Dec. 1, 1970 V. SAARINEN 3,544,149

SUSPENDED GRIPPING ELEMENT

Filed April 18, 1968

Fig. 1

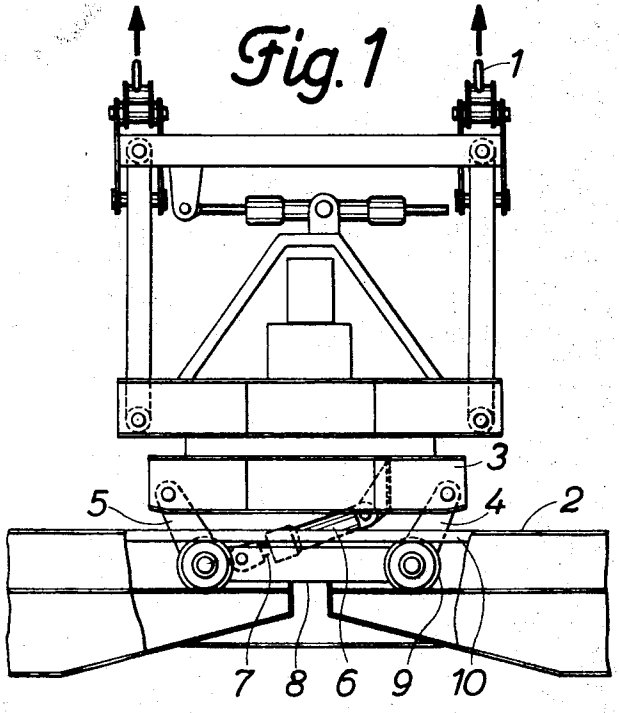
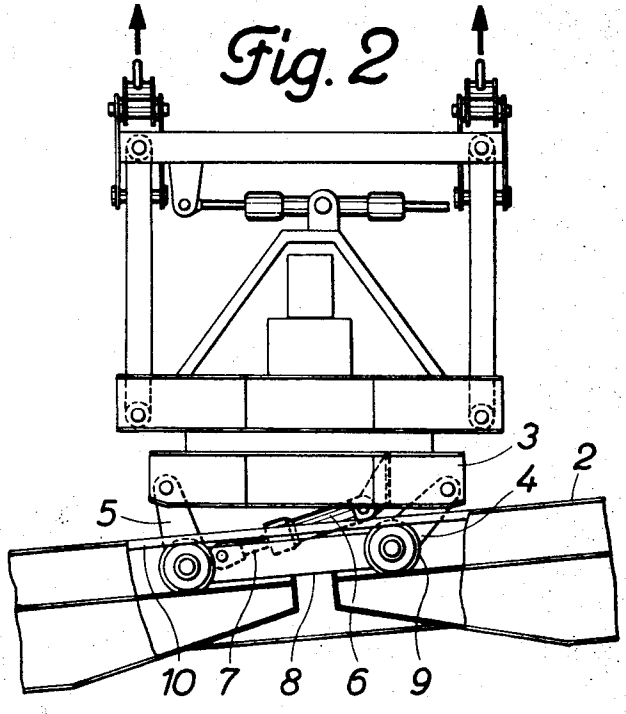


Fig. 2



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SUSPENDED GRIPPING ELEMENT

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ABSTRACT OF THE DISCLOSURE

A gripping element is suspended by the hoisting ropes of a crane, and can be positioned in various inclined positions to engage a load to be hoisted. The gripping element is vertically divided into two parts which are joined together by two linkage arms so that in the quadrangle defined by the pivot points of the linkage arms at least two opposite sides are non-parallel, and that the parts are furthermore interconnected by a pressure cylinder for moving the lower part in relation to the upper part.

A ship in harbor often has a list. When such a ship is loaded or unloaded, it is important in certain instances to be able to position the gripping element suspended by the hoisting ropes of a crane to have an inclination consistent with the list of the ship. This is particularly essential when the goods to be handled consist of so-called containers, in the loading and unloading of which gripping elements of a given type are used.

A variety of solutions have been presented for positioning the gripping element suspended by the hoisting ropes at different inclinations. However, such solutions have rendered the gripping element complex both in its construction and operation.

An object of the present invention is to provide an extraordinarily simple solution to the above-mentioned problem. The invention is characterized in that the gripping element is vertically divided into two parts which are joined together with two linkage arms so that in the quadrangle defined by the pivot points of the linkage arms at least two sides are non-parallel, and the parts are furthermore interconnected by means of a pressure cylinder for the purpose of moving the parts relative to each other. It is immaterial which pair of opposite sides of the said quadrangle are non-parallel. The lower part of the gripping element is tilted when it is displaced with reference to the upper part.

The invention is decribed in detail hereafter with reference to the attached drawing, wherein

FIG. 1 shows the gripping element in elevational view,

FIG. 2 shows the same gripping element with its lower part tilted with reference to the upper part.

The gripping element shown in the drawing is intended to be suspended from ropes attached to rings **1** in a harborside crane. The gripping element is used to hoist containers. In FIGS. 1 and 2 the ends of the long body

engaging the container, or of the lower part **2** of the gripping element, have not been shown.

The gripping element is vertically divided into two parts **2** and **3**, which are joined together with linkage arms **4** and **5**. The lower part **2** and upper part **3** are furthermore interconnected by a pressure cylinder **6**. The cylinder **6** is mounted on the upper part **3** and its piston rod **7** is attached to the lower part **2**. In the position displayed in FIG. 1 the quadrangle defined by the pivot points of the linkage arms **4** and **5** is a trapezoid in which the linkage arms **4** and **5** are non-parallel.

The lower ends of the linkage arms **4** and **5** are connected to a carriage **8**, which is provided with rollers **9**. The rollers **9** support the lower part **2** of the gripping element by means of the rail **10** which rests on rollers **9**. The lower part **2** of the gripping element may thus be longitudinally displaced in relation to the carriage **8**.

When the piston rod **7** is extended from the double-acting cylinder **6**, that is when the lower part **2** of the gripping element is displaced in relation to the upper part **3**, the lower part **2** is tilted into an inclined position, as can be seen from FIG. 2. If the piston rod **7** is retracted into the cylinder **6**, the lower part of the gripping element is tilted in the opposite direction.

What is claimed is:

1. A gripping element adapted for being suspended from the hoisting ropes of a crane and positioned at various inclinations, said gripping element comprising a first element adapted for support by the ropes of the crane, a pair of linkage arms pivotably connected to said first element and depending therefrom, a carriage pivotably connected to said linkage arms such that the pivotal connections between said linkage arms and the first element and carriage define a quadrangle with two opposite non-parallel sides, a second gripping element supported by said carriage and adapted for gripping a load, and a pressure cylinder connected to said first and second elements for moving the second element in relation to the first element.

2. A gripping element as claimed in claim **1** comprising means supporting said second element for displacement on said carriage.

3. A gripping element as claimed in claim **2** wherein said means comprises wheels on said carriage rollably supporting said second element thereon.

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