

12

EUROPEAN PATENT APPLICATION

21 Application number: 82303732.0

51 Int. Cl.³: **A 61 G 7/00, B 66 F 1/02**

22 Date of filing: 15.07.82

30 Priority: 27.05.82 GB 8215517

71 Applicant: **J. NESBIT-EVANS & COMPANY LIMITED**,
 Holyhead Road, Wednesbury West Midlands WS10 7BL (GB)

43 Date of publication of application: 07.12.83
 Bulletin 83/49

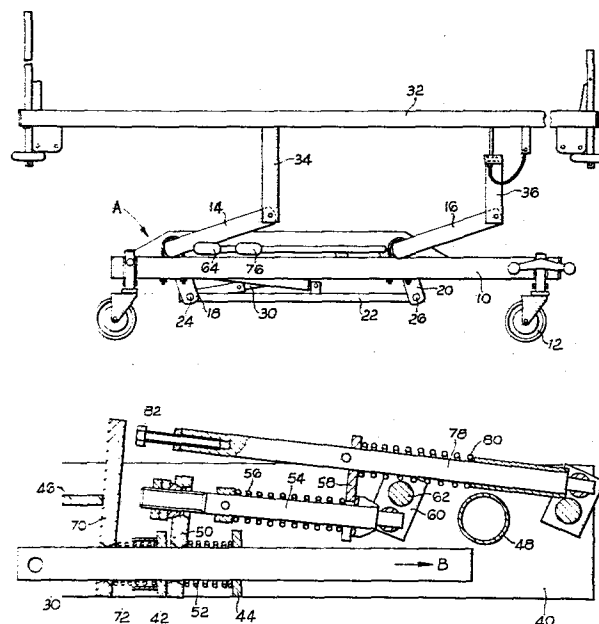
72 Inventor: **Croxton, John Mervyn**, 359 Stourbridge Road
 Catshill, Bromsgrove Hereford & Worcester (GB)
 Inventor: **Hayes, Stephen**, 46 Wallows Wood, Himley
 Staffordshire (GB)
 Inventor: **Jones, Robert Hugh**, 16 Lingfield Avenue
 Fordhouses, Wolverhampton West Midlands (GB)

84 Designated Contracting States: **FR GB SE**

74 Representative: **Hands, Horace Geoffrey et al, GEORGE FUERY & CO** Whitehall Chambers 23 Colmore Row, Birmingham B3 2BL (GB)

54 Improvements relating to beds.

57 A hospital bed or trolley is of the radius arm type in which the base (10) the radius arms (14, 16) and the platform (32) supporting the mattress form a generally parallelogram linkage, and the mechanical jack (30) of the canting plate type displaces a tie rod (22) connecting the radius arm to raise the mattress frame. One of the canting plates (70) wedge-locks the tie rod and has to be tilted to allow lowering of the mattress, and the invention provides a simple construction without any connection between the two pedals.



EP 0 095 538 A1

1.

IMPROVEMENTS RELATING TO BEDS

This invention relates to hospital beds and trolleys of the kind in which the platform to support the patient is mounted on a linkage from a base frame or chassis with a jack for extending the linkage
5 so as to raise the platform.

One early proposal of this kind is contained in our prior Patent 1060120 where the linkage is an X frame and the jack is a hydraulic one. A much more recent proposal is contained in our application
10 No. 2018221 where a mechanical jack is used to move pairs of radius arms, and the platform, base and radius arms together make up a kind of parallelogram linkage.

In beds of this kind the jack provides for
15 elevation of the platform, and the platform is allowed to descend to a lower position under its own weight. Often a gas strut is used as a damper to restrict the rate of descent. Particularly in the case of the mechanical jack, elaborate provision is made
20 for transferring the weight of the platform (and hence of the patient) from one part of the linkage to the other at the end of a period of elevation, or at the commencement of a period of descent, with the object of avoiding jerkiness and shocks which
25 are transmitted to the patient.

The object of the invention is to provide an improved structure.

In accordance with the invention, a hospital bed or trolley has a platform carried on a pair
30 of radius arms forming a generally parallelogram linkage, a tie rod connected between the radius

arms, the rod (or a ram connected to the radius arms) passing through a pair of canting plates of a mechanical jack, an elevating pedal on the end of one limb of a lever which extends generally parallel to said tie rod, a second limb of the lever extending transversely of the tie rod and being fixed to a rocking crank, the crank being coupled to an operating member connected to one of said plates whereby pedal displacement cants the plate to wedge on the rod (or ram) and axially displaces the same to elevate the platform, and the second of the plates being springloaded to a normal canting position in which it wedge-locks the rod (or ram) but allows the same to be drawn therethrough in the platform elevating direction, and a second like pedal for displacing the second plate to the non-canting non-wedge-locking position, characterised in that there is no connection between the two pedals and in that said second pedal is directly and permanently crank connected to a member for displacement of the second plate.

Comparing the invention with the structure in said prior application 2018221, it will be seen that considerable simplification is effected. A complete rod with its springloading abutments and like are omitted and the comparatively complicated linkages connecting the descent pedal to the second plate are also eliminated being replaced by the direct connection.

According to a feature of the invention, the platform is pivotally connected to one of the radius arms and is connected to the other of the radius arms by an adjustable length strut whereby the platform may be tilted relative to the base frame (known per se) and the base frame terminates as close as possible to the mechanism at the foot end of the latter so that maximum tilting of the platform in

a foot down position is possible even at minimum elevations of the platform.

These and other features of the invention will be more clearly understood from the description of a presently preferred embodiment of the invention
5 which is now given in conjunction with the accompanying drawings wherein:-

Figure 1 is a elevation of the bed,

Figure 2 is a plan view of the same with the
10 mattress supporting platform removed, and certain parts cut away for clarity;

Figure 3 is an elevation of the jack structure used in the bed of Figures 1 and 2 and

Figure 4 is a plan view of the same, Figures
15 3 and 4 being on a larger scale than Figures 1 and 2.

Turning now to Figure 1, the bed comprises a base frame 10 provided with a castor 12 at each corner and mounting a pair of radius arms 14 16
20 which are duplicated on opposite sides of the base frame and are journalled on the base frame. The radius arms have crank extensions 18 20 which are coupled by tie rods 22 only one of which is seen in these drawings. This may be effected by providing
25 parallel shafts 24 26 each of which is coupled to the free ends of the corresponding cranks 18 or 20, these shafts 24 26 being interconnected by a single tie rod 22 which may be laterally offset from the centre line of the arrangement, as best
30 seen in Figure 2. The tie rod may be connected to a gas strut or damper 28 and the opposite end of the same is fixed to the front of the base frame, as also seen in figure 2. The jack, which is particularly shown in Figures 3 and 4, comprises a ram 30 which
35 is connected to the shaft 24 so that the action of the jack is to swing the shaft 24 anticlockwise

during elevation of the bed platform 32.

The platform 32 is connected to the radius arms 14 and 16 by a pair of links 34 towards the foot end of the bed and by a pair of adjustable
5 links 36 towards the head end of the bed. The former are connected to the radius arms 14 and the latter to the radius arms 16. The adjustment, by extending the effective length of the links 36 tilts the foot end of the platform 32 downwardly (or vice versa),
10 and it will be noted (particularly from Figure 2) that the base frame extends forwardly of the radius arms 18 by relatively small dimension so that maximum foot down tilt can be achieved even when the bed platform is at minimum elevation, and without the
15 platform contacting the base frame in the area indicated by the arrow A of Figure 1.

The radius arms are journalled by diametrically split shell bearings clamped to the base frame by "U" bolts.

20 Turning now to the jack construction of Figures 2 and 4, this comprises a pair of side plates 40 which are connected together by transversely extending plates 42-46 which also form abutments as will be hereinafter explained. Additionally, the side plates
25 40 are connected by a carrier member 48 which is used to mount the jack in the base frame.

A first canting plate 50 abuts the jack member 42 and is urged by compression spring 52 trapped between it and the jack body member 44. This plate
30 50 is the one used to displace the ram 30 in the direction of the arrow B of Figure 3 and elevate the platform. Displacement is effected by tie rod 54 which is urged by spring 56 trapped between an

abutment on the rod and a loose abutment plate 58,
and the rod 54 is connected to crank 60 which is
fast with the limb 62 of the first pedal shaft.
The pedal shaft is generally L-shaped with its second
5 limb extending forwardly and approximately parallel
to the ram 30, and the shaft is journalled in the
plates 40 of the jack body. When the pedal 64 is
depressed the crank is rocked anticlockwise, the
tie rod 54 is displaced generally in the direction
10 of the arrow B, the canting plate 50 tilts (because
it is restrained in its lower end by the spring
52) the plate wedges on the ram 30, and the rod
is displaced in the direction of arrow B. When
the pedal is released, the springs return it and
15 the tie rod 54 and plate 50 to the positions illustrated
in Figures 1 and 3 respectively.

The ram 30 passes through a second and locking
plate 70 which rocks on the abutment 46 and is urged
to the illustrated position by spring 72 which is
20 a compression spring abutting against the opposite
side of the plate 42 to that abutted by the first
plate 50. The spring 72 cants the second plate
70 into the locking position, but movement of the
ram 30 in the direction of the arrow B is accompanied
25 by slight movement of the plate against the spring
72 to allow the ram to be drawn through the plate.
Any tendency towards reverse movement permits the
spring to wedge the plate 70 on the ram and prevent
reverse movement of the ram 30.

30 The second pedal 76 is connected to a corresponding
pedal shaft likewise journalled and crank connected,
but this time connected to rod 78 which is urged
generally in the direction of arrow B by compression
spring 80 trapped between abutment on the rod and
35 the floating abutment 58. The free end of rod 78

carries a striker 82, here shown as an adjustable member, which, on depression of pedal 76 is generally axially displaced against the plate 70 to counter-balance the same and overcome the spring 72 to allow the
5 rar 30 to move in the direction opposite to that of arrow R.

It will be appreciated that because there is no interconnection between the rods 54 and 78 movement of either completely independently of the
10 other is possible. This is a particularly simple jack mechanism which is economical to manufacture.

Nevertheless it has been found in experiments that the illustrated construction does not result in any jar to the platform when descent commences
15 despite the absence of complicated provisions for transferring load from one pedal operated mechanism to the other.

7.
CLAIMS

1. A hospital bed or trolley having a platform
32 carried on a pair of radius arms 14, 16 forming
a generally parallelogram linkage, a tie rod 22
connected between the radius arms, the rod (or
5 a ram 30 connected to the radius arms) passing
through a pair of canting plates 50, 58 of a mechanical
jack, an elevating pedal 64 on the end of one limb
of a lever which extends generally parallel to
said tie rod, a second limb 62 of the lever extending
10 transversely of the tie rod and being fixed to
a rocking crank 60, the crank being coupled to
an operating member 54 connected to one of said
plates 50 whereby pedal displacement cants the
plate to wedge on the rod (or ram) and axially
15 displaces the same to elevate the platform, and
the second of the plates 70 being springloaded
to a normal canting position in which it wedge-locks
the rod (or ram) but allows the same to be drawn
therethrough in the platform elevating direction,
20 and a second like pedal 76 for displacing the second
plate to the non-canting non-wedge-locking position,
characterised in that there is no connection between
the two pedals 64, 76 and in that said second pedal
is directly and permanently crank connected to
25 a member 78 for displacement of the second plate.

2. A hospital bed or trolley as claimed in Claim
1 wherein the platform 32 is pivotally connected
to one of the radius arms 14, 34 and is connected
to the other of the radius arms 16 by an adjustable
30 length strut 36 whereby the platform may be tilted
relative to the base frame (known per se) and the
base frame 10 terminates as close as possible to
the mechanism at the foot end of the latter so
that maximum tilting of the platform in a foot
35 down position is possible even at minimum elevations

of the platform.

3. A hospital bed or trolley as claimed in Claim
1 or Claim 2 characterised in that the operating
member 54 for displacing the canting plate which
5 effects elevation of the platform 32 extends through
a compression spring 56 which serves to return
the pedal to the starting position after operation
and release.

4. A hospital bed or trolley as claimed in Claim
10 3 wherein a loose abutment 58 forms a reaction
member for said compression spring 56 and also
for a like compression spring 80 operative to turn
the second pedal to the starting position after
operation and release.

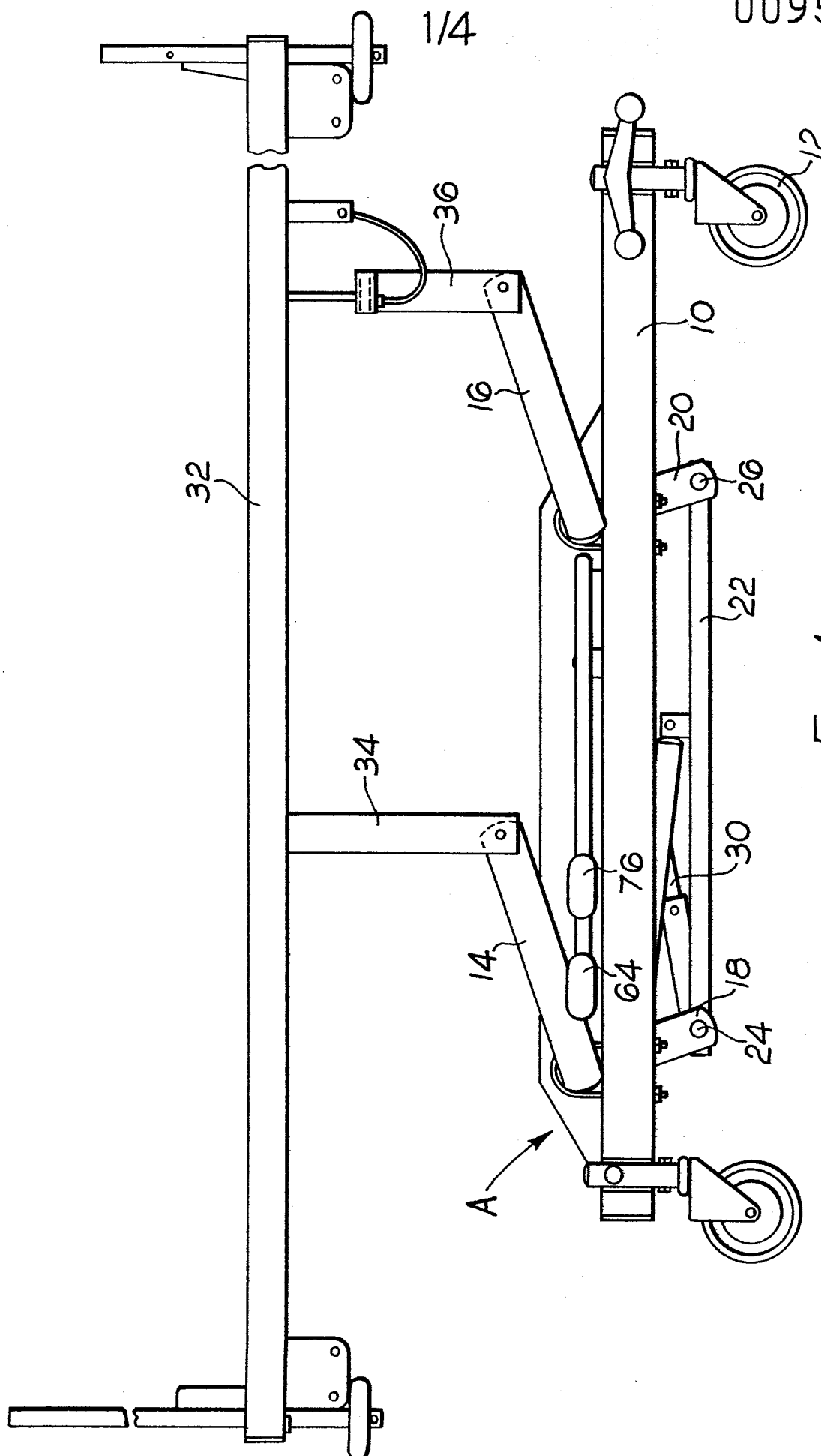


Fig. 1

2/4

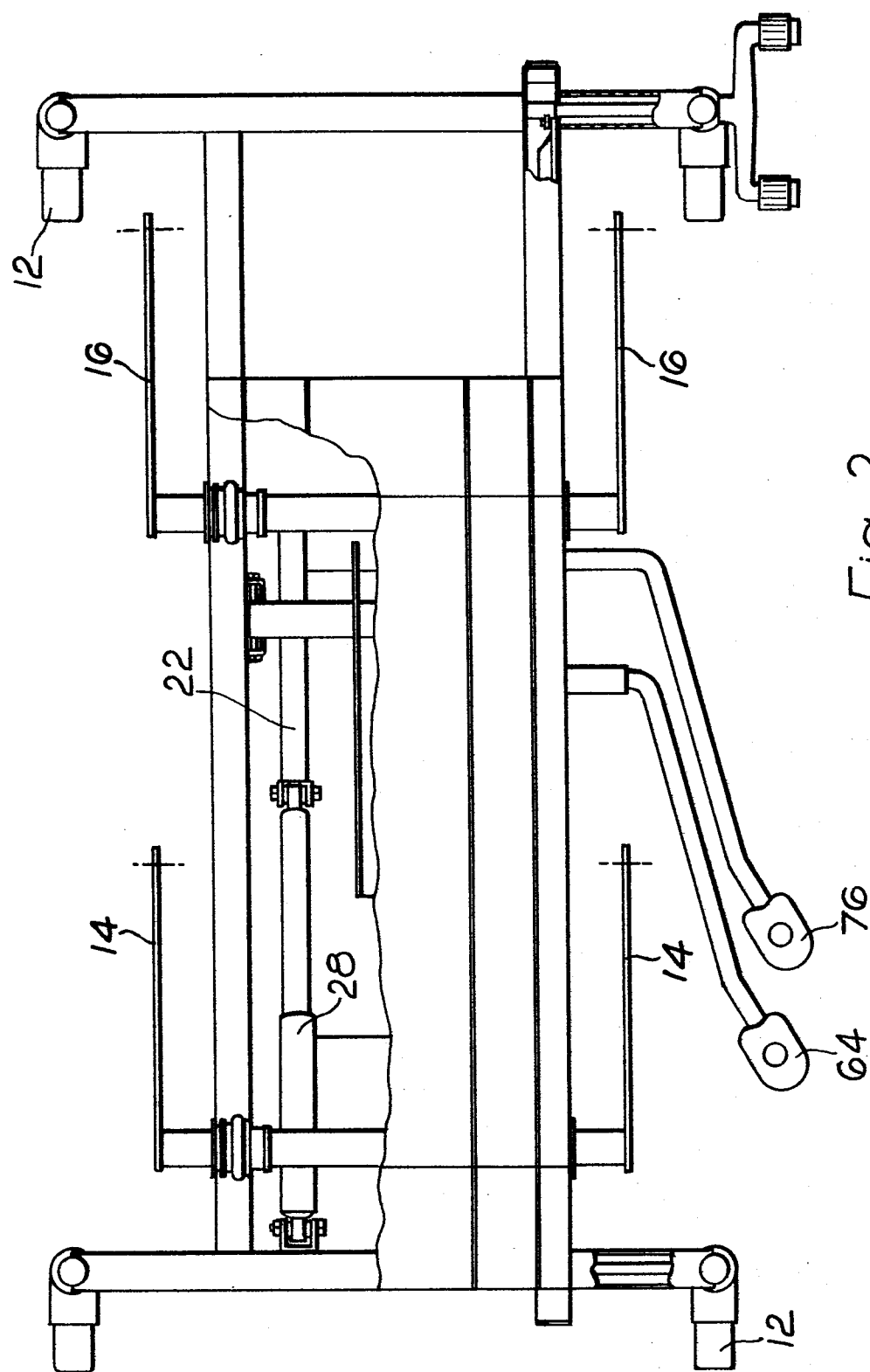


Fig. 2

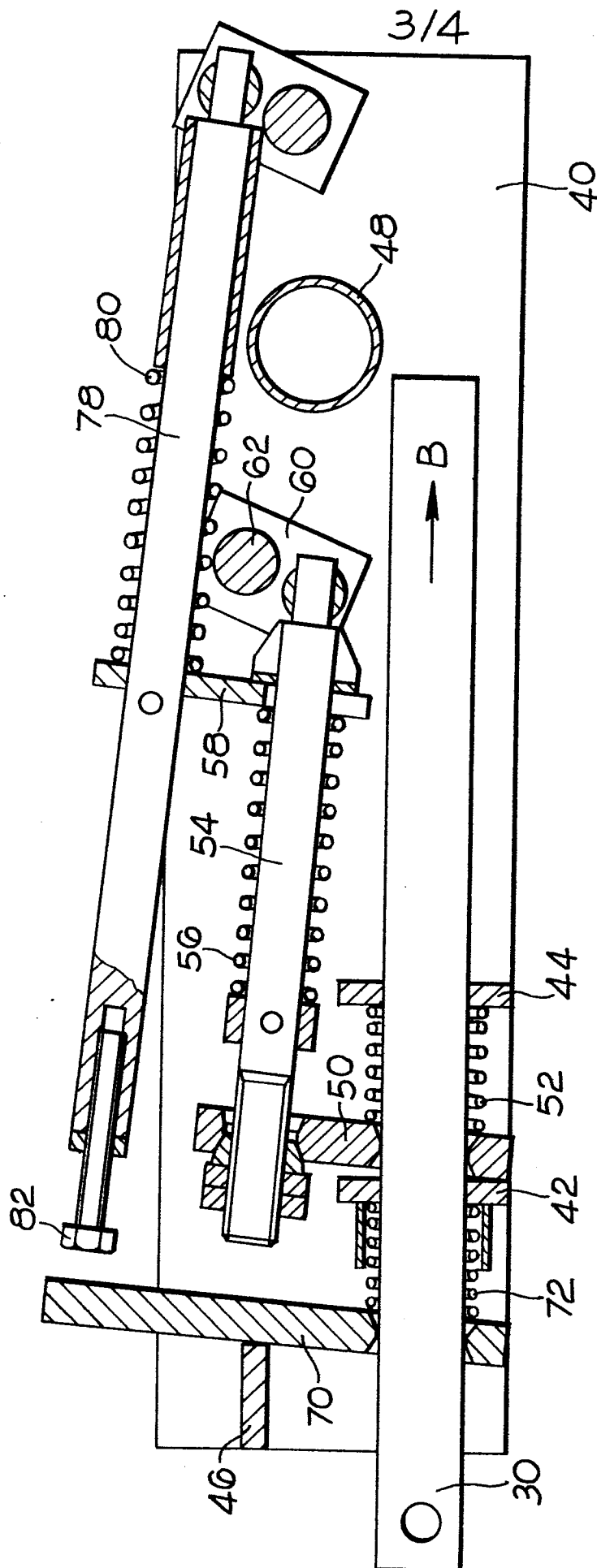
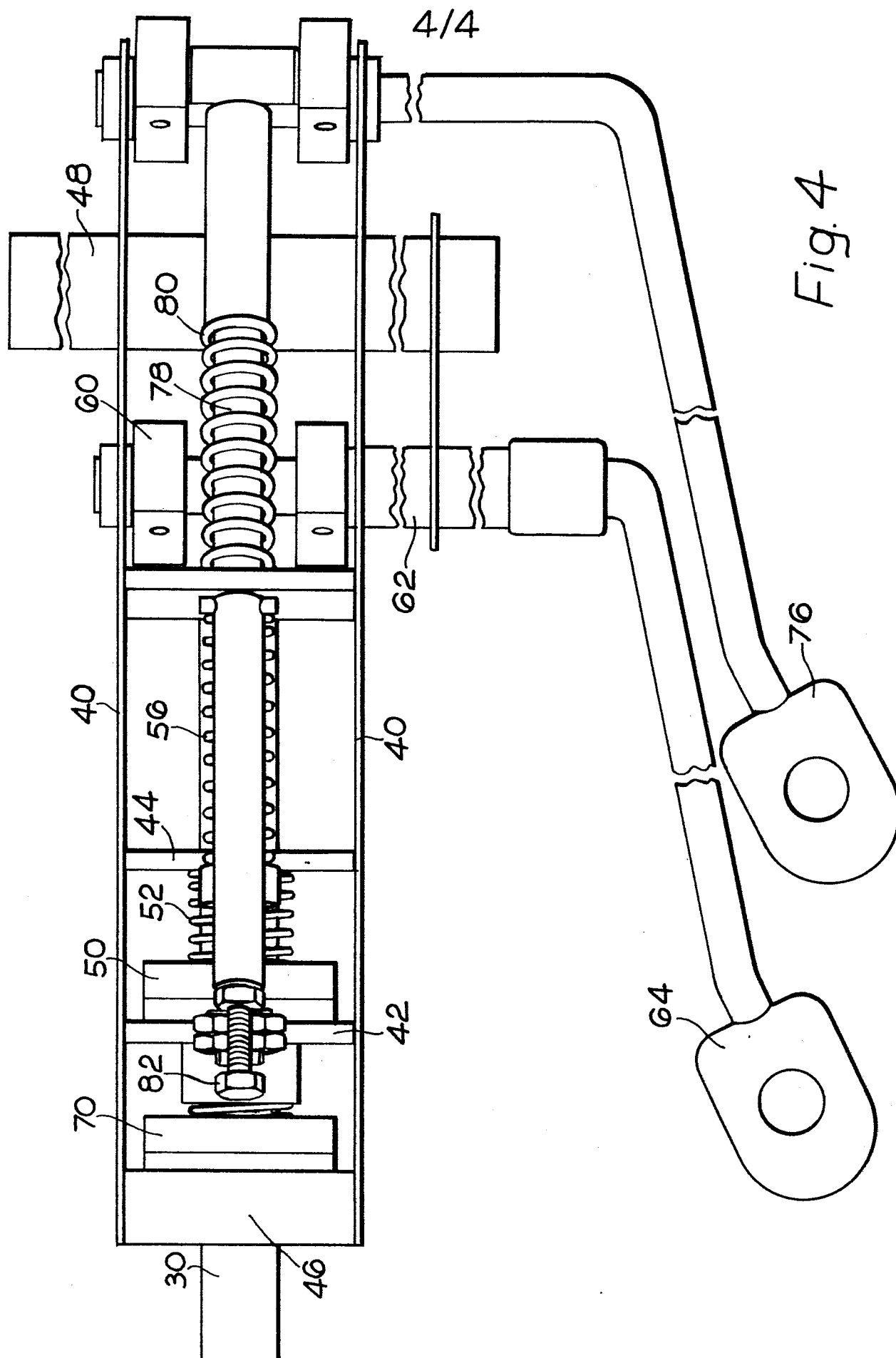


Fig. 3





European Patent
Office

EUROPEAN SEARCH REPORT

0095538

EP 82 30 3732

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
D,Y	GB-A-2 018 221 (NESBIT-EVANS) * Whole document *	1,3,4	A 61 G 7/00 B 66 F 1/02
Y	GB-A-2 073 140 (KIMURA) * Whole document *	1,3,4	
			TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
			A 61 G B 66 F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 19-08-1983	Examiner VAN BOGAERT J.A.M.M.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	