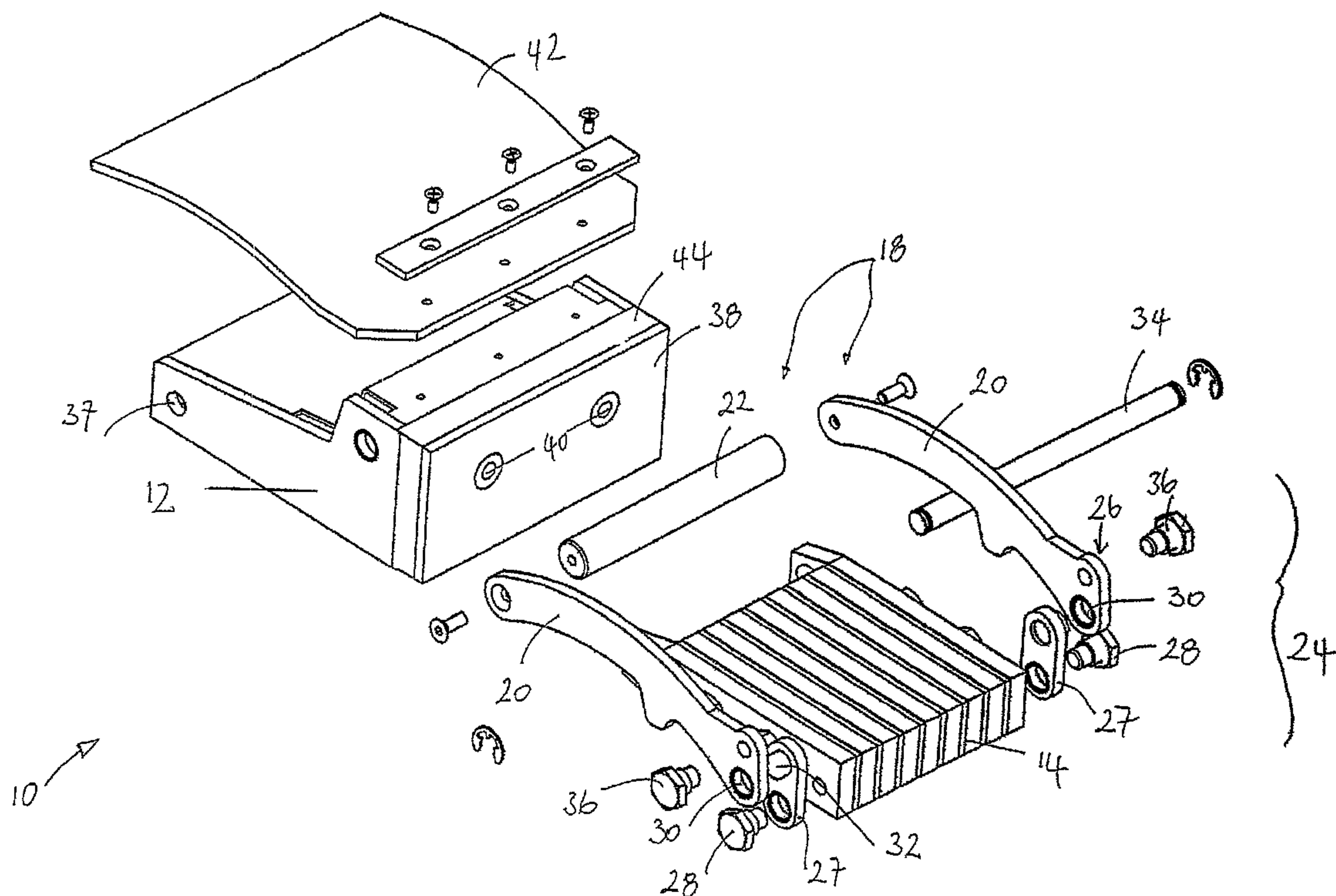




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(54) Titre : AGRAFE MAGNETIQUE
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(57) Abrégé/Abstract:

A magnetic clamp (10) for use in clamping metal formwork in precast concrete manufacture includes a housing (12). A magnet (14) is displaceably arranged within the housing (12). A displacement mechanism (18) is displaceably arranged on the housing (12) to displace the magnet (14) relative to the housing (12). A force amplification mechanism (24) is connected to the magnet (14) and at least a portion of the force amplification mechanism (24) is interposed between the displacement mechanism (18) and the magnet (14).

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

"A magnetic clamp"**Cross-Reference to Related Applications**

The present application claims priority from Australian Provisional Patent Application No 2004904824 filed on 24 August 2004, the contents of which are
5 incorporated herein by reference.

Technical Field

The present invention relates to the clamping of metal formwork. More particularly, the invention relates to a magnetic clamp for use in clamping metal
10 formwork in precast concrete manufacture.

Background of the Invention

In the pre-cast concrete manufacturing industry, concrete members are often pre-made off site in casting yards or factories and then transported to site for erection as
15 required. In a typical casting yard, concrete members are constructed on a steel bed. The advantage of using a steel bed is that the members can be constructed to a high degree of accuracy thus leaving an accurate finish on that surface of the concrete member in contact with the steel bed.

Sideforms are used to define the dimensions of the concrete members.
20 Traditionally the sideforms are screwed or bolted to the steel bed. Once the concrete has been poured and allowed to cure, the screws/bolts and sideforms are removed. The cast concrete members are then lifted from the bed and the process repeated to form another member. However concrete members have become increasingly architectural having differing sizes and shapes. Therefore, if the concrete area of the new member to
25 be cast is larger than the area of the previous member then the holes in the steel bed have to be patched so that the hole does not form an imprint in the next concrete member to be cast. Patching is often performed by welding the bolt holes then grinding them flush with the steel bed. However welding of the holes warps the steel beds as a result of the heat expanding the metal and this causes the steel beds to buckle and bow
30 locally leaving imperfections in the surface of the concrete member. Moreover, this process is particularly labour intensive as the steel beds constantly require repair.

Other means of patching involve plugging the hole with a steel plug or cone and then grinding it flush with the bed. However forcing the plugs into the holes is found to cause a depression in the bed in the locality of the plug causing imperfections in the
35 surface of the steel bed. Once again, the imperfection may form an imprint in the surface of the concrete member being cast. The grinder blades used to remove excess

Summary of the Invention

According to the invention, there is provided a magnetic clamp for use in clamping metal formwork in precast concrete manufacture, the clamp including:

- a housing;
- 5 a magnet displaceably arranged within the housing;
- a displacement mechanism displaceably arranged on the housing to displace the magnet relative to the housing; and
- a force amplification mechanism connected to the magnet, at least a portion of the force amplification mechanism being interposed between the displacement
10 mechanism and the magnet.

The displacement mechanism may include a handle operable to move the magnet between a first, disengaged position and a second, operative position in which the magnet is substantially fully in contact with a steel bed on which the clamp is mounted for use. The handle may be pivotally connected to the housing adjacent a first
15 end of the housing. The handle may comprise a pair of lever arms, the pair of lever arms being interconnected at their free ends by a handle bar.

In a first embodiment, the force amplification mechanism may comprise a linkage mechanism. The linkage mechanism may include a pair of links associated with each lever arm of the handle. A first link may be carried by an end of the lever
20 arm opposite its free end and a second link may interconnect the first link and a first end of the magnet at the first end of the housing, i.e. a displaceable end of the magnet, the second link being pivotally attached to the magnet and to the first link.

The length of the lever arms may be substantially greater than the length of the links such that, when the clamp is in the operative position, the force applied by the
25 lever arms to the first end of the magnet to move the magnet from its operative position to the disengaged position is amplified.

In a second embodiment, the force amplification mechanism may include a cam mechanism. The cam mechanism may comprise a bore in each end of the lever arm opposite the free end of the lever arm, each bore being eccentrically arranged relative to
30 a centre of rotation of the lever arm, and a shaft interconnecting the bores. The shaft may co-operate with a follower arrangement carried by the magnet. The follower arrangement may be formed by a pair of slots, the slots being arranged on opposite sides of the magnet adjacent a first end of the magnet at the first end of the housing.

The clamp may include a limiting device to limit the extent of displacement of
35 the displacement mechanism and magnet relative to the housing.

It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention as broadly described. The present embodiments are, therefore, to be considered in all respects as
5 illustrative and not restrictive.

19. The clamp of claim 18 which includes a compensation member releasably connectable to an exterior region of the housing for absorbing vibrational impacts, the compensation member being arranged between the connector plate and the front end of the housing.

5

20. The clamp of any one of the preceding claims which includes a retaining member arranged to enable the magnet to be suspended in a position intermediate its first position and its second position.

10 21. The clamp of any one of the preceding claims which includes a skirt arranged to increase a frictional coefficient between the magnet and a steel bed when the magnet is positioned on the steel bed.

15 22. The clamp of any one of the preceding claims which includes a cover releasably attached to the housing.

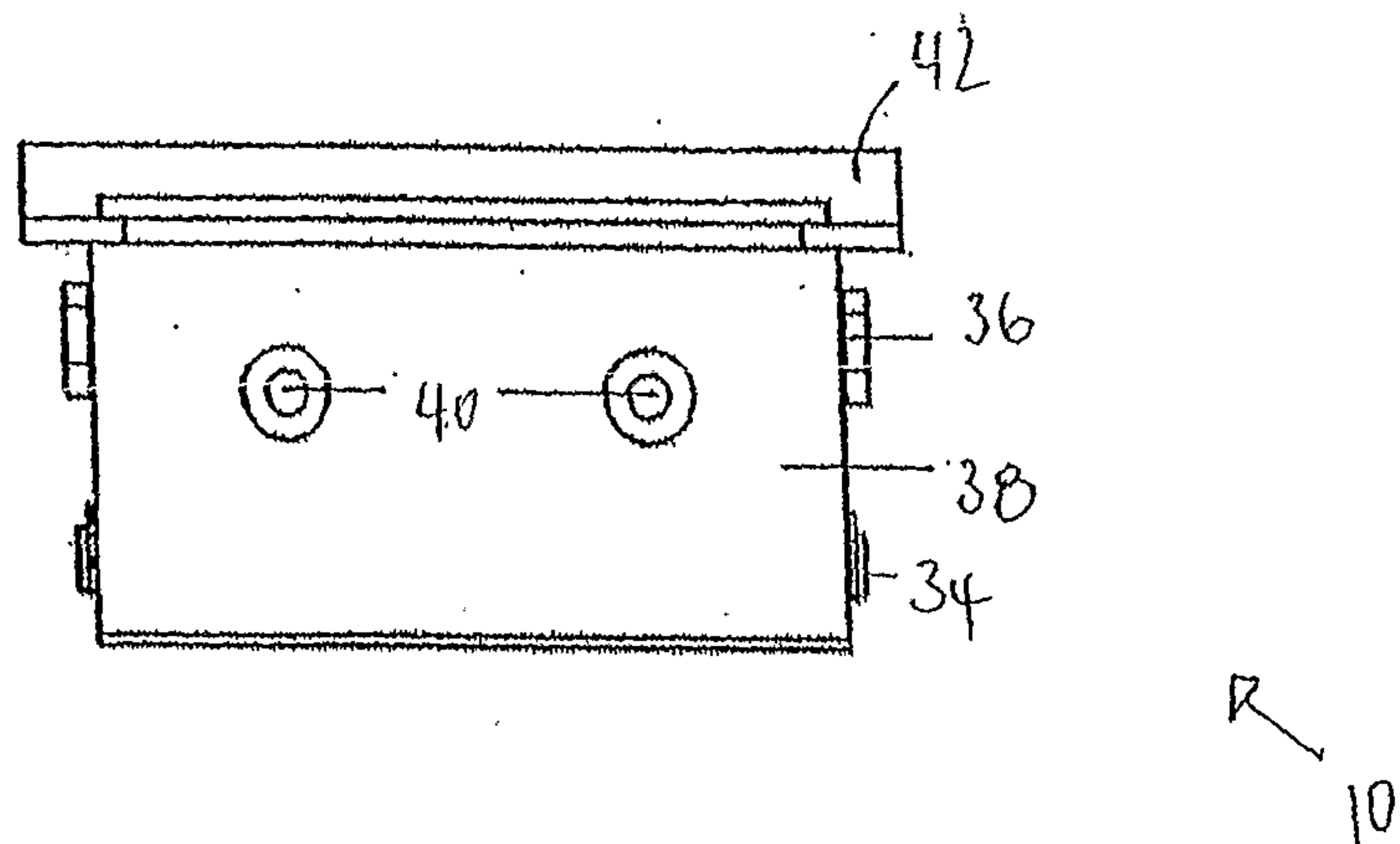
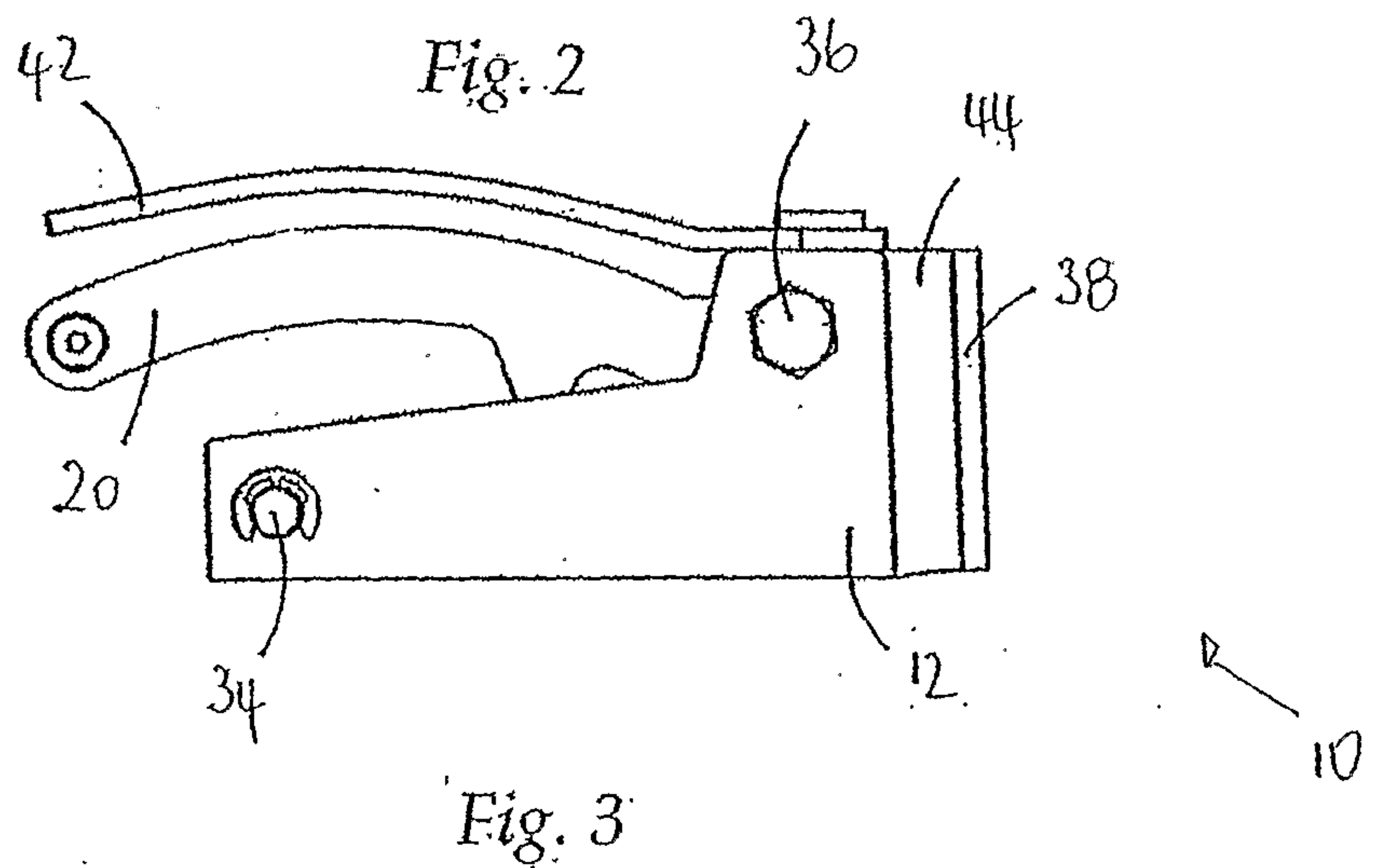
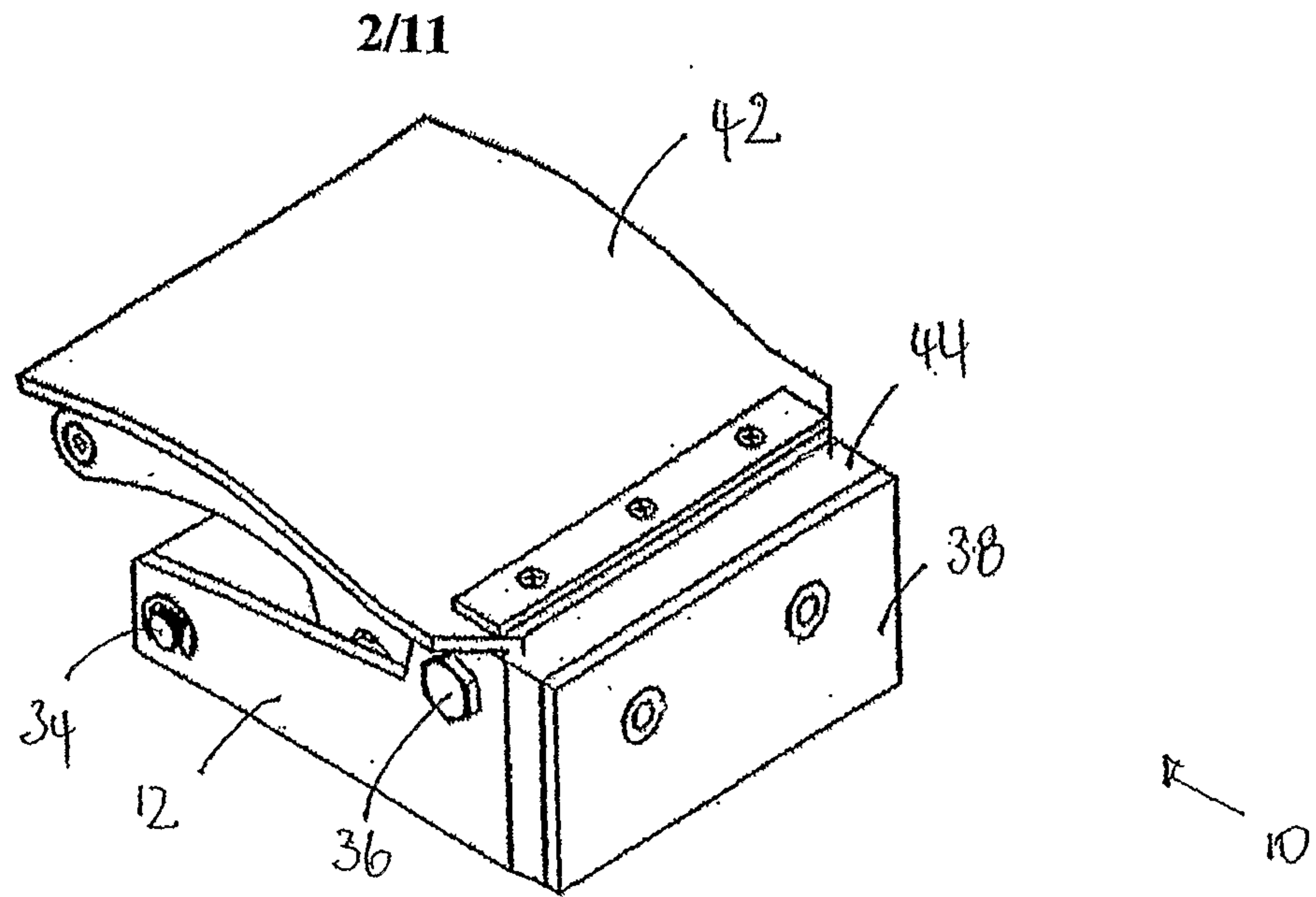


Fig. 4

