Sept. 9, 1969 A. LÖDIGE 3,465,864

SUPPORTING ROLLER ARRANGEMENT FOR A RACK, PARTICULARLY A LARGE-CAPACITY RACK

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Fig. 1

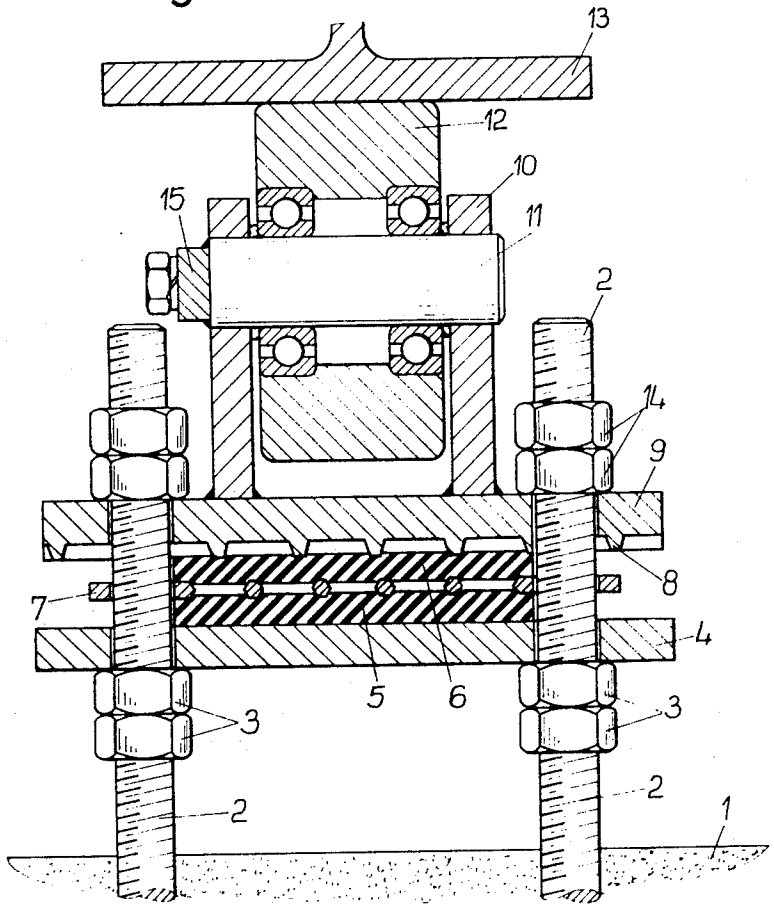


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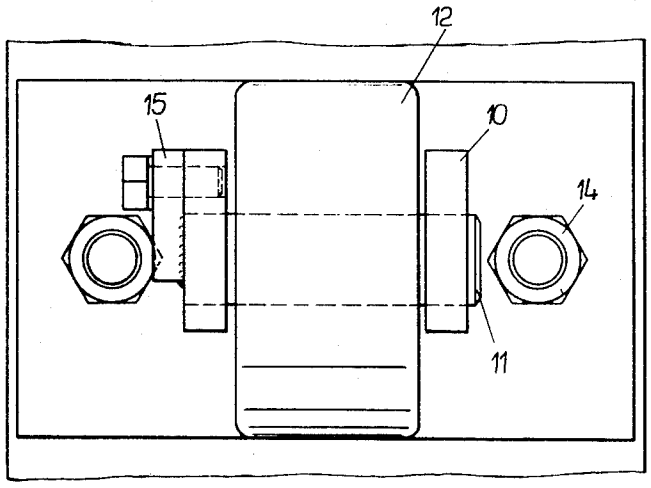
Fig. 2



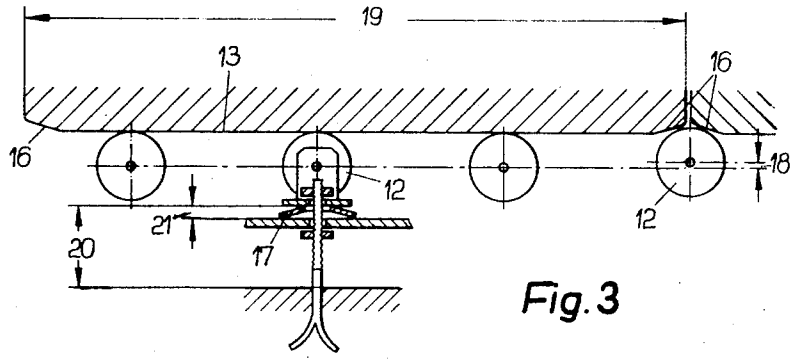




Fig. 3

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3,465,864

# SUPPORTING ROLLER ARRANGEMENT FOR A RACK, PARTICULARLY A LARGE-CAPACITY RACK

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Int. Cl. B65g 13/00
U.S. Cl. 193—35 5 Claims

## ABSTRACT OF THE DISCLOSURE

An arrangement for maintaining evenly disposed racks of great weight on rollers by automatic compensation of the heights of the individual rollers in which the compensation is achieved by pre-compressed springs adjustable as to height and pre-compression.

The invention relates to a supporting roller arrangement for a rack, particularly a large-capacity rack.

Supporting rollers under transportable racks are known. In this connection, one is concerned with jack-rollers, which are adjustable in height. Unevennesses of the roller conveyor track beneath the substructure of a rack leads to point-loadings on the rollers, because then not all the rollers are participating equally in the load. Point-pressures then arise if the roller conveyor track is not absolutely flat, because not all the rollers are bearing equally. With medium-sized racks up to 10 tons overall weight, no particular difficulties are encountered, provided one chooses the dimensions of the bearing appropriately.

The danger of higher point-pressures upon individual rollers always becomes much greater with the increasing weight of a rack and with the multiplicity of rollers which carry the rack, particularly when the roughly welded substructure is very large and can therefore be manufactured with even surfaces by machine only with difficulty and at considerable costs.

A further difficulty arises with large highly-loaded substructures from the fact that the height-adjustment of the rollers causes difficulties, because one must expect to encounter slight local ground-subsidence.

The repeated overloading of an individual roller can also arise from the fact that a foreign body, for example a paper carton or the contents of a carton, can roll in between the roller track and the roller, whereby the individual roller is destroyed.

These difficulties increase the more extensive the substructure and consequently the number of supporting rollers necessary.

The object of the invention avoids the high point-loadings as a consequence of local unevennesses in the substructure of a rack, which are unavoidable with a welded construction, by making the supporting rollers adapt themselves resiliently to these unevennesses. Equal loads are then achieved even if the foundation subsides locally.

A relatively flexible, flat faced hollow member or a flat bar is adjustable in height, lying on cemented-in screw-bolts which form stilts. On this adjustable track lie spring-members, which support the individual jack-rollers. These spring-members are pretensioned to about two-thirds their normal carrying capacity, so that at their normal carrying capacity the spring-members are further compressed. At those points where the roller track falls below the specified level, the spring-member can expand itself to its pretensioned position, so that the roller thereafter carries about two-thirds of the normal force. The missing third then distributes itself over the rollers in the vicinity.



If any section of the roller conveyor track projects above the specified level, then the roller, and consequently the supernormally compressed spring-member, receives a supernormal load. The spring-member can be made in any desired manner, as for example from leaf- or cup-springs or even, as shown below, from a rubber which presses itself elastically into the hollow spaces of a perforated sheet or a corrugated sheet.

The fractional supporting surface area and the elastic properties of the rubber then determine the spring constants.

The spring-member has not only the task of load-equalization, but also, in particular, the task of adapting the roller-axle for the purpose of even loadings with variably inclined roller conveyor tracks, so as thereby to attain an even line-contact for the protection of ball-bearings supporting the roller, the roller circumference itself and the roller track.

By means of this feature of the elastically swinging suspension of each individual roller, the life of such an installation is increased several times, because the point-forces upon all the supporting elements are avoided to the greatest possible extent. Even with machine-planed substructures, the creation of unacceptable point-forces by pendulum movements of high racks is not excluded. The unsupported stem-length, which gives the stilt effect, of the cemented-in supporting screw-bolts is so great that a sufficiently great lateral elasticity is created. This lateral elasticity is therefore necessary because a multiplicity of rollers are never able to be installed exactly at right-angles to the desired direction of movement. The coefficient of friction in rolling line contact in the axial direction amounts to about 15%. With high weights of racks, for example 100 tons, the lateral drift would amount to about 15 tons.

These 15 tons must act as a lateral external guiding force in order to bring the line contact to the sliding-point. This force must be distributed over a number of rollers at the narrow side.

The object of the invention does away with this lateral drift by means of the fact that the rollers are partially released at the junction between two neighbouring racks, due to the chamfered junctions, so that the jack-roller moves off sideways with its substructure so that any amount of drift, which arises from maladjustment and from the related roller track length from junction to junction, springs back to the original position at the junction. In this way, the drift of different neighbouring racks is not additive, so that the amounts of drift and the necessary external guiding forces are kept within acceptable limits.

The invention will now be described with reference to the accompanying drawings, which show an embodiment of the invention but in no restrictive sense.

FIGURE 1 shows an example according to the invention in cross section.

FIGURE 2 shows the roller body in plan view.

FIGURE 3 shows roller conveyor tracks with skids.

In the ground foundation **1** there stand the supporting screw-bolts **2**. The adjusting nuts **3** carry a flat bar or a sufficiently elastic hollow, flat member **4**. Upon this height-adjustable flat member **4** lies a spring-member, consisting, for example, of rubber strips **5**, **6**, and the perforated sheet **7** and/or the ribs **8** of a corrugated sheet **9**, on which are mounted the end-plates **10** of the roller axle **11**.

The roller **12** flexibly supports the roller track of the rack-substructure. The adjustment and pre-compression is effected with nuts **3** and/or **14**. The sidebar **15** secures the roller axle.

FIGURE 3 shows roller conveyor tracks with chamfered edges **16** and cup-springs **17** as spring-members. In FIGURE 3 can be seen how the rollers **12** between the chamfers **16** can relieve the tension at the rack junction

points in relation to the lateral elasticity which arises from the drift, in order to prevent the roller from sliding during lateral drift with line contact. The lateral drift is unavoidable. In this case, according to the invention, it is absorbed by the elasticity of the stem of the screw-bolt **2** having the free bend-length **20**, and partially also by the spring-member **17** for the roller conveyor track section in question, and discharged at the chamfer point **16** where the roller is relieved of its load. Since the rollers, as a result of the high load pressures, do not slide at the junction points of the racks on an even running-surface, if the rollers cannot be relieved, the drifts over successive rack-lengths **19** would be additive. The loaded spring-member height is indicated by **21.**

In the unloaded condition at the chamfer **16** the spring-member height amounts to **21** plus relief-travel **18.** This height then corresponds to the pretensioned height.

I claim:

**1.** In a supporting roller arrangement for transportable, movable racks, comprising rollers and elastic supporting means, including compressed spring supports for the rollers for equalising the load: the improvement of stilt-like supports for the said compressed spring supports, the said stilt-like supports being threaded and carrying nuts acting an adjusting members for the height and spring compression of the compressed spring supports."



**2.** An arrangement as claimed in claim **1,** in which the compressed spring supports comprise a flat member freely mounted and adjustable for height on the stilt-like supports by means of one of the said nuts in each stilt-like support, a compressed spring supported in the flat member, and a spring compressing member freely mounted in the stilt-like supports and adjustable therein by one of the said nuts thereabove in each of the stilt-like supports.

**3.** An arrangement as claimed in claim **2,** in which the spring includes rubber strips and at least one sheet having hollow spaces into which the strips can exude elastically."

**4.** An arrangement as claimed in claim **3,** in which the rubber strips are restricted from exuding outwardly of the said at least one sheet having hollow spaces.

**5.** An arrangement as claimed in claim **1,** in which the stilt-like members are elastically definable to accommodate lateral and longitudinal deflection of the rollers.

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