United States Patent [19]

Hanning et al.

[11] **3,921,230**

[45] **Nov. 25, 1975**

[54] **APPARATUS FOR RAISING THE END OF A BED MATTRESS**

[76] Inventors: **Robert Hanning,** Via Tagliaferri 15, Campione d'Italia, Italy; **Gernot Neumann,** Teichstrasse 3, Oerlinghausen, Germany

[22] Filed: **May 24, 1974**

[21] Appl. No.: **472,989**

[30] **Foreign Application Priority Data**

May 25, 1973 Germany 2326709

[52] **U.S. Cl.** **5/68;** 5/66

[51] **Int. Cl.²** **A47B 83/04;** A61G 7/10

[58] **Field of Search** 5/61, 63, 64, 66, 68, 328

[56] **References Cited**

UNITED STATES PATENTS

2,582,565	1/1952	Schnippel et al.	5/68
3,127,619	4/1964	Bronstien	5/68
3,593,350	7/1971	Knight	5/66
R26,411	6/1968	Alsobrook, Jr.	5/64

Primary Examiner—Casmir A. Hunberg
Attorney, Agent, or Firm—Karl F. Ross; Herbert Dubno

[57] **ABSTRACT**

The end regions of a bed mattress lie on a closed frame which is hung from a pair of parallel side beams bridged by a pair of parallel end beams and which has a rotatable actuating rod extending between the side beams and provided at each end with a hanger supporting the rod. This rod is provided with a pair of adjustment arms engageable with the mattress and with a crank connected to one end of a longitudinally extendable motor whose other end is carried on a rigid support assembly connected by hangers to the frame at locations remote from the hangers on the rod. This support assembly may comprise a simple bar extending back from the rod and connected via a hanger to the end beam of the bed or may comprise another rod parallel to the first-mentioned rod and connected via a rigid bar to the first-mentioned rod. It is also possible to provide this second rod with lifting arms driven by an operating crank so as to raise both ends of the mattress.

7 Claims, 5 Drawing Figures

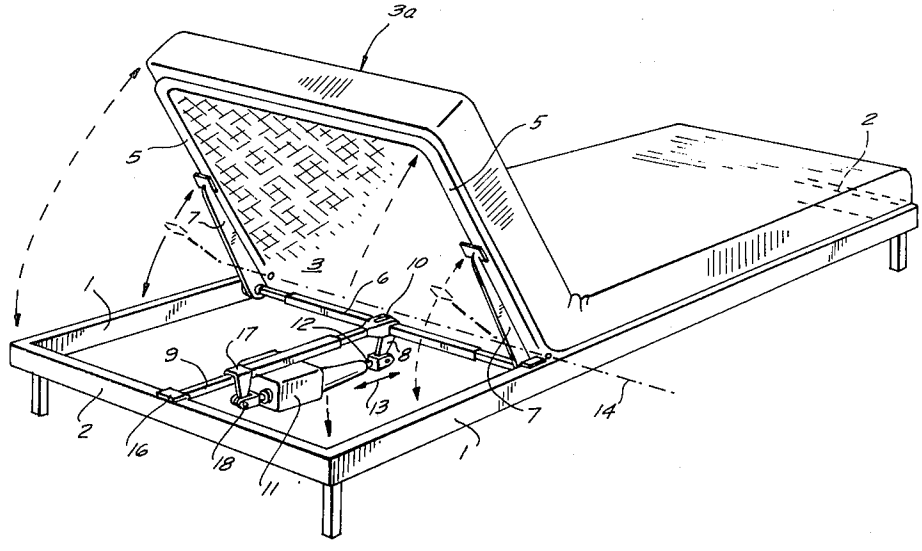


FIG. 1

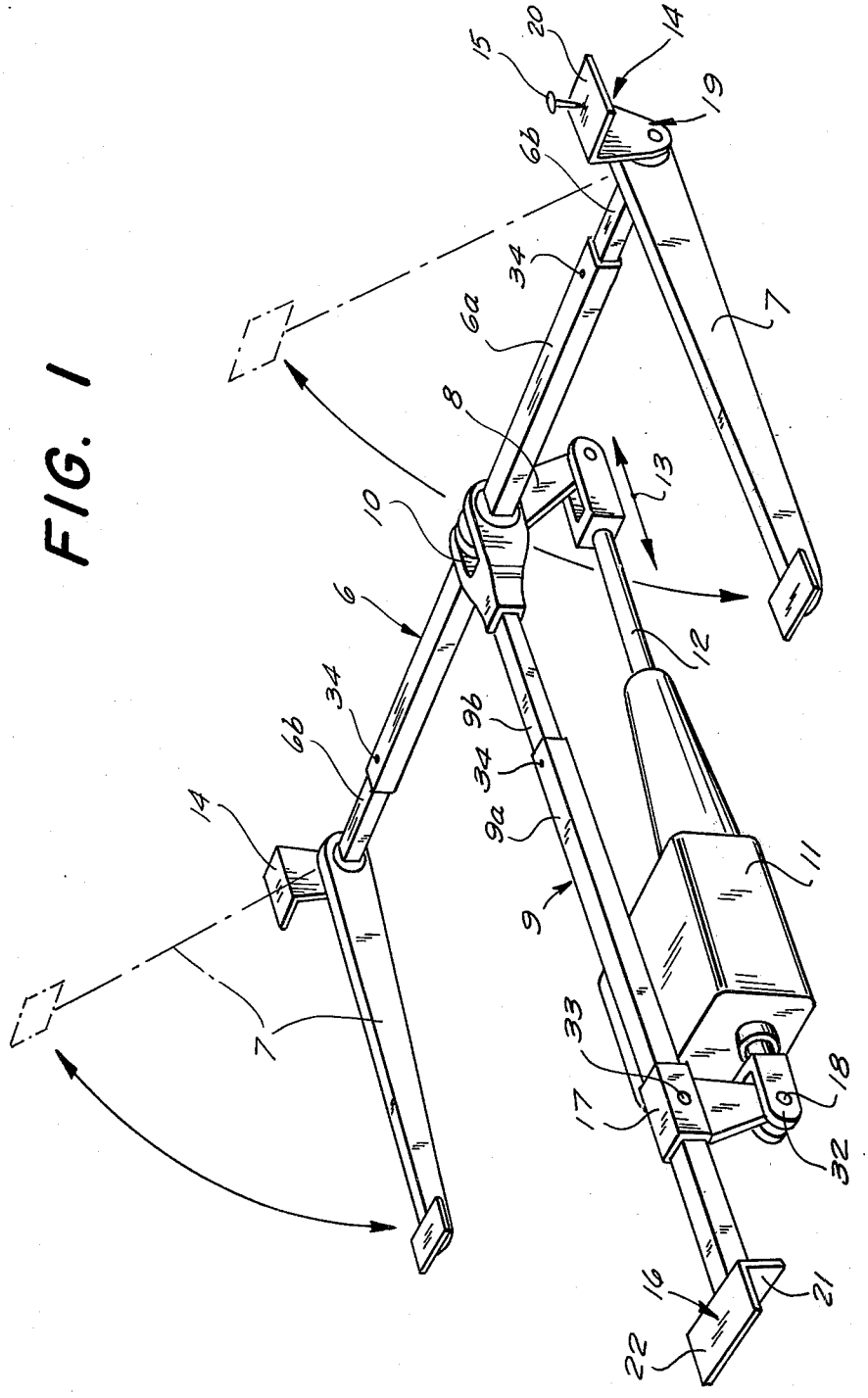

15
20
14
19
6b
34
6a
7
8
13
10
6
12
34
6b
9b
34
9a
14
11
9
7
33
17
18
32
16
21
22

FIG. 2

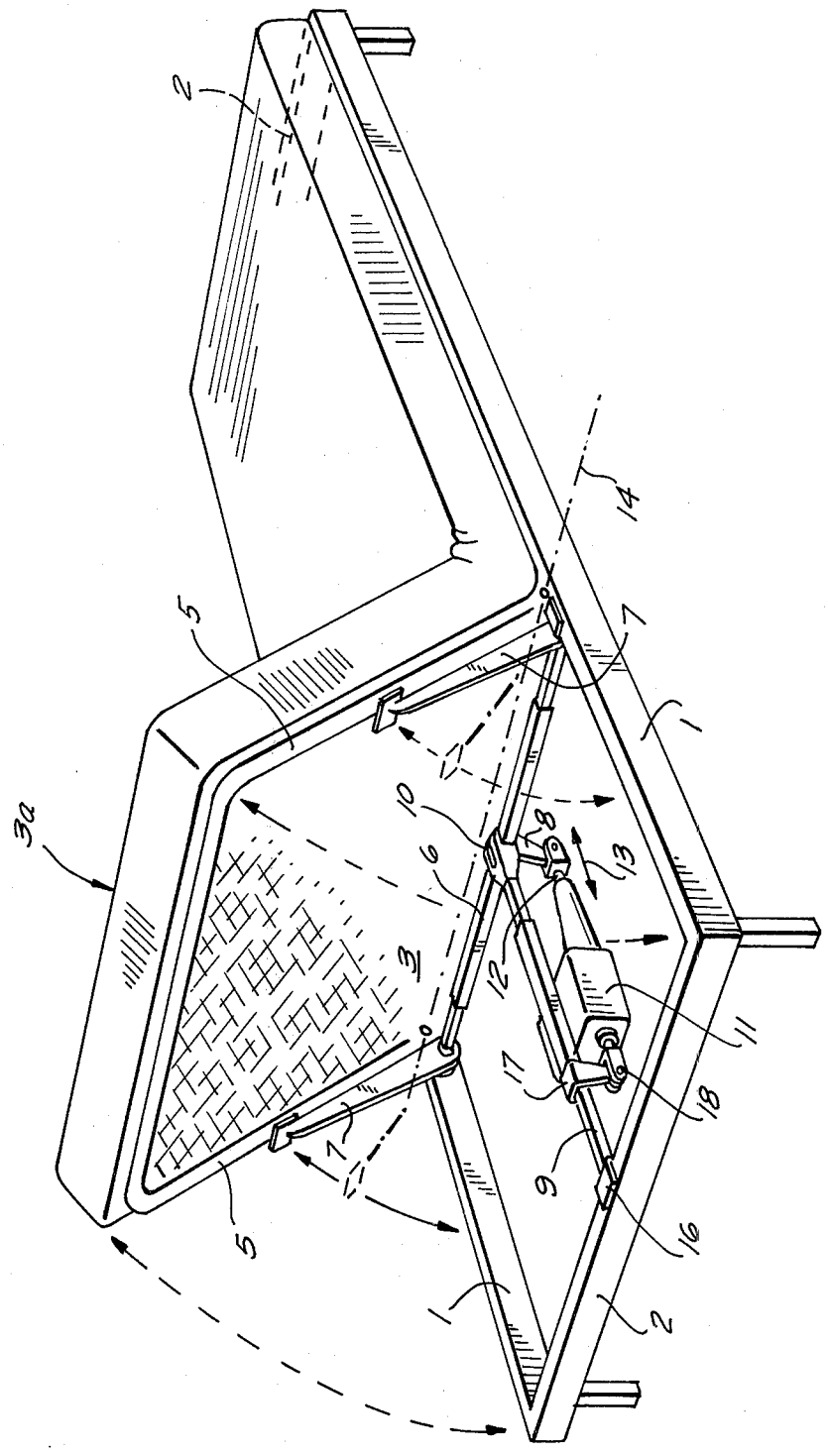
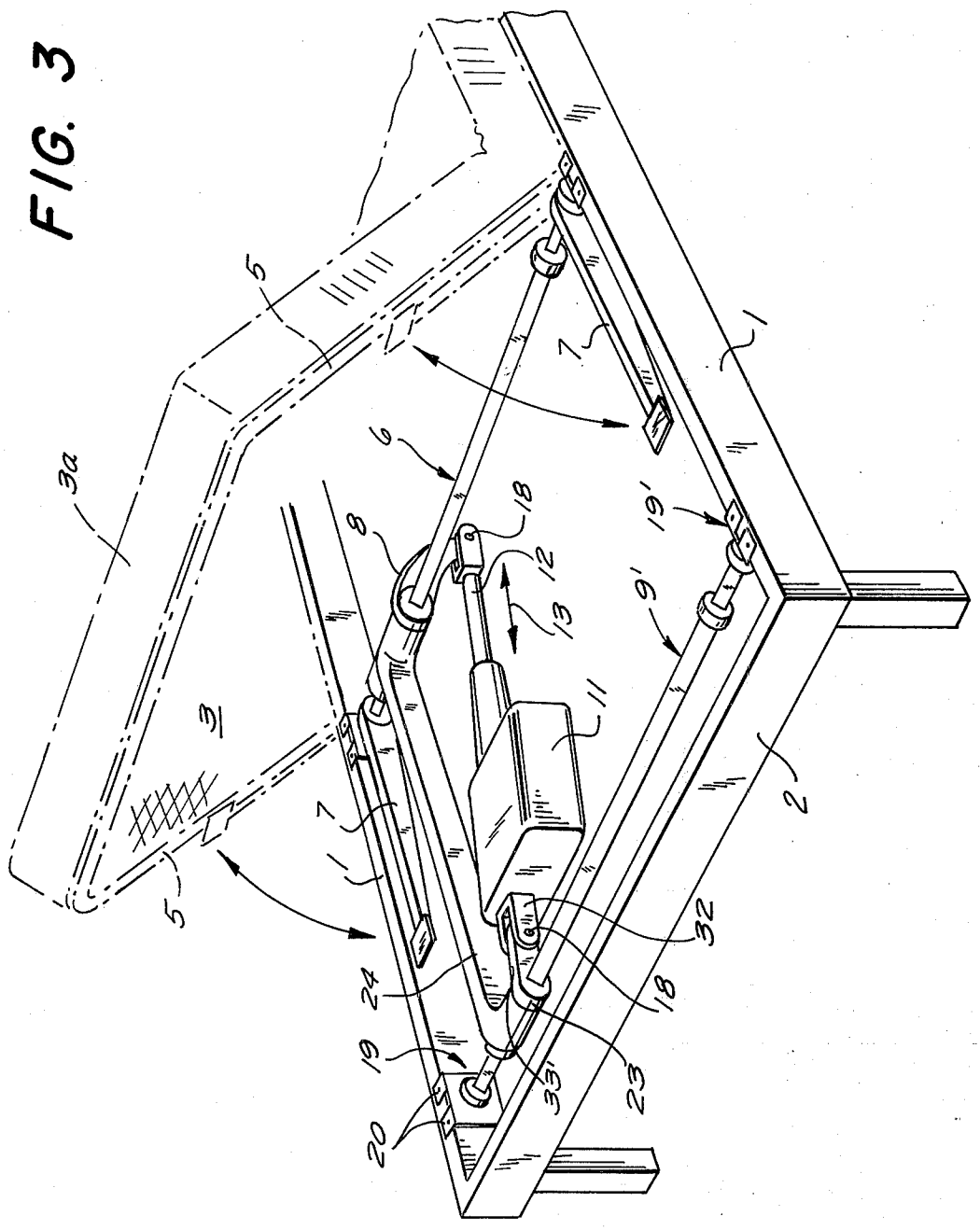


FIG. 3



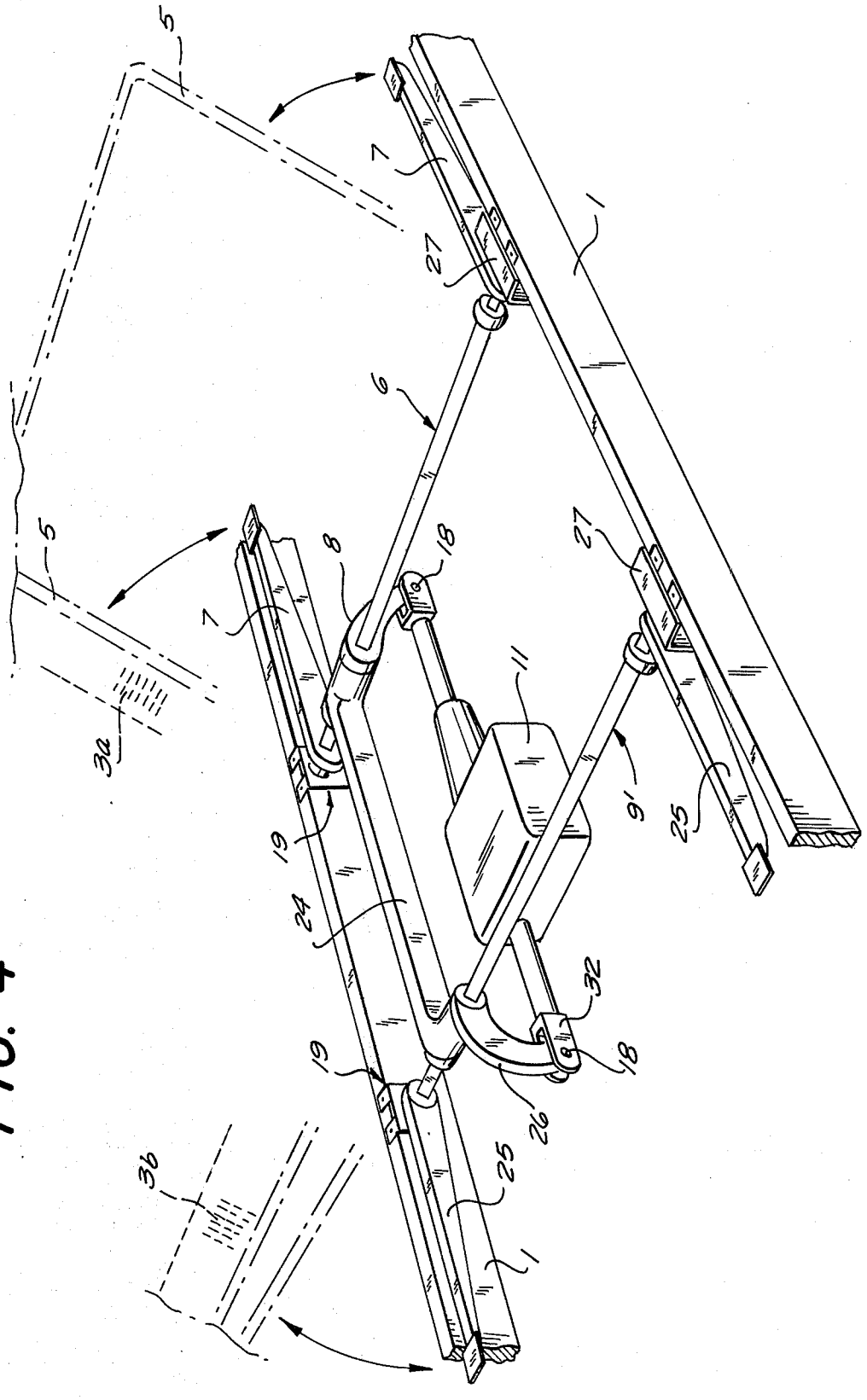


FIG. 4

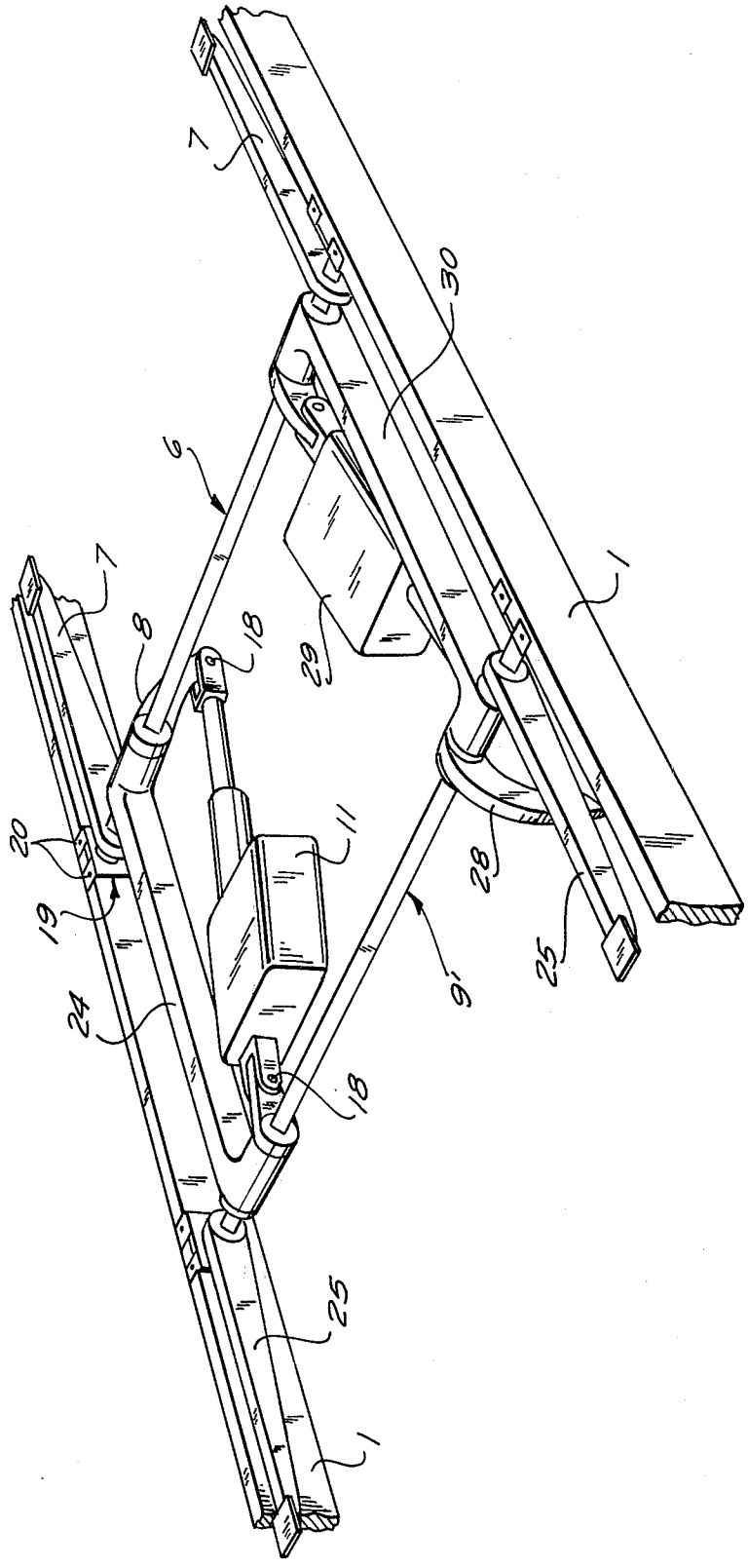


FIG. 5

APPARATUS FOR RAISING THE END OF A BED MATTRESS

FIELD OF THE INVENTION

The present invention relates to an apparatus for lifting a portion of a mattress. More particularly this invention concerns such an apparatus suitable for raising the ends of a mattress lying on a closed rectangular frame formed of a pair of parallel side beams bridged by a pair of parallel end beams.

BACKGROUND OF THE INVENTION

Hospital beds are known wherein the ends of the mattress can be raised so as to elevate the head or the feet of the user. As a general rule such beds are very expensive so as to place them out of the reach of a person needing a long-term recuperation at home. The apparatus which serve to raise the end or ends of the mattress is relatively complex so that it has hitherto been impossible to adapt a conventional bed to operate as a hospital bed.

OBJECTS OF THE INVENTION

It is therefore an object of the present invention to provide an assembly which can be used with a conventional bed so as to raise one or both ends of the mattress.

Another object is the provision of such an apparatus which is relatively inexpensive.

Yet another object is to provide such an apparatus which can readily be installed.

SUMMARY OF THE INVENTION

These objects are attained according to the present invention in an apparatus comprising an actuating rod extending generally parallel to one of the pairs of side or end beams of the frame and supported on the other of the pairs by hangers provided at its ends. At least one adjusting arm extending radially from and rotationally secured to the rod is operatively engageable with the portion of the mattress to be raised so that on rotation of the rod about its longitudinal axis that portion is lifted. A crank extending radially from and rotationally secured to the rod is connected to one end of a motor which is extensible in a direction transverse to the rod. The other end of the motor is connected to a rigid support assembly having one end attached to the rod and another end connected to the frame at a location remote from the hangers of the rod.

Such an apparatus can be set into an existing bed frame and can readily function to raise the end of the mattress. The number of working parts is minimal so that the cost of such a device is low and its service life is long.

In accordance with another feature of this invention each of the hangers is generally L-shaped, comprising a rigid plate adapted to overlie the respective beam and another plate extending at right angles thereto and adapted to press against one of the inner faces of the beam. The overlying plate is advantageously screwed or otherwise clamped to side beam of the bed.

The support assembly according to this assembly can comprise a single rigid bar extending from the rod to a hanger secured to one of the end beams of the bed, or this bar can extend to a second such rod parallel to the first-mentioned rod and similarly secured via hangers at its ends to the side beams of the bed.

According to further features of this invention this second rod is also rotatable and is provided with lifting arms and an operating crank so that the arrangement may be placed in the middle of a bed with the lifting arms extending in opposite directions so as to be able to lift either of the ends of the bed. To this end means is provided for preventing rotation of one of the rods which entails locking the respective crank relative to the rigid bar of the support assembly.

In accordance with yet another feature of this invention each of the rods is formed of a pair of polygonal-section telescoping parts which are secured together by clamping means such as grub or set screws. Thus the size of the arrangement can readily be adjusted for beds of different widths.

The invention according to the present invention can be produced at relatively low cost so that without considerable expense a person needing the features of a hospital bed can buy a simple apparatus which converts his own bed into an adjustable hospital-type bed. The device can be readily set up to operate with twin size or double beds.

BRIEF DESCRIPTION OF THE DRAWING

The above objects, features, and advantages will become more readily apparent from the following description, reference being made to the accompanying drawing in which:

FIG. **1** is a perspective view of the apparatus according to this invention;

FIG. **2** is a perspective view of a bed equipped with the apparatus of FIG. **1**; and

FIGS. **3**, **4**, and **5** are further perspective views of three other configurations in accordance with this invention.

SPECIFIC DESCRIPTION

As shown in FIGS. **1** and **2** a bed frame comprises longitudinally extending and parallel side beams **1** whose ends are bridged by parallel and transversely extending end beams **2**. A mattress **3** lying on top of this frame **1**, **2** has an end region **3***a* adapted to be pivoted upwardly about an axis **4** of a pivotal U-shaped support member **5**.

The apparatus according to the present invention comprises a rod **6** extending parallel to the end beams **2** and carrying on each end a radially extending lifting arm **7** which engages the framework **5**. Thus rotation of the rod **6** about its own axis will raise the arms **7** and lift the end section **3***a* as shown in FIG. **2**.

The rod **6** is provided with a crank **8** and is rotatable in a fork **10** fixed to one end of a bar **9** extending parallel to the side beams **1**. A motor **11** has an operating rod **12** which is reciprocal as shown by double-headed arrow **13** in a direction transverse to rod **6**.

The rod **6** at each end is journaled in one plate **19** of an L-shaped hanger **14** whose other plate **20** is adapted to overlie the respective beam **1**, while the plate **19** is adapted to press against the surface. A screw **15** passes through each of the upper plates **20** so as to secure the assembly snugly in place. Another such hanger **16** is provided at the free end of the bar **9** with its vertical plate **21** pressing against the inner face of the end beam **2** and its horizontal plate **22** overlying this end beam **1**, another screw **15** being provided to secure it in place.

The other end of the motor **11** is provided with a fork **32** pivoted at **18** on a bracket **17** slidable along the bar **9** and securable thereon by a set screw **33**. The rod **9** is

formed by a pair of telescoping sections **9***a* and **9***b* which are secured together by a set screw **34.** Similarly the rod **6** is formed by three such telescoping sections, and outer section **6***a* and two inner sections **6***b* secured again by set screws **34.** Thus it is possible to adjust the apparatus in accordance with the present invention to fit a wide range of different bed sizes.

The arrangement shown in FIG. **3** is identical to that shown in FIGS. **1** and **2** except that a second rod **9'** is provided parallel to the first rod **6** and is provided at each end with a hanger **19'** having fingers **20** overlying the side beams **1.** A rigid bar **24** extends between the two rods **6** and **9'** and a mounting block **23** secured to the rod **9'** by a set screw **33'** holds the fork **32** of the motor **11.** The rod **9'** is extensible like the rod **6.** This arrangement is particularly useful in beds where the entire end section **3***a* is not to be lifted but a portion inward of the end section so as to raise the knees of the user.

In FIG. **4** another arrangement is shown which is adapted to lift end sections **3***a* and **3***b* of a mattress. Reference numerals identical to those in FIGS. **1–3** are used for identical structure. Here the principal difference lies in that the fork **32** on the end of the motor is secured via a crank **26** to the rod **9'** which itself carries two lifting arms **5** adapted to raise the end **3***b*. Clutches **27** are provided at the ends of each of the rods **6** and **9** so as to prevent rotation of the respective rod. Thus the user locks the clutch of rod **6** and operates the motor **11** so that portion **3***b* of the bed will be raised whereas locking of the clutch **9'** and releasing the other clutch will cause the motor **11** to raise the head **3***a* of the bed.

In the arrangement according to FIG. **5** similar reference numerals are again used for identical structure. Here a second bar **30** extending between the rods **6** and **9'** and a second motor **29'** is pivoted at one end on the rod **6** and at the other end on a crank **28** carried on the rod **9'**. In this manner the two ends of the mattress can be lifted independently or jointly. Again the rods **6** and **9'** are telescoping as described with reference to FIGS. **1** and **2** so as to permit the apparatus to be adjusted for any width bed.

We claim:

1. For use in combination with a hospital-type bed frame having parallel longitudinal sides and parallel transverse sides and a mattress having a portion hinged for displacement relative to another portion and resting on said frame, a mattress-displacing unit engageable with said displaceable portion of said mattress for selectively raising and lowering same, said unit comprising:

a rigid shaft extending transversely to said longitudinal sides;

first hanger means engaging said shaft at opposite ends thereof and mounting said shaft on said longitudinal sides for rotation of said shaft;

a stationary rigid bar rotatably engaging said shaft at one end of said bar and extending perpendicular to said shaft for retaining said shaft at a fixed location relative to the other end of said bar;

further hanger means at said other end of said bar engageable with a side of said frame;

at least one lifting arm extending radially from said shaft and rotatably entrained therewith, said arm having a free end bearing on the undersides of said displaceable portion of said mattress for raising and lowering same relative to said frame upon rotation of said shaft;

a crank lever carried by said shaft and rotatably entraining same;

a linear positioning motor having relatively displaceable parts, one of said parts being articulated to said crank; and

means for mounting the other of said parts on said stationary bar between said ends thereof.

2. The apparatus defined in claim **1** wherein each of said hanger means comprises an L-shaped bracket having a flange adapted to overlie a respective side of said frame and a shank lying within said frame along an inner face of the respective side.

3. The apparatus defined in claim **1** wherein said shaft has a pair of such arms at either end of said shaft for engagement with opposite longitudinal sides of the displaceable portions of said mattress.

4. The apparatus defined in claim **1** wherein another rigid shaft is provided at said other end of said bar and said further hanger means includes respective hangers for mounting said further shaft rotatably on said longitudinal sides of said frame, said means for mounting said other of said parts on said bar includes a further crank connected to said further shaft and articulated to said other part.

5. The apparatus defined in claim **1** wherein said bar includes a pair of telescoping parts and clamping means for locking the telescoping parts together.

6. The apparatus defined in claim **5** wherein said telescoping parts are of polygonal cross-section.

7. The apparatus defined in claim **5** wherein said clamping means includes a screw threaded into one of the telescoping parts.

* * * * *