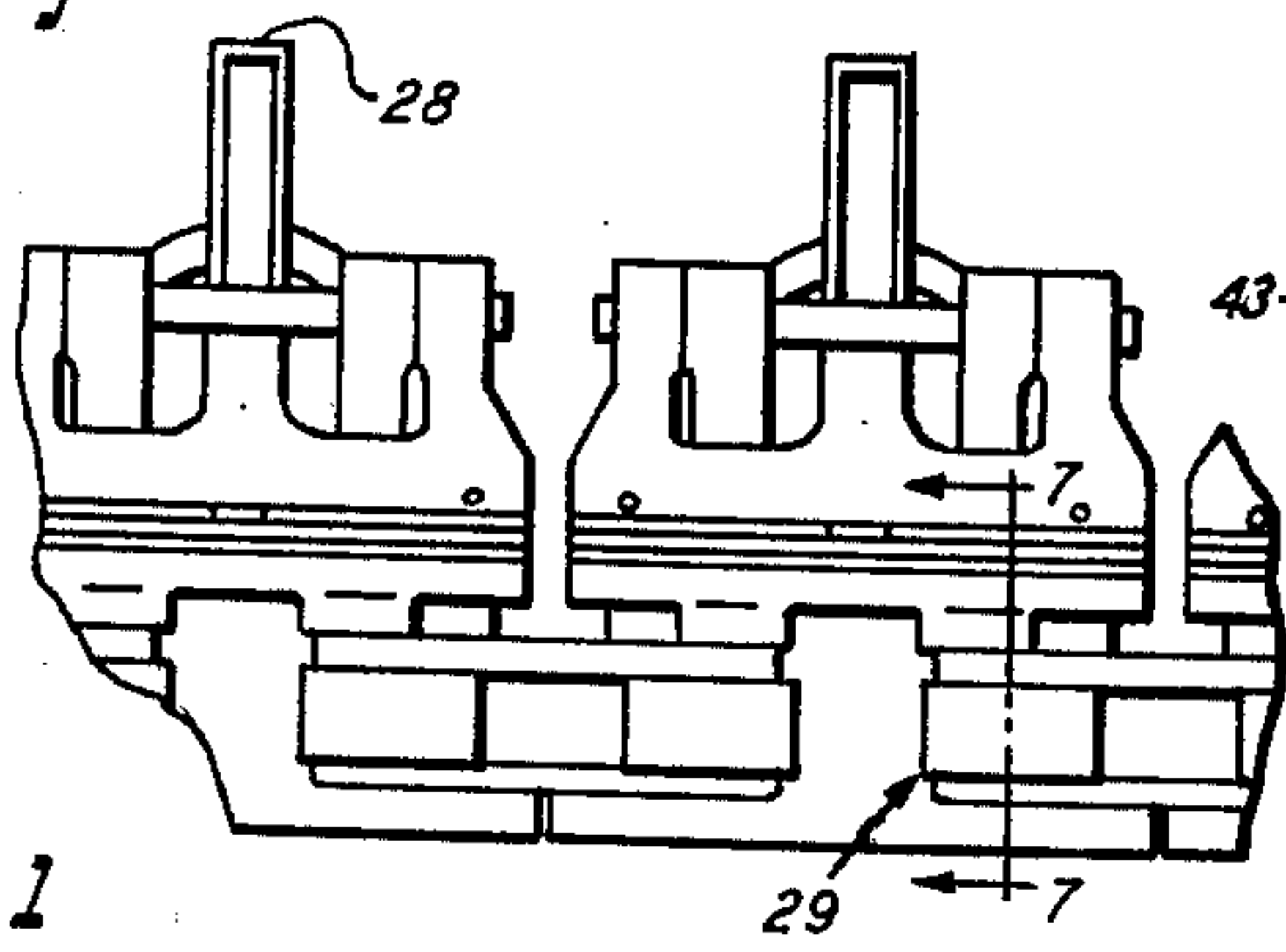


Fig 6

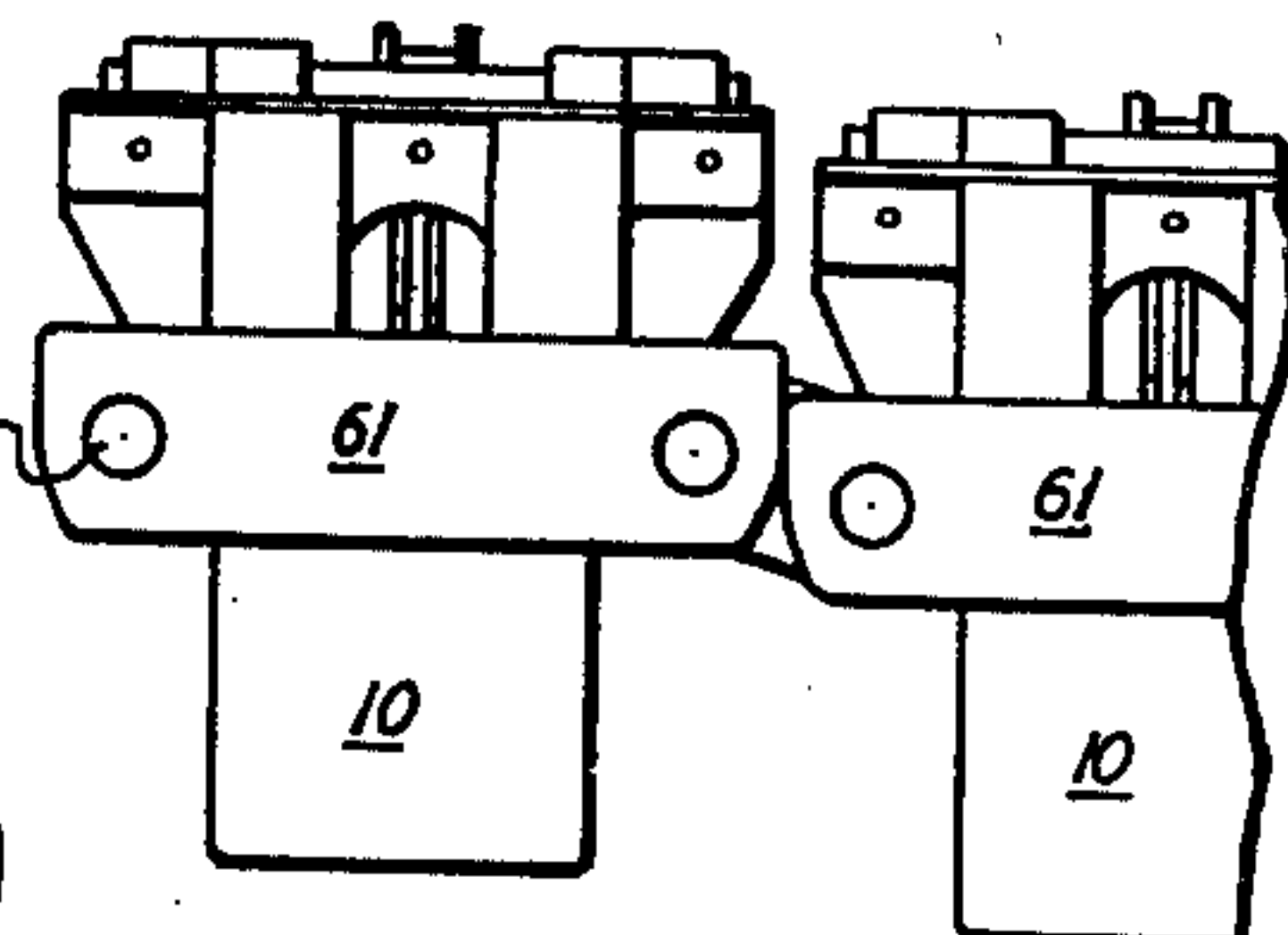


Fig 13

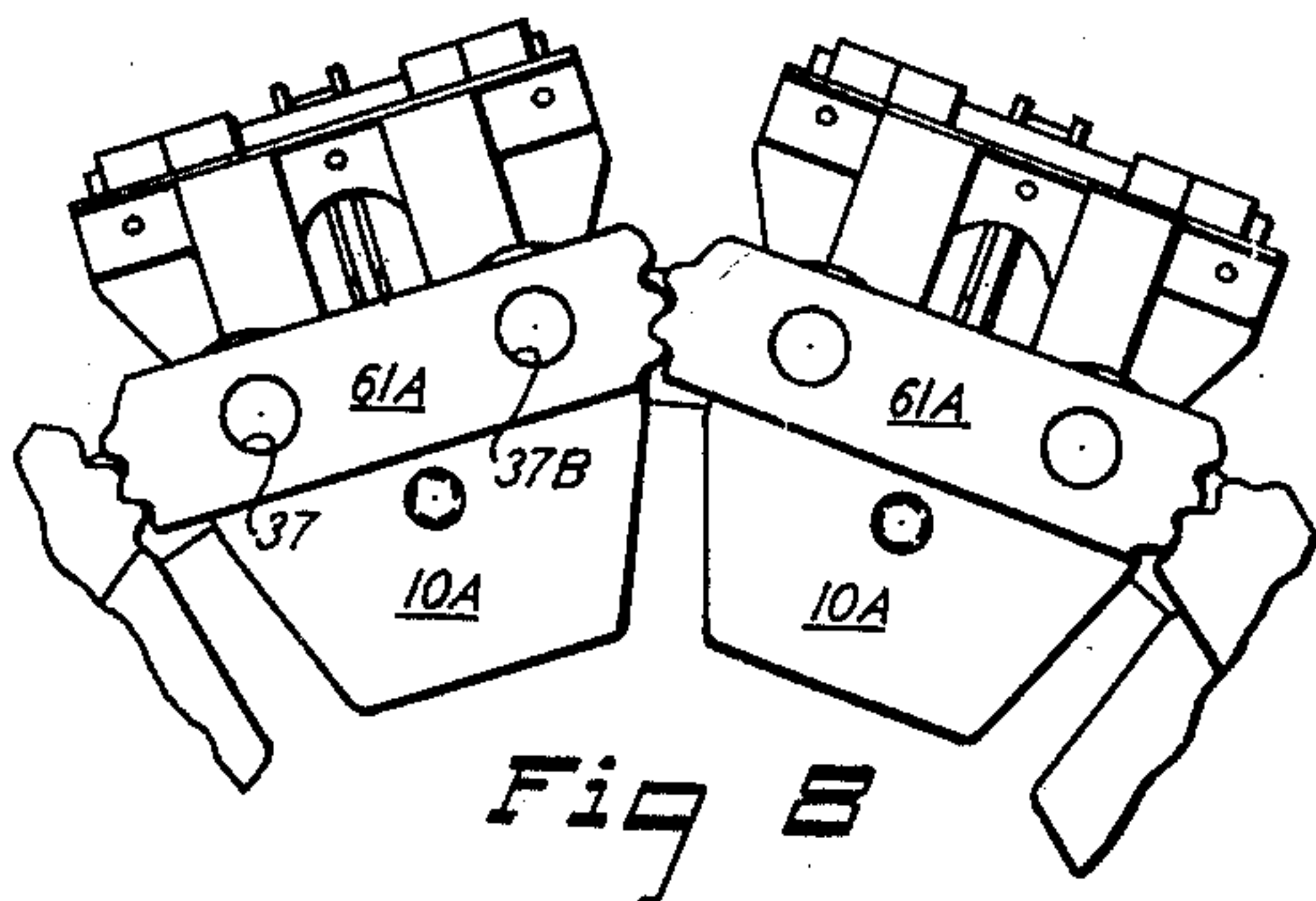


Fig 8

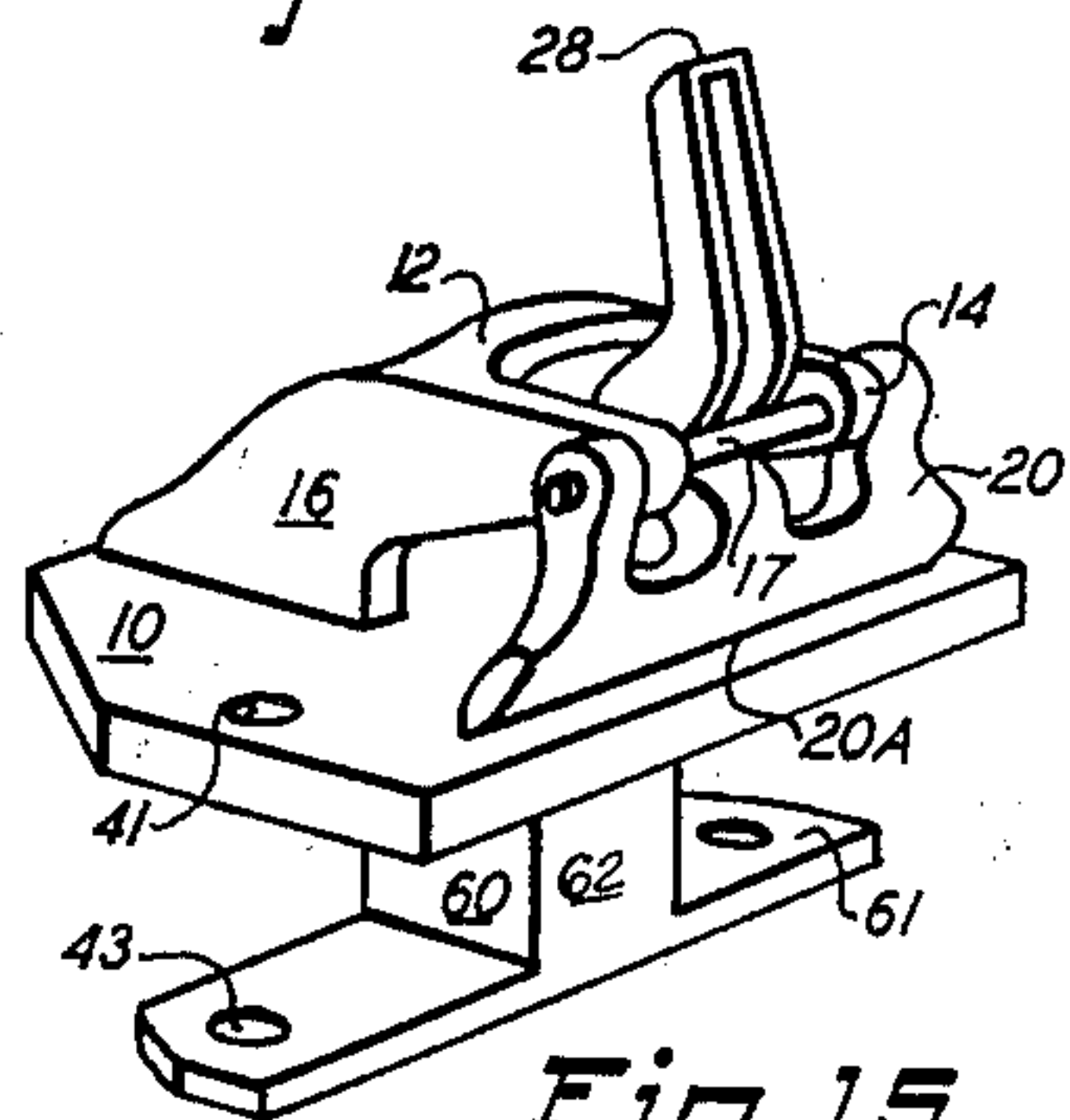


Fig 15

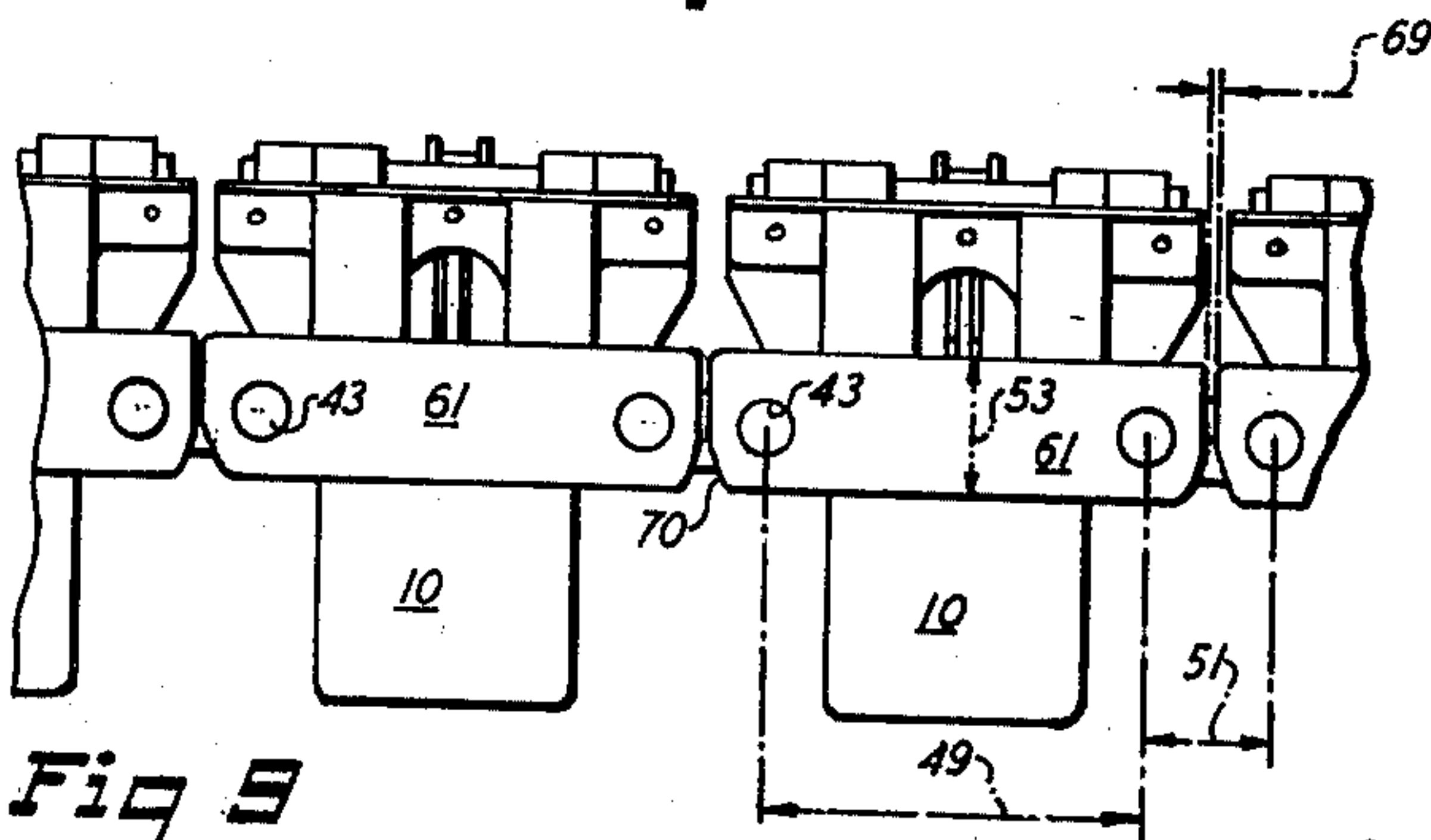


Fig 9

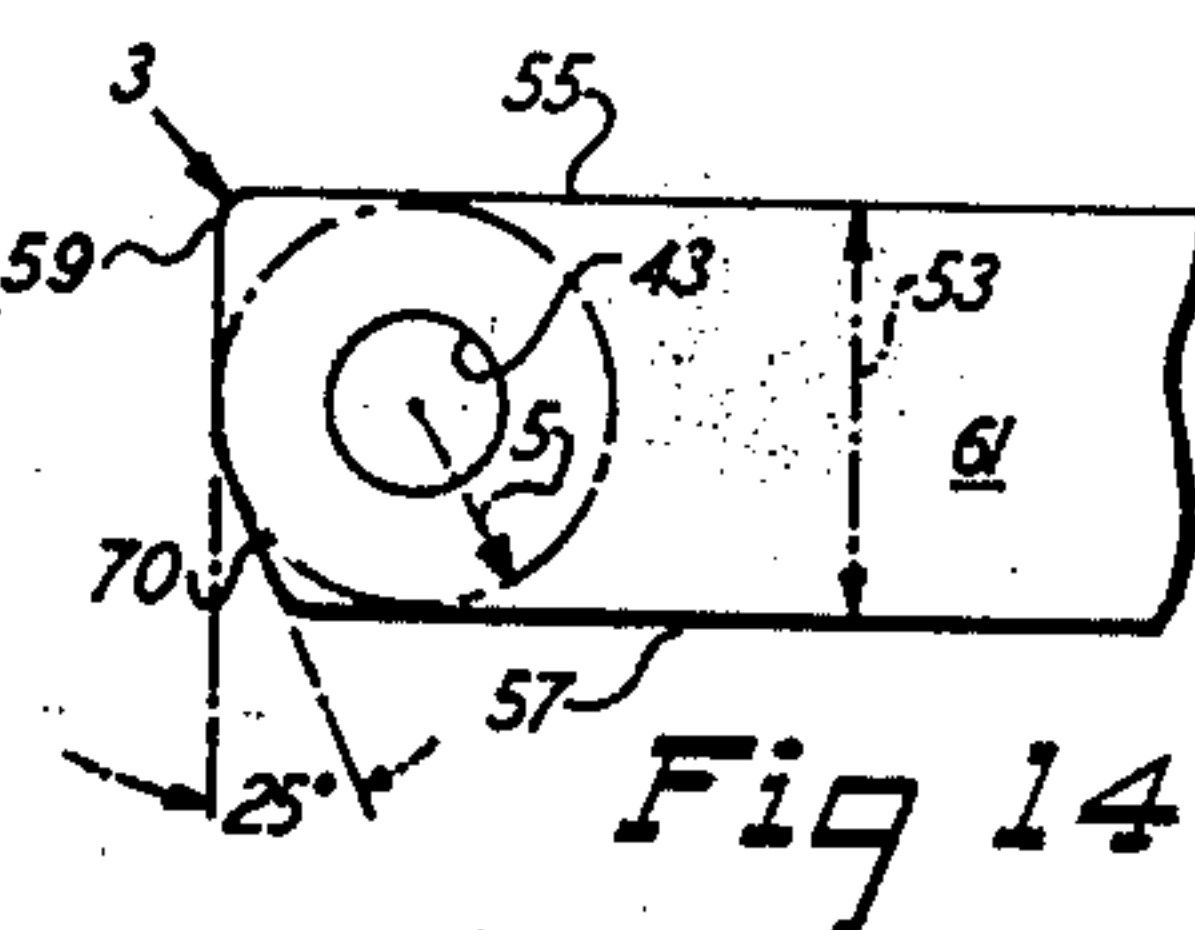


Fig 14

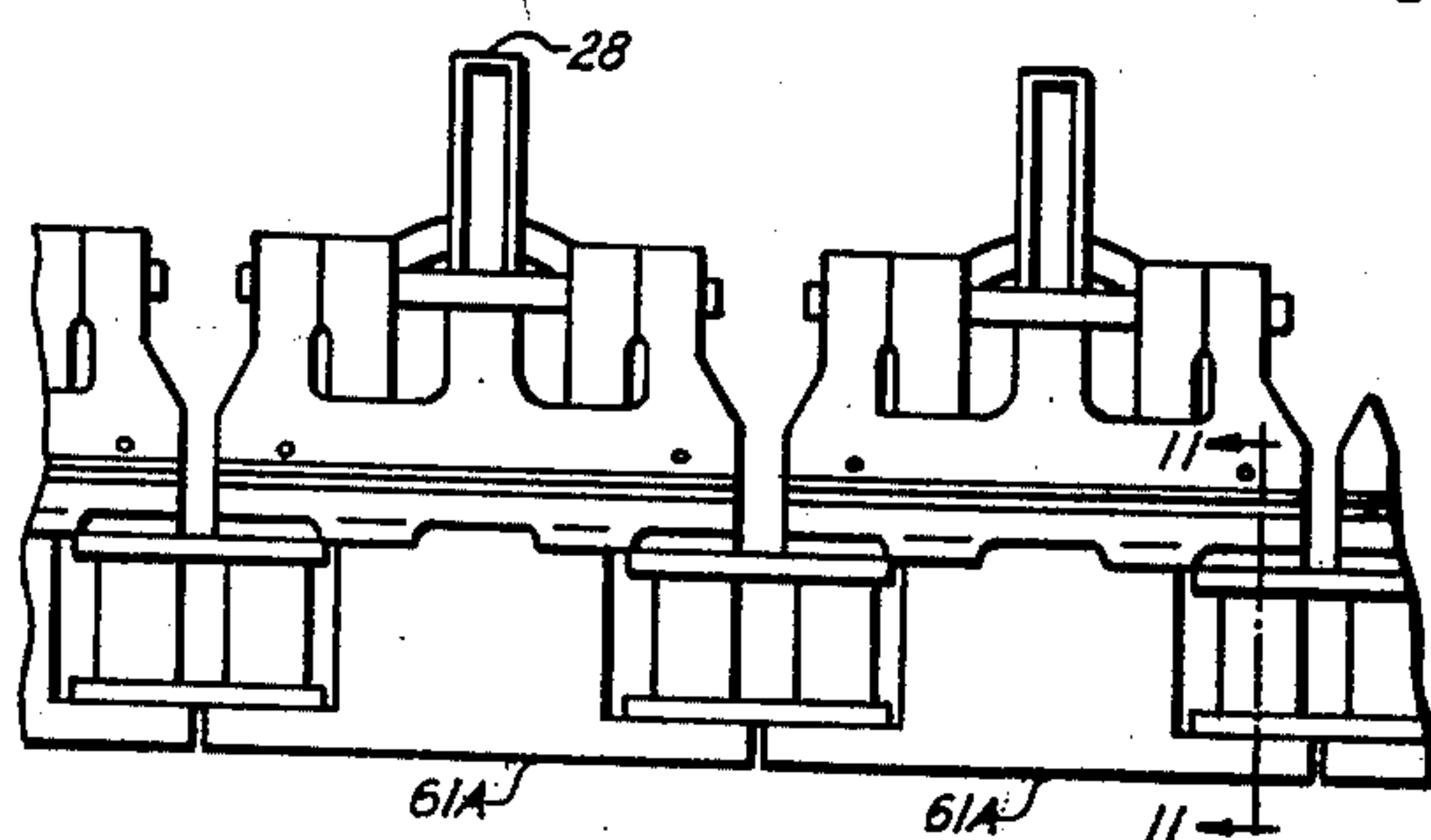
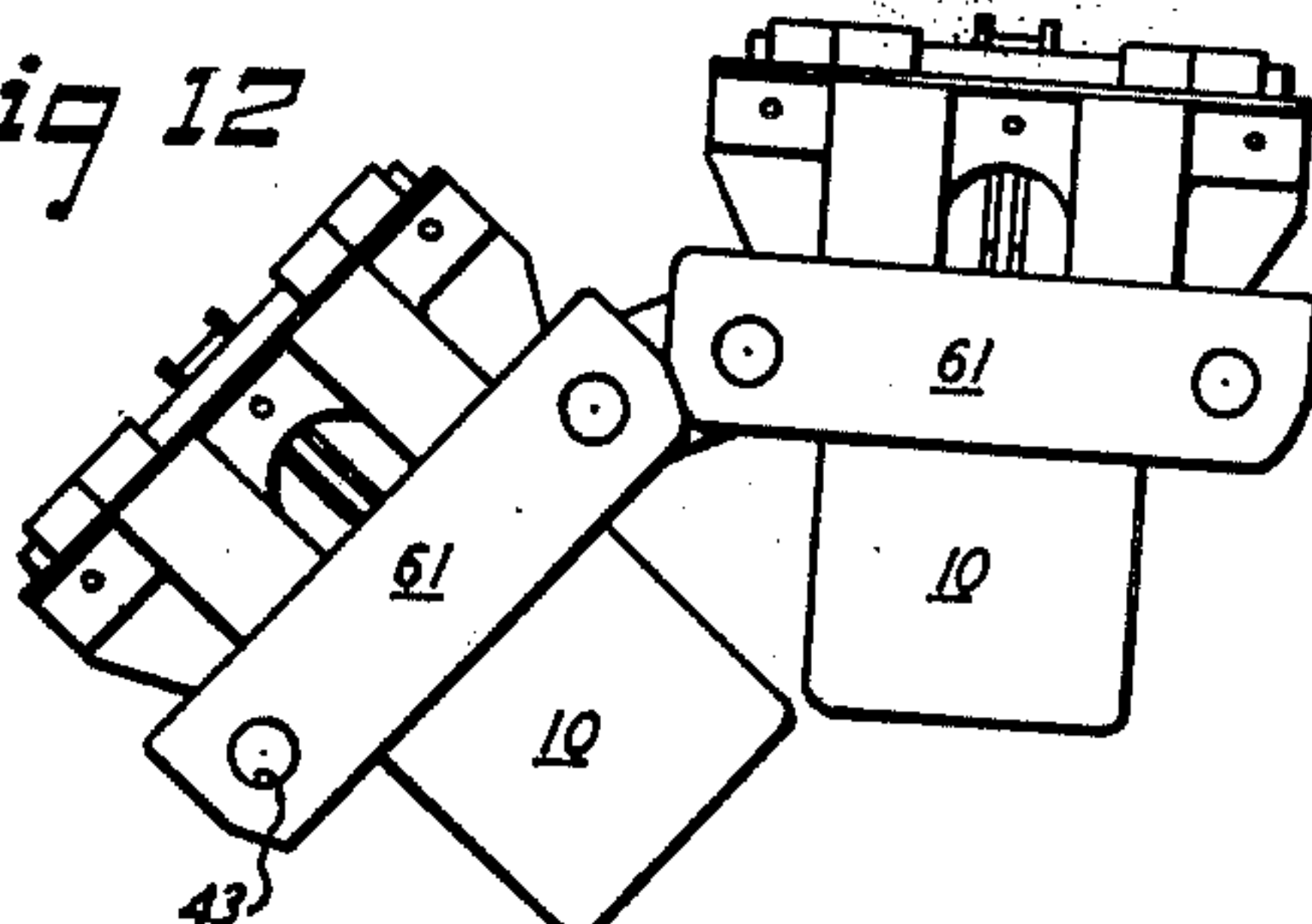


Fig 10

Fig 12



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3,180,001

TENTER CHAINS AND CLIPS

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4 Claims. (Cl. 26—61)

This invention relates to tenting machines and more particularly to the tenter clips which make up a tenter chain of a tenting machine.

One of the objects of the present invention is to improve the tenter clip structure whereby the tenter chain cannot be distorted out of alignment.

Another object of the present invention is to improve the tenter clip structure whereby the pivot pins serve the single function of permitting the links of the chain to pivot thereon.

And still another object of the present invention is to provide a unitary tenter clip structure with a base plate having cam means on opposite ends thereof which limits the relative pivoting motion between tenter clips.

Other objects of the present invention will be pointed out in part and become apparent in part in the following specification and claims.

Referring to the drawings in which similar characters of reference indicate corresponding parts in all the figures:

FIGURE 1 is a schematic view of a tenting machine.

FIGURE 2 is an enlarged fragmentary plan view of a tenting machine chain and sprocket.

FIGURE 3 is a perspective view of the new and improved tenter clip.

FIGURE 4 is a perspective view of the new and improved tenter clip in upside down position.

FIGURE 5 is a bottom plan view of a series of the new and improved tenter clips.

FIGURE 6 is a front elevational view of a series of the new and improved tenter clips.

FIGURE 7 is a fragmentary cross sectional view taken along line 7—7 of FIGURE 6.

FIGURE 8 is a bottom plan view of a plurality of the new and improved tenter clips illustrating freedom of movement in one direction.

FIGURE 9 is a bottom plan view of a modified form of base plate used on the new and improved tenter clip.

FIGURE 10 is a front elevational view of FIGURE 9.

FIGURE 11 is a fragmentary cross sectional view taken along line 11—11 of FIGURE 10.

FIGURE 12 is a view similar to FIGURE 9, illustrating the limited pivotal movement, between adjacent tenter clips, in one direction.

FIGURE 13 is a view similar to FIGURE 9, illustrating the limited movement between adjacent clips whereby juxtapositioning between adjacent clips is eliminated.

FIGURE 14 is a fragmentary enlarged view of the cam on the modified form of clip shown in FIGURES 9, 12 and 13.

FIGURE 15 illustrates a modified form of tenter clip body which may be used with the cam shown in FIGURES 3, 4 and 5 and the modified form of cam shown in FIGURES 9, 12, 13 and 14.

In this specification the term cloth includes any type of web material such as cotton, wool, synthetic fibers, plastic film, aluminum foil, etc.

Referring to the drawings, and particularly to FIGURE 15, the tenter clip comprises a horizontally disposed base 10, a vertically upstanding body 12 and a pair of arms 14, 16 which project sidewise from body 12 to overlie base 10. Pivotaly mounted between arms 14, 16 on a pintel 17 is a jaw 20. Between the lower

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edge 20A of jaw 20 and base 10, the cloth (not shown) is gripped as the tenter chain moves along a rail (not shown). When the tenter chain reaches a sprocket 26 at the delivery end of the rail a suitable cam (not shown) engages an upstanding arm 28 of the pivoted jaw 20 causing lower edge 20A to swing away from base 10 and disengage the cloth.

Base 10 is provided with a depending central yoke or arm 60. A bottom plate 61 is integrally attached to the lower end of arm 60. A face 62 is provided in arm 60 for purposes which will presently appear.

With reference to FIGURES 3, 4, 5 and 6, a modified form of tenter clip is illustrated, comprising a horizontally disposed base 10A, a vertically upstanding body 12A and a pair of arm 14A, 16A which projects sidewise from body 12A to overlie base 10A. Secured to base 10A is a bearing plate 18 and pivotally mounted between arms 14A, 16A on a pintel 17A is a jaw 19 having an inserted strip 22 at its lower edge between which and the plate 18 the edge of the cloth (not shown) is gripped and released in the same manner as described with reference to FIGURE 15. Upstanding arms 28 and 28A serve like functions.

In an embodiment of the present invention shown in FIGURES 6 and 7 the bodies of two adjacent clips are connected together by roller links, generally indicated by reference numeral 29. Each roller link has a pair of plates, an upper plate 30 and a lower plate 32 separated by a roller 36 which functions as a spacing sleeve and a roller bearing in cooperation with the teeth of the sprocket. Base 10A may be provided with a slot 11. An axle pin 37 provided with an enlarged head 39 passes through an orifice 41A in base 10A with head 39 located in slot 11. Axle pin 37 also passes through orifices in upper plate 30, roller 36, lower plate 32, and as will presently appear, orifice 43A, where axle pin 37 may be secured by a drive fit.

In the modified form of axle construction illustrated in FIGURE 11, axle pin 37A is provided with a riveted end 37B located in a counterbore 42 of orifice 43 located in bottom plate 61. Slot 11 is dispensed with. Head 39A of axle pin 37A engages the top surface of base 10. Roller 36A is smaller in diameter than roller 36 to accommodate a different tooth type of sprocket wheel 26 and to provide for a different type of guide means.

When the roller link shown in FIGURE 7 is employed, roller 36 engages the guide rail (not shown). When the roller link shown in FIGURE 11 is employed face 62 of arm 60 engages the guide rail (not shown).

In applying such roller links 29 to the present tenter chain, the bottom plate 61 serves as the supporting member for lower plate 32, thereby freeing axle pin 37 from the heretofore function of uniting the upper plate 30 with the lower plate 32. The axle pin 37 in addition to serving as a connecting pin between plates 30, 32 also serves to hold the roller links against the twisting action imparted by the sprocket 26 and against the centrifugal force generated by the sprocket 26 on the roller links 29. In the present embodiment bottom plate 61, in addition to supporting bottom plate 32, is so shaped as to afford either cam means or cam means having a plurality of gear teeth arranged so as to keep the tenter chain as a whole in proper alignment as it moves away from the sprocket 26.

Reference is now made to FIGURES 9, 12, 13, 14 and 15 where cams are formed in opposite edges of bottom plate 61. The center distance 49 between orifices 43 in the same bottom plate 61 is determined by the pitch of the teeth of the sprocket 26. The center distance 51 between orifices 43 in adjacent bottom plates 61 is determined by the size of the roller 36A and the pitch of

the teeth of sprocket 26. Distances 49, 51 are standard in the tentering chain art.

A circle 5 is scribed from the center of orifice 43. The width 53 of bottom plate 61 is equal to the diameter of circle 5. Two parallel sides 55, 57 are thereby provided in bottom plate 61. An edge 59 tangent to circle 5 and located at an angle of ninety degrees is also provided in bottom plate 61. A surface 70 is provided at an angle of approximately twenty five degrees from surface 59 and tangent to circle 5. Surface 70 may be termed an angular surface. Thus a cam is formed in opposite edges of bottom plate 61 consisting of two portions. One portion consists of a surface 59 perpendicular to the parallel sides 55, 57. The other surface 70 is at an angle to surface 59. Circle 5 is small enough to provide a slight clearance 69 between adjacent bottom plates 61. As will be seen in FIGURE 13, clearance 69 allows adjacent surfaces 59 to pivotally move in a relative sliding action. However, the clearance is small enough to prevent adjacent bottom plates 61 from pivoting into a juxtaposition. Thus adjacent tenter clips cannot become misaligned. FIGURE 12 illustrates the limited pivotal movement allowed by surfaces 70 on adjacent bottom plates 61. This movement allows the tenter clips to pivot around sprocket 26.

Corners 3 formed in the opposite edges of bottom plate 61 at the intersection of surfaces 59 with surface 55, abut with the corresponding corners on adjacent clips to strictly limit the pivotal movement between adjacent clips in a direction opposite to the direction shown in FIGURE 12.

In the modified form of bottom plate 61A illustrated in FIGURES 3, 4, 5 and 8, gear teeth 80 are provided in surfaces which are equivalent to surfaces 59, 70 of FIGURES 9, 12, 13, 14 and 15. Teeth 80 serve to the function of horizontally aligning adjacent bottom plates 61A, thereby preventing one bottom plate 61A from slipping into a juxtaposition in relation to an adjacent bottom plate 61A when clearance distance 69 is great enough to permit juxtapositioning to take place.

Referring to FIGURE 1 wherein is illustrated a schematic view of a tentering machine, reference character "A" indicates the head or cloth entering end of the machine. Reference character "B" indicates the cloth discharge end of the machine.

The tenter chain, generally indicated by reference character 1 is a flexible unit. Sprockets 2, 3 are idler sprockets. Sprockets 26, 27 are the driving or pulling sprockets. The tenter chains are taut in the length between sprockets 2 and 26, and, 3 and 27 due to the pull exerted by sprockets 26, 27 in the direction of arrows 7, 8. The pull sides of the tentering chains are indicated at C and D. The slack sides of the tentering chains are indicated at E and F. The greatest slack in the tentering chains is at points Y and Z. It is at these points Y, Z, that buckling of the tentering chains is apt to occur. The buckling may take the form of juxtapositioning of adjacent clips. The present invention is directed to prevent this buckling and juxtapositioning.

At points Y, Z, the tenter chains are disengaged from the respective sprockets and the chains have not as yet reengaged the respective guide rails.

Centrifugal force at points Y, Z also tends to throw adjacent clips into a juxtaposition. In addition, the roller links 29 frequently do not peel off the sprocket teeth. The sticking of the rollers 36 or 36A to the teeth of the sprocket wheel also cause a juxtapositioning of adjacent tenter clips. This sticking occurs through the accumulation of dirt or through the lack of proper lubrication.

The tenter clips are under stress and strain at sides C, D because the cloth (not shown) tends to pull the tenter clips C, D toward each other. As the tenter clips approach sprocket wheels 26, 27, respectively, the clips release their grip on the cloth. The clips forming the tenter chain tend to buckle at the loss of the tension of the cloth.

However, since the cloth release is approximately at the points E, F or point of tangency of the tenter clips with the sprocket teeth G, H, respectively, the buckling action is delayed until the tenter clips leave the point of engagement with the teeth G, H. As soon as the tenter clips leave the respective points of tangency and before the tenter clips engage the guide rails (not shown) of the tentering machine; the tenter clips tend to buckle into a juxtaposition in relation to adjacent tenter clips. Such points or areas of buckling occur at points Y, Z, in the respective tenter chains. Such buckling or jamming results in costly break downs of the tentering machine. The strain on the tenter clips or rather on the pintle or axle holding the roller links is very great. In normal usage, the axles frequently twist out of alignment or break. In order to overcome this undesirable condition applicant has removed the function of the axle of holding a bottom plate to a base as illustrated and described in United States Patents #2,285,820 and #2,496,475 and replaced this function with the central yoke or arm 60. Thus applicant provides bottom plate 61 as a unitary structure with base 10. Such a structure can withstand the stress, and twisting strain at points Y, Z. In addition the axle structure for the roller links is simplified and long lasting. Applicant's bottom plates 61, 61A are provided with contours which preclude movement between tenter clips in a direction away from the guide rail so that a juxtaposition between clips is physically impossible.

Applicant's tenter chain can be operated at higher linear running speeds with an absolute degree of safety against misalignment between tenter clips. Thus, inherently the problem of preventing juxtaposition between tenter clips has existed since the first tentering machine came into use.

To clarify the language in the claims, orifice 41A will be termed "a first upper axle orifice." Orifice 41B will be termed "a second lower axle orifice," respectively. Axle pin 37 be termed "a second upper axle orifice." Orifices 43A and 43B will be termed, "a first lower axle orifice" and, will be termed "a first axle pin." Axle pin 37B will be termed, "a second axle pin."

Having shown and described preferred embodiments of the present invention by way of example, it should be realized that structural changes could be made and other examples given without departing from either the spirit or scope of this invention.

What I claim is:

1. A tenter clip consisting of a horizontally disposed base having a vertically upstanding body, a pair of arms which project sidewise from said body to overlie said base, a jaw having a lower edge, a pintel pivotally mounting said jaw to said pair of arms, said lower edge engaging said base in gripping position, a central yoke having a rail engaging face integral with and depending from said base, a bottom plate integrally fastened to said central yoke, a first upper axle orifice and a second upper axle orifice in said base, a first lower axle orifice in said bottom plate vertically aligned with said first upper axle orifice, a second lower axle orifice in said bottom plate vertically aligned with said second upper axle orifice, a first axle pin located in said first upper axle orifice and secured in said first lower axle orifice, a second axle pin located in said second upper axle orifice and secured in said second lower axle orifice, a first roller link mounted on said first axle pin, a second roller link mounted on said second axle pin, one side of said bottom plate having two portions, one portion being an angular surface formed on a radius struck from the center of said first lower axle orifice, the other portion being tangent to said radius and engaging said angular surface below a horizontal center line passing through said lower axle orifices, and the other side of said bottom plate having two portions, the first portion being an angular surface formed on a radius struck from the center of said second lower axle orifice, the second portion being tangent to said last mentioned radius

and engaging said angular surface below a horizontal center line passing through said lower axle orifices.

2. A tenter chain for operative movement about a sprocket and along an adjacent guide rail comprising, in combination, a series of tenter clips each having a horizontally disposed base, a vertically upstanding body, and a pair of arms which project sidewise from said body to overlie said base, a jaw having a lower edge, a pintel pivotally mounting said jaw to said pair of arms, said lower edge engaging said base in gripping position, a rail engaging arm integral with and depending from said base, a bottom plate integrally fastened to said arm, two axle pins, one on each side of said rail engaging arm secured in both said base and in said bottom plate, roller links pivotally mounted upon said two axle pins thereby to pivotally connect the tenter clips together, each opposite side of said bottom plate having two portions, the first portions being angular surfaces formed on radii struck from the centers of said two axle pins, the other portions being tangent to said angular surfaces and parallel to corresponding portions on adjacent clips, the points of tangency of said portions being below a horizontal center line passing through the centers of said axle pins, whereby the tangent portions of adjacent tenter clips abut to limit the pivotal movement of adjacent tenter clips in one direction and the angular surfaces on adjacent tenter clips limit the pivotal movement of adjacent tenter clips in an opposite direction when the tenter clips are disengaged from both the sprocket and guide rail.

3. A tenter clip consisting of a horizontally disposed base having a vertically upstanding body, a pair of arms projecting sidewise from said vertically upstanding body to overlie said horizontally disposed base, a jaw having a lower edge, a pintel pivotally mounting said jaw to said pair of arms, said lower edge engaging said base in gripping position, an arm having a rail engaging face integral with and depending from said base, a horizontally disposed bottom plate integrally fastened to said arm and underlying said horizontally disposed base, an axle pin orifice in said bottom plate on one side of said last mentioned arm, a vertically aligned axle pin orifice in said horizontally disposed base, a second axle pin orifice in said bottom plate located on the opposite side of said last mentioned arm, a second vertically aligned axle pin orifice in said horizontally disposed base, said bottom plate having parallel sides tangentially connecting a first circle scribed from the center of said first-mentioned axle pin orifice and a second circle scribed from the center of said second axle pin orifice, said bottom plate having two

opposite and parallel edges perpendicular to said parallel sides, one edge being tangent to said first circle, the second edge being tangent to said second circle, a first angular surface having an angle of approximately twenty-five degrees from said first edge below a horizontal center line passing through said axle pin orifices, said first angular surface being tangent to said first circle to form a cam in one edge of said bottom plate, a second angular surface having an angle of approximately twenty-five degrees from said second edge below a horizontal center line passing through said axle pin orifices, said second angular surface being tangent to said second circle to form a second cam in the second edge of said bottom plate.

4. A tenter clip consisting of a horizontally disposed base having a vertically upstanding body, a pair of arms projecting sidewise from said vertically upstanding body to overlie said horizontally disposed base, a jaw having a lower edge, a pintel pivotally mounting said jaw to said pair of arms, said lower edge engaging said base in gripping position, an arm having a rail-engaging face integral with and depending from said base, a horizontally disposed bottom plate integrally fastened to said arm and underlying said horizontally disposed base, said bottom plate being of rectangular shape, an axial orifice adjacent each end of said plate, an axle pin secured in each orifice, angularly disposed surfaces defining the ends of said plate, one said surface at each end being substantially perpendicular to the sides of the plate and tangent to a circle concentric with the corresponding orifice, the remaining surface at each end of said plate also being tangent to the circle concentric with the orifice associated therewith and at an angle to the corresponding end surface first mentioned, the surfaces at each edge of the plate engaging at a point below a horizontal center line passing through said axle orifices.

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