United States Patent [19]

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[11] **3,894,598**

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[54] **TELESCOPIC BEAM FORMED OF TWO SLIDABLY MOUNTED LENGTHS AND AN ORGAN FOR CONTROLLING THE RELATIVE POSITIONS OF THESE LENGTHS RELATIVE TO ONE ANOTHER**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** ..... **180/9.48**; 280/34 R; 403/330; 52/115

[51] **Int. Cl.** **B62d 55/06**

[58] **Field of Search** ..... 180/9.48; 280/34 R; 403/138, 330, 322; 52/111, 115, 52/117, 118, 632

[56] **References Cited**

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[57] **ABSTRACT**

The invention relates to a telescopic beam formed of two slidably mounted lengths and an organ for controlling the relative positions of these lengths relative to one another.

A locking apparatus permits selective locking and unlocking of the lengths.

One application is the construction of a tracked appliance with a variable gauge.

5 Claims, 4 Drawing Figures

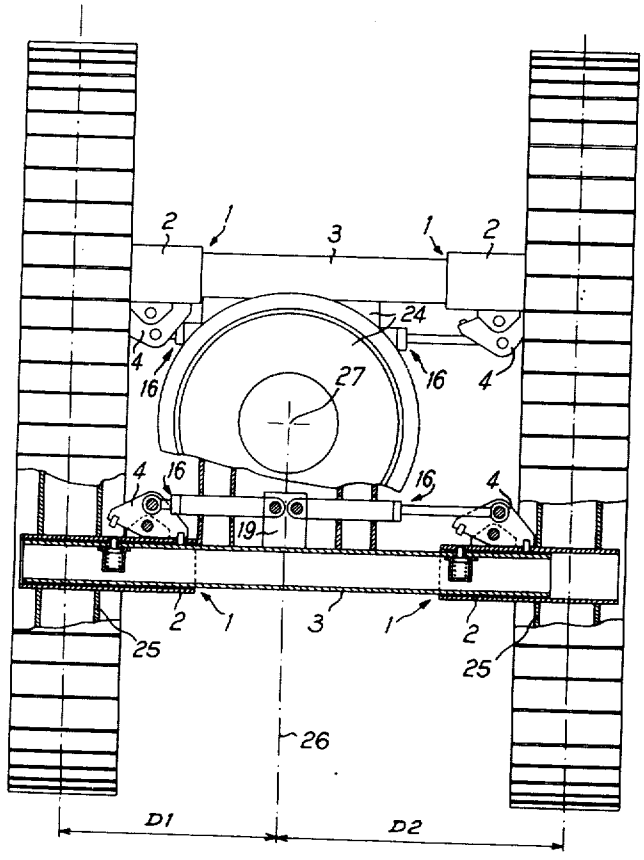


FIG. 1

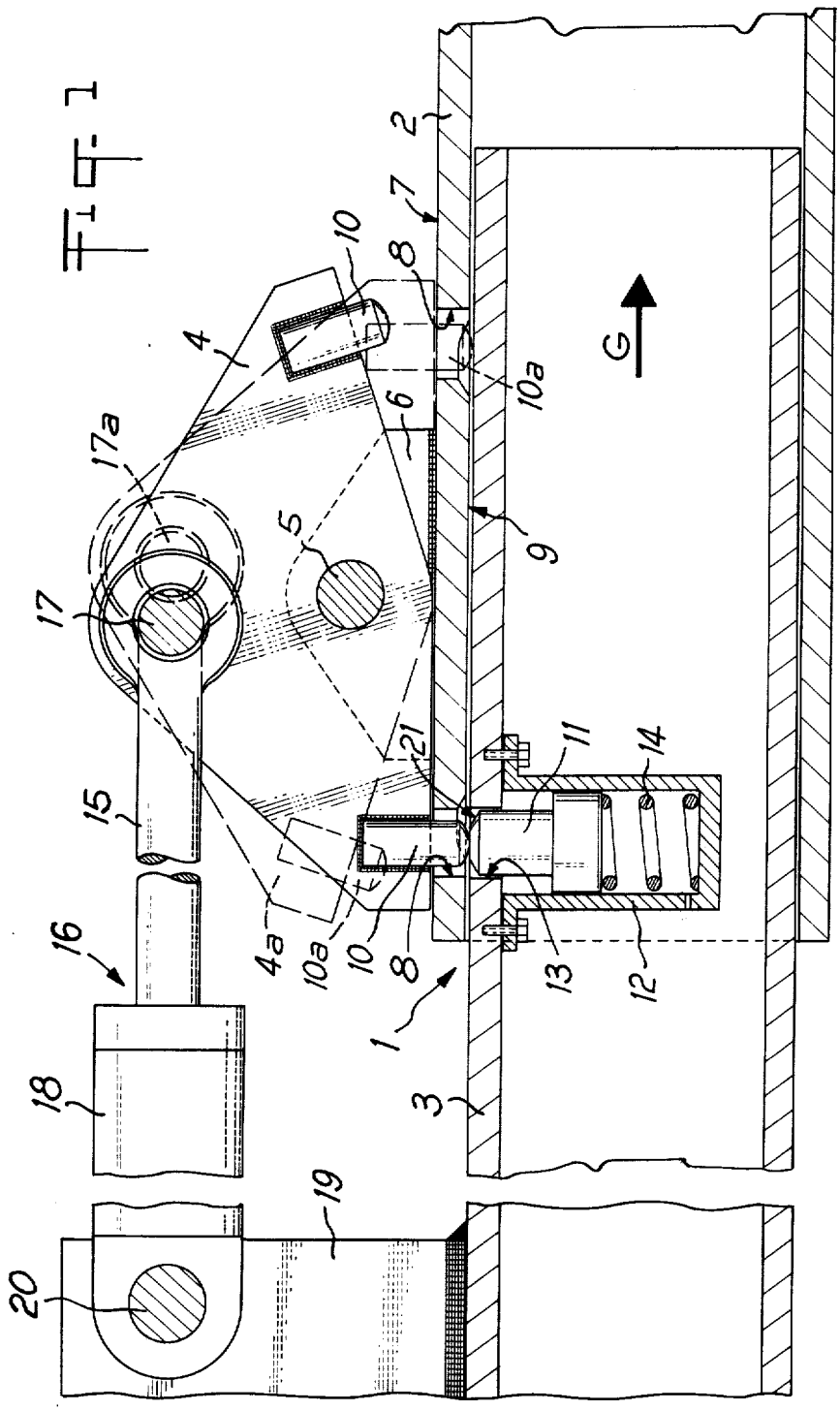


Fig. 2

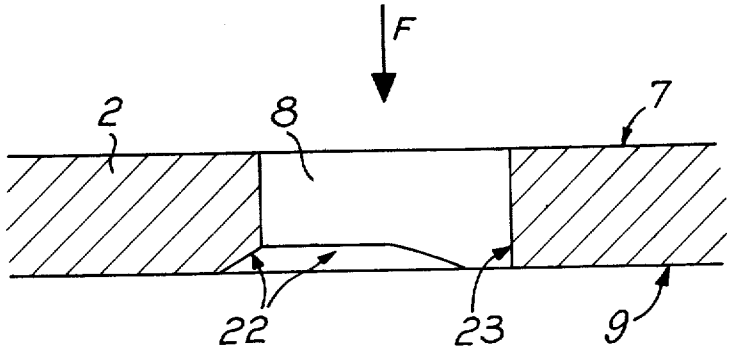


Fig. 3

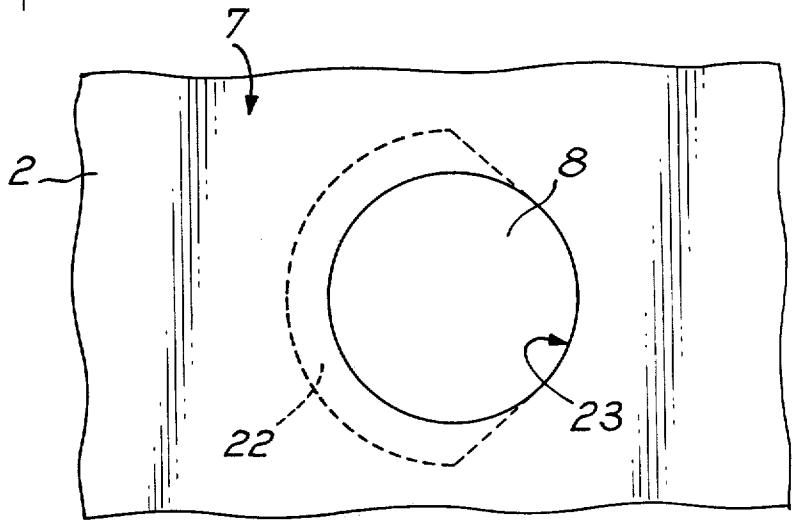
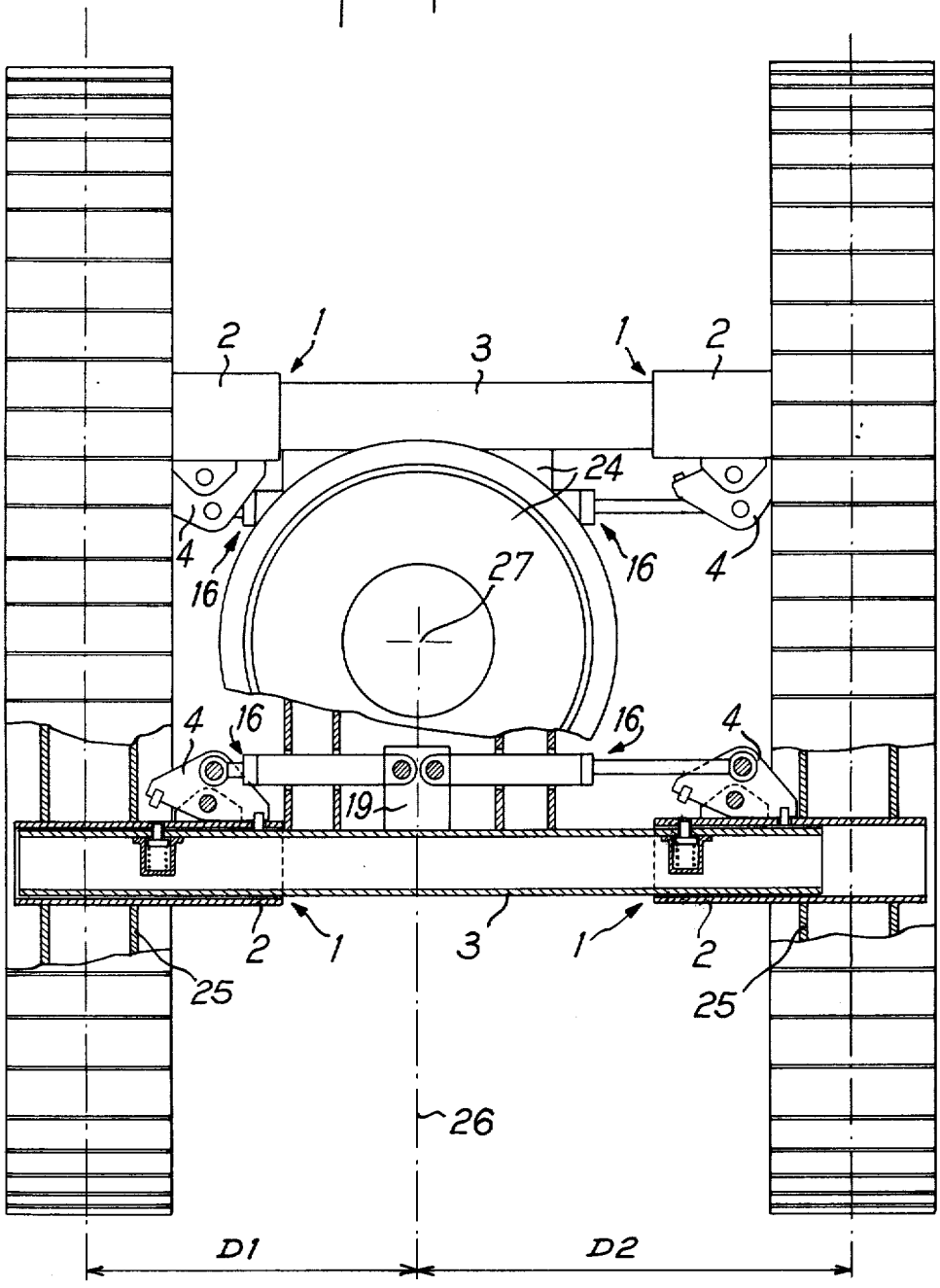


FIG. 4



TELESCOPIC BEAM FORMED OF TWO SLIDABLY MOUNTED LENGTHS AND AN ORGAN FOR CONTROLLING THE RELATIVE POSITIONS OF THESE LENGTHS RELATIVE TO ONE ANOTHER

The invention relates to a telescopic beam formed of two slidably mounted lengths and an organ for controlling the relative positions of these lengths relative to one another.

Telescopic beams are already known which are provided with an automatic apparatus for locking and unlocking the various sliding lengths. Such beams are used, for example, in variable-gauge tracked vehicles or in mobile cranes with telescopic jibs.

The application of a telescopic beam to a tracked, variable-gauge shovel, whose turret-chassis is connected to the tracks by two hydraulically actuated telescopic beams, will be used by way of example in the following discussion.

In known tracked shovels with variable gauge, the tracks are moved towards or away from the central chassis by means of hydraulic rams. To fix the gauge at the required width, as hydraulic locking of the rams does not always give perfect results, it is often necessary to use additional, mechanical, manually positioned locking organs such as fixing bolts for example.

Now it is not always easy to register holes by means of hydraulic rams. Moreover, it is necessary for a second person, other than the driver of the shovel, to supervise exact registering of the holes and introduce the bolts into them. Moreover, in the majority of cases, the holes are hidden by mud and invisible.

The present invention is intended to remedy these disadvantages and enable the driver of the shovel to vary the gauge by himself, the gauge locking operations being carried out automatically,

However, the invention has applications other than the construction of an apparatus for varying the gauge of a tracked vehicle.

According to the present invention, there is provided a telescopic beam comprising at least two lengths mounted to be relatively slidable, a drive organ which controls the relative positions of these lengths, means linking the drive organ between the said lengths and an apparatus for locking these two lengths in two of their relative positions, the locking apparatus comprising a lug which is mounted on one of the said lengths and two orifices which are formed in the other length, the lug being selectively engageable with and disengageable from these orfices, and the means linking the drive organ to the length provided with two orifices including an element which is movably mounted on this length and which bears two fingers of which one will enter the orifice engaged by the lug when the drive organ is to move the lengths relative to one another to bring the lug to the other orifice, the finger entering that orifice through the face of the length opposite to the face through which the lug entered that orifice, the controlling drive organ being operable to move the element relative to the length having two orifices when operated to vary the relative positions of the two lengths of the beam.

In accordance with a preferred embodiment, the element is pivotably mounted on the length provided with two orifices, while the fingers are fixed on this element at equal distances from the pivot axis.

In addition it is advantageous for each orifice to be provided with a chamfered sector which merges into the face through which the lug enters the orifice, the chamfered sectors of the two orifices being oriented towards each other.

Lastly, it is simple to insert an elastic organ between the length provided with the lug and the said lug and for this to have the effect of biasing this lug towards the face of the other length through which the lug enters the orifices.

The invention also relates to a variable-gauge. This vehicle comprises a central chassis and two track-bearing frames, each of the said frames being connected to the central chassis by means of a telescopic beam as previously defined, while one of the lengths of the beam in question is fast with the central chassis and the other length of the said beam is fast with the corresponding frame.

A better understanding of the invention will be obtained and secondary features and their advantages will become apparent in the course of the description of an embodiment given below by way of example.

It will be understood that the description and drawings are only given by way of illustration and are not limiting.

Reference will be made to the attached drawings, in which:

FIG. **1** is a partial axial section of an embodiment of a telescopic beam in accordance with the invention;

FIG. **2** is a characteristic section of a constructional detail of the beam of FIG. **1**;

FIG. **3** is a view in the direction of arrow F of FIG. **2**;

FIG. **4** is a partially sectioned plan of a tracked vehicle incorporating the beam.

The beam **1** shown in FIG. **1** comprises an outer length **2** and inner length **3**, which is mounted slidably relative to the outer length **2** in the direction of the arrow **6**.

An element **4** is mounted pivotably about an axis **5** on a support **6** welded to an external face **7** of a wall of the outer length **2**. This wall of the length **2** also has passing through it two orifices **8** which therefore emerge both on the external face **7** and on the face opposite to this external face, known as the introduction face **9**.

Two fingers **10** are fast with the element **4**, one of these fingers being introduced into one of the orifices **8** from which it has driven a lug **11**. It will be noticed in this respect that the lug **11** is mounted slidably in a cylinder **12** fixed to the internal face of the wall of the inner length **3**, opposite an orifice **13** passing through this wall. A spring **14** is inserted between the cylinder **12** and the lug **11** and has the effect of pushing the said lug towards the introduction face **9**. In addition, the rod **15** of a ram **16** is pivoted on the element **4** about an axis **17**, the cylinder **18** of the said ram **16** itself being pivoted about an axis **20** on an arm **19** fast with the length

It will also be noted that, all other things being equal, and in particular the two lengths **2** and **3** retaining their relative positions, the element **4** can have another position and, after pivoting, be arranged at **4***a*. In this position, the first finger **10** which was previously introduced into one of the orifices **8**, is disengaged at **10***a* from this orifice, while conversely the other finger is now arranged at **10***a* in the other orifice **8**. This modification of the position of the element **4** follows the mod-

ification of the position of the axis 17 which has travelled to 17*a*.

The end of the lug 11 is provided with a chamfer 21. Similarly, the orifices 8 have a chamfering sector 22 with which they merge on to the introduction face 9. This sector does not cover the whole of the edge of the orifice 8 which therefore also has a portion with a sharp edge 23. It will lastly be noted, in FIG. 1, that the chamfered sectors 22 of the two orifices 8 are oriented towards each other.

The appliance shown in FIG. 4 is a tracked hydraulic shovel, only the supporting framework of which has been shown for the sake of clarity. This comprises a central chassis 24, which usually supports a pivoting turret, and two track-bearing frames 25. Each frame 25 is mounted so that its position relative to the chassis 24 can be adjusted by means of two telescopic beams 1. It should also be noted that the telescopic beams 1 related to the two frames 25 are aligned in pairs, the inner lengths 3 of two aligned beams forming a single part.

These inner lengths are fast with the central chassis 24, while the outer lengths are fast with their corresponding track-bearing frame 25. Relative to the axis 26 parallel to the direction of travel of the shovel and passing through the axis 27 of the central chassis 24, it will be noted that the left track is only distant from the axis 26 by a distance D1, while the right track is distant from this axis 26 by a distance D2 greater than D1. The half-gauges of each track are therefore, in this case, different and generally equal either to D1 or to D2.

As regards the operation obtained, it will be understood that the object which it was proposed to obtain by adopting the beam of FIG. 1 has effectively been achieved.

Thus, starting with the maximum possible extension of the ram 16, i.e. the illustrated position of the lengths 2 and 3 and the position 4*a* of the pivoting element, it will be noted that the beam 1 is also in the extended configuration. Such a configuration is shown in FIG. 4, with regard to the beams 1 associated with the right frame 25.

By operating the ram 16 in the direction causing retraction of the rod 15 into the cylinder 18, firstly the element 4*a* is caused to pivot to 4. The lug 11, which was previously inserted in one of the orifices 8 and consequently locked the two lengths 2 and 3, it pushed back out of the said orifice 8 by one of the fingers 10. The lengths 2 and 3 are therefore no longer locked and retraction of the ram 16 moves the length 2 relative to the length 3 in the direction opposite to the arrow G. The end of the lug 11 rubs on the introduction face 9 until the moment when the lug comes opposite the other orifice 8, into which it is introduced under the influence of the spring 14. The lengths 2 and 3 are then again immobilized relative to each other, the beam 1 being retracted.

It will be realized that, taking into account the position of the fingers 10 relative to the orifices 8, these fingers can be introduced at any moment into the said orifices and possibly drive out the lug 11 which might be in them, all this being done completely automatically. In other words, the lug 11 permits automatic selective locking of the lengths 2 and 3 in one or the other of their relative positions, while operation of the ram 16 automatically causes unlocking of the said lengths.

Naturally, the chamfered sectors 22 facilitate introduction of the lug 11 into the orifices 8, just as the sharp right-angled edges 23 enable a sharp stop and exact maintenance of the position of one of the two lengths relative to the other to be obtained.

Lastly, the advantage of the shovel of FIG. 4 in use is obvious. It comprises being able to adjust the total gauge of the appliance and to make it equal to one of three values: 2D1, (D1 + D2) and 2D2. Of course, whether the orifices 8 are visible or not, locking and unlocking are still carried out automatically without intervention of a third party. Furthermore the invention is not limited to the description which has been given, but on the contrary covers all the modifications which could be made to it without departing from its scope or spirit.

I claim:

1. Telescopic beam comprising at least two lengths mounted to be relatively slidable, a drive organ which controls the relative positions of these lengths, means linking the drive organ between the said lengths and an apparatus for locking these two lengths in two of their relative positions, the locking apparatus comprising a lug which is mounted on one of the said lengths and two orifices which are formed in the other length, the lug being selectively engageable with and disengageable from these orifices, and the means linking the drive organ to the length provided with two orifices including an element which is movably mounted on this length and which bears two fingers of which one will enter the orifice engaged by the lug when the drive organ is to move the lengths relative to one another to bring the lug to the other orifice, the finger entering that orifice through the face of the length opposite to the face through which the lug entered that orifice, the controlling drive organ being operable to move the element relative to the length having two orifices when operated to vary the relative positions of the two lengths of the beam.

2. A beam in accordance with claim 1, in which the element is mounted pivotably on the length provided with the two orifices, while the fingers are fixed on this element at equal distances from the pivot axis of that element.

3. A beam in accordance with claim 1, in which each orifice is provided with a chamfered sector which merges on to the face through which the lug enters that orifice in operation, the chamfered sectors of the two orifices being oriented towards each other.

4. A beam in accordance with claim 1, in which an elastic organ is inserted between the length provided with the lug and the said lug and has the effect of biasing this lug towards the face through which the lug will enter the orifices of the other length.

5. A variable-gauge tracked vehicle comprising a central chassis and two track-bearing frames, each of the said frames being connected to the central chassis by means of a telescopic beam in accordance with claim 1, one of the lengths of the beam being fast with the central chassis and the other length of the said beam being fast with the corresponding frame.

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