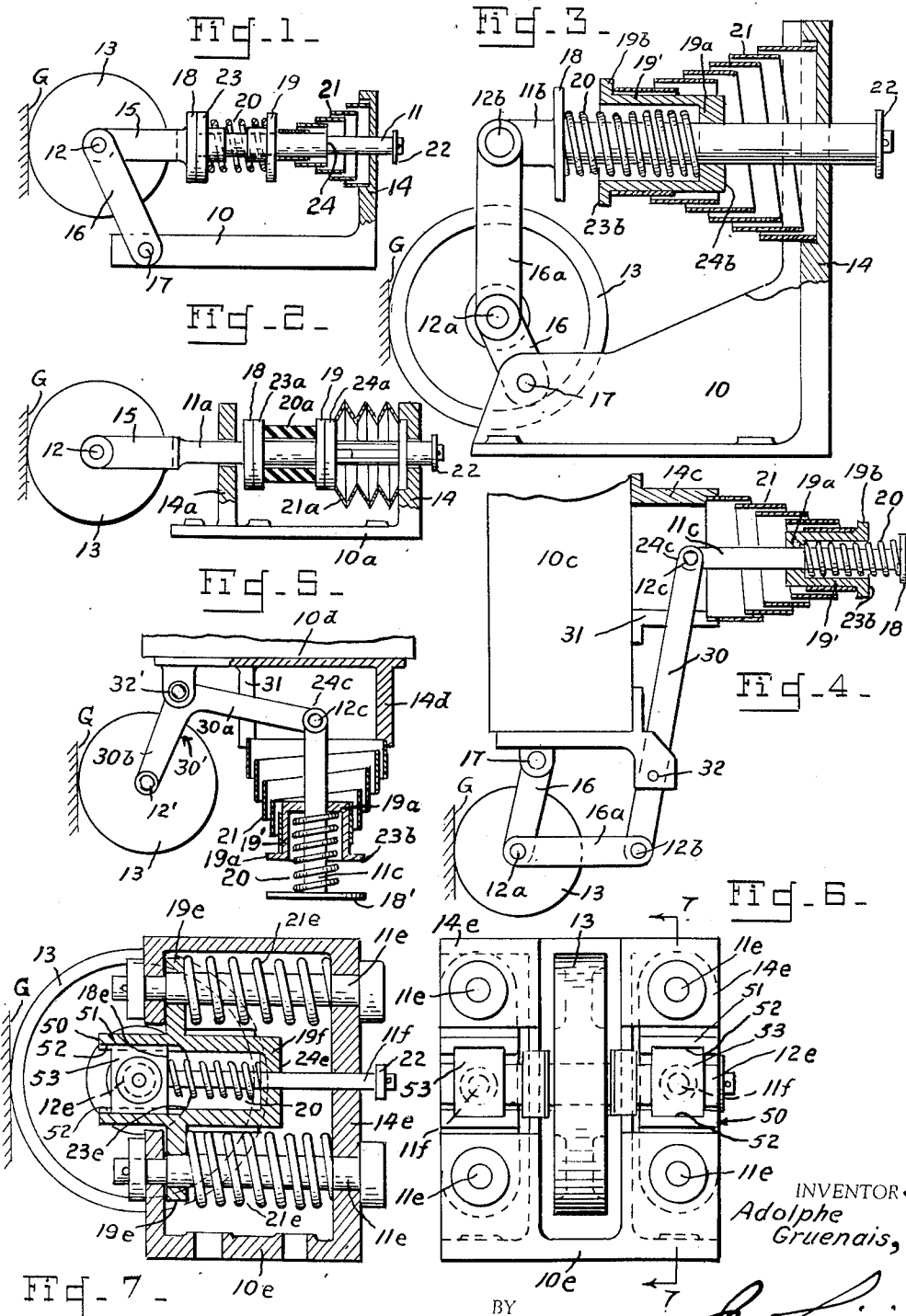


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A. GRUÉNAIS
SPRING LOADED ROLLER FOR GUIDING
GASHOLDERS OR OTHER PURPOSES
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SPRING LOADED ROLLER FOR GUIDING
GASHOLDERS OR OTHER PURPOSES

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This invention relates to gasholders, and more particularly to guide rollers for gasholders.

Single or multiple shell gasholders are generally guided in their displacement by rollers running either on guide bars or in channel runways. This displacement must be easy and effected with a minimum stress which, as a rule, must be distributed equally. For numerous reasons, the rollers can not be maintained at uniform contact pressure upon the guides. It is even necessary, in order that the displacement of the shells may take place without jamming, that the rollers are adjusted with a certain play between them and the guides.

When the gasholder undergoes the action of the wind, the distribution of this thrust is not uniform with all of the rollers due to a defective adjustment of the rollers, a different stroke of the rollers with respect to their runways by reason of the circular shape of the shells and the like. The distribution of the stresses due to the wind is, therefore, unequal, and these stresses can reach a very high power during high winds and may create difficulties in the displacement of the gasholder.

After the action of the wind upon the gasholder, the rollers which have been subjected to the greatest reaction are displaced slightly with respect to their guides. It is necessary, therefore, to re-establish the balance of the contact pressure between all the rollers and the guides.

The invention has for its object to use, for guiding the gasholders, a damping roller with a double compensating action. Its chief object is to make it possible to obtain, through the compensation of the forces, a better distribution of the stresses due to the wind acting upon the rollers, and consequently, to reduce the minimum pressures exerted by the wind upon the guides and the framings. It is also possible, when the gasholder is relieved of the pressure of the wind, to establish a contact pressure which is uniform between all of the rollers and their guides, thus promoting the ease of displacement of the gasholder shells.

A plurality of types of damping rollers based upon the principle of the invention are described hereunder. These rollers are not the sole types which can be adopted. Any combination of damping devices with compensating actions meeting the principle of the invention and capable to act directly or indirectly upon the roller can be chosen.

The novel features that are considered characteristic of the invention are set forth with par-

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ticularity in the appended claims. The invention itself, however, both as to organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of specific embodiments when read in connection with the accompanying drawing, in which:

Figure 1 is a side view in elevation and partially in section of one embodiment of a guide roller for gasholders in accordance with the invention.

Figures 2, 3, 4 and 5 are side views in elevation and partially in section of modified embodiments of the invention.

Figure 6 is a front view in elevation of another embodiment of the invention, and

Figure 7 is a cross-sectional view corresponding to line 7—7 of Figure 6.

Referring now to the drawing, specifically to Figure 1, a gasholder roller in accordance with the present invention comprises a frame 10 adapted to be mounted on the gasholder and supporting a rod-like member 11, which carries at one end a transverse shaft 12, upon which a roller 13 is journaled for engagement with a guide G. The rod-like member 11 is slidably supported at its rear end by an upright 14 on the frame 10, the forward end of the rod 11 comprising a fork 15 spanning the roller 13 and being supported by a link 16 (there preferably being one link on each side of the roller) pivoted at one end on the shaft 12 and on the other end on a pivot 17.

The rod 11 is provided with a fixed abutment 18 in the form of a flange, and a second abutment member 19 is slidably mounted on the rod between the fixed abutment 18 and the frame upright 14. A contact buffer 20 is interposed between said abutments 18 and 19, and a compensation buffer 21 is interposed between the slidable abutment 19 and the frame upright 14. These buffers bias the rod 11 to press the roller 13 against the guide G, and a stop 22 is mounted on the rear end of the rod 11 to preclude the ejection of the rod from the upright 14 when the roller 13 is free from engagement with the guide G. Compression of the roller 13 against the buffers 20 and 21 is preferably limited by a stop member 23 on the rod and engageable with the slidable abutment 19 to limit compression of the contact buffer 20, and a stop member 24 on the rod and engageable with the frame upright 14 to limit compression of the compensation buffer 21.

The contact buffer 20 is relatively weak and may comprise a coiled spring, as shown in Figures 1 and 3—7, or a rubber sleeve 20a, as shown in Figure 2. In contrast, the compression buffer

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21 is relatively strong and may comprise a helically coiled flat spring, as shown in Figures 1 and 3-5, Belleville-type spring washers 21a, as shown in Figure 2, or heavy wire coiled springs 21e, as shown in Figure 7. Moreover, the compression buffer 21 may comprise a single spring, as shown in Figures 1-5 or a plurality of springs 21e, as shown in Figure 7.

Other modifications may also be effected in the roller assembly. For example, the rod-like roller supporting member 11 may be slidable exclusively, as shown in Figures 2 and 7, or the roller may be supported exclusively by linkage between the rod-like member 11 and the frame 10, as shown in Figures 3-5, and the linkage may be adapted to amplify the action of the buffer, as shown in Figures 4 and 5.

Referring specifically to Figure 2, the rod-like member 11a is slidably supported at its front end by an upright 14a of the frame 10a between the fork 15 and fixed abutment 18 as well as the slidable support of its rear end by the upright 14. The contact buffer is shown as comprising a rubber sleeve 20a, while the compression buffer is shown as comprising Belleville type springs 21a. The compressions of the buffers 20a and 21a are respectively limited by stop members 23a and 24a.

According to the modification shown in Figure 3, the roller 13 is journaled on a shaft 12a that is supported indirectly rather than directly by the rod-like member 11b. In this case, the shaft 12a is carried by lever means including an arm 16 on one side of the shaft which is pivoted at 17 to the frame 10, and an arm 15a on the other side of the shaft and which is connected by a pivot 12b to the forward end of the rod 11b. The slidable abutment 19' comprises a sleeve-like member surrounding the contact buffer 20 and having at its rear end an intumed flange 19a slidable on the rod 11b and forming the abutment for the contact buffer 20, and at its forward end an out-turned flange 19b forming the abutment for the compensation buffer 21. The forward end of the member 19' forms the stop 23b for engagement with the abutment 18, and the rear end of said member 19' forms the stop 24b for engagement with the upright 14 of the frame 10.

The reaction of the buffers may be amplified by a lever-linkage mounting of the roller and the arrangement may be particularly adapted in small space requirements. Embodiments of this type of mounting are shown in Figures 4 and 5, wherein the arrangement of the buffers is reversed and the rod is connected at its inner end to the roller 13 by a lever arrangement. In this case, the fixed abutment 18' is at one end of the rod 11c, and the roller connecting pivot 12c is at the other end of the rod with the slidable abutment 19' disposed therebetween.

In Figure 4, the compensation buffer 21 is seated against an annular support 14c on the frame 10c, the inner end of the rod 11c extending into said support 14c and connected to one end of a lever 30 by the pivot 12c, said support having a slot 31 for accommodating said lever 30. The inner end of the lever forms the frame engaging stop 24c for limiting the compression of the compensation buffer 21. The lever 30 is connected at its other end to the roller supporting link 16a by the pivot 12b and mounted intermediate its ends on the pivot 32 that is supported by the frame 10c.

The embodiment of Figure 5 is similar to that of Figure 4 except that the rod 11c and the an-

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nular support 14d of the frame 10d are disposed with their axes parallel to the guide G, and the rod 11c is connected to the roller 13 by a bell-crank lever 30'. The rod 11c is connected by its pivot 12c to one arm 30a of the bell-crank lever 30', the other arm 30b of said lever 30' carrying the shaft 12' on which the roller 13 is mounted. The bell-crank lever 30' is mounted at its elbow on the pivot 32' carried by the frame 10d.

Another and preferred modification of slidably mounted roller and rod means is shown in Figures 6 and 7, and in this arrangement the rod means comprises a plurality of separate rods. The housing 10e has a pair of front opening U-shaped housings 14e, and a rod means is mounted in each of these housings. These rod means each include two rods 11e which are respectively mounted longitudinally in the legs of the housings and a rod 11f therebetween and slidable centrally of the housings. A yoke 50 has two ears which form slidable abutments 19e on the rods 11e and which support a box-like housing 51 therebetween. The top and bottom walls of the housing 51 have internal grooves 52 to slidably support a bearing box 53. Each bearing box 53 supports one end of the shaft 12e upon which the roller 13 is mounted.

The bearing housings 51 have rear end walls which slidably surround the intermediate rods 11f and form slidable abutments 19f, the side walls of said housings being recessed to accommodate the roller shaft 12e. The forward ends of the intermediate rods 11f are fixed to said bearing boxes, 53, the rear side of said boxes forming the fixed abutments 18e, and the contact buffers 20 are interposed between said abutments 18e and 19f. The inner ends of the bearing slide grooves 52 form the stops 23e for limiting compression of the contact buffer. The compensation buffer comprises springs 21e coiled around each of the rods 11e between the slidable abutments 19e and the rear wall of the frame housings 14e. The rear walls of the yoke housings form stops 24e engageable with the rear frame wall to limit compression of the springs 21e.

In each of the foregoing embodiments, the roller 13 is biased against the guide G, and stresses therebetween are absorbed by the contact buffer 20 or 20a and the compensation buffer 21, 21a or 21e, so that all of the rollers 13 disposed around a gasholder are constantly in substantially uniform contact with their respective guides G. As previously stated, the contact buffer 20 or 20a is relatively weak as its function is to maintain a slight pressure on the roller 13 to maintain contact between the roller and its runway or guide but without creating sufficient pressure to effect the raising and lowering of the gasholder. The compensation buffer 21, 21a or 21e absorbs high stresses due to wind pressure or the like and normally is activated only after the contact buffer 20 or 20a is compressed to the limit imposed by the stop 23.

When the pressure of the wind is exerted upon the gasholder, the rollers receiving the resulting stress press on their guides G and thus cause the compensation buffer 21, 21a or 21e to become active for each of these rollers. This buffer transmits partially or wholly, according to its power, the stress produced by the wind acting upon the rollers through the supports 10. If the rollers had not been provided with buffers or dampers, only the rollers in contact with their guides would have transmitted the stresses due to the wind. The action of the buffer 21 on each

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roller is, therefore, effectively a compensating action for the stresses due to the wind. When the action of the wind upon the gasholders ceases, the balance of the contact pressure between all the rollers and their guides is reestablished through the action of the contact buffers 20.

Practically the contact pressure, without wind, of each roller of a gasholder on its guide must not exceed some tens or hundreds of kilograms according to the chosen limits, in order to preclude excessive pressure during use of the gasholder, while the pressure of the roller due to the wind can easily reach thousands of kilograms. The minimum and maximum pressures of both of the buffers 20 and 21 and their strokes and the like are determined by the selected contact pressure, the irregularity of the guides, the wind thrust to be compensated, the number of the rollers of the gasholder, and the like.

The damping rollers can be applied to all gasholders of any construction, the guiding of which must bear the action of the wind. They can be used alone or twinned as well as in combination with other rollers. They can be applied as well to the inner guiding as to the outer guiding of the gasholders during the vertical movements of the latter.

Although certain specific embodiments of the invention have been shown and described, it is obvious that many modifications thereof are possible. The invention, therefore, is not to be restricted except insofar as is necessitated by the prior art and the spirit of the appended claims.

I claim:

1. A gasholder guide roller structure for support on a gasholder to cooperate with and bear on a guide, comprising a frame for mounting on a gasholder, rod means, supporting means carried by said frame and supporting said rod means for longitudinal movement, a shaft extending transversely of said rod means and movably positioned by said rod means, a roller rotatively supported by said shaft for engagement with a guide, an abutment fixed on said rod means, a member slidably mounted on said rod means between said abutment and said supporting means, relatively strong stress counterbalancing buffer means between said member and said supporting means to counter-balance stresses between said roller and frame, and relatively weak contact buffer means between said abutment and said member to progressively resist movement of said rod means longitudinally and thereby oppose movement of said roller from the guide and its normal position.

2. A gasholder guide roller structure for support on a gasholder to cooperate with and bear on a guide, comprising a frame for mounting on a gasholder, rod means, supporting means carried by said frame and supporting said rod means for longitudinal movement, a shaft extending transversely of said rod means, lever means pivoted on said frame and connecting said rod means and shaft whereby said shaft is movably positioned by said rod means, a roller rotatively supported by said shaft for engagement with a guide, an abutment fixed on said rod means, a member slidably mounted on said rod means between said abutment and said supporting means, relatively strong stress counterbalancing buffer means between said member and said supporting means to counter-balance stresses between said roller and frame, relatively weak contact buffer means between said abutment and said member to progressively resist movement of

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said rod means longitudinally and thereby oppose movement of said roller from the guide and its normal position, and means on said rod means and cooperative with said frame for limiting the longitudinal movement of said rod means.

3. A gasholder guide roller structure comprising a support, rod means including a plurality of rods supported by said support, at least two of said rods being longitudinally slidable relative to said support, a shaft extending transversely between and movably positioned by said slidable rods, a roller rotatively supported by said shaft between said slidable rods and for engagement with a guide, an abutment fixed on each of said slidable rods, yoke-like members slidably mounted on a plurality of said rods including one such member on each of said slidable rods, relatively strong stress counterbalancing buffer means surrounding certain of said rods between said yoke-like members and said support, and relatively weak buffer means surrounding said slidable rods between said abutments and said yoke-like members to progressively resist movement of said slidable rods through said support and thereby oppose movement of said roller from the guide and its normal position.

4. A gasholder guide roller structure comprising a support, a rod slidably mounted on said support, a shaft extending transversely of said rod and movably positioned by said rod, a roller rotatively supported by said shaft for engagement with a guide, a link pivoted at one end to said support and at the other end to said shaft, an abutment fixed on said rod, a member slidably mounted on said rod between said abutment and said support, relatively strong stress counterbalancing buffer means between said member and said support to counter-balance and support stresses between said roller and said support, and relatively weak compression buffer means between said abutment and said member to progressively resist movement of said rod through said support and thereby oppose movement of said roller from the guide and its normal position.

5. A gasholder guide roller structure comprising a support, a rod supported by said support for longitudinal movement, a shaft extending transversely of said rod and movably positioned by said rod, a roller rotatively supported by said shaft for engagement with a guide, an abutment fixed on said rod, a member slidably mounted on said rod between said abutment and said support, relatively strong buffer means comprising Belleville washers of progressively increasing resistance between said member and said support to counter-balance stresses between said roller and support, and relatively weak compression buffer means comprising a rubber washer between said abutment and said member to progressively resist movement of said rod through said support and thereby oppose movement of said roller from the guide and its normal position.

6. A gasholder guide roller structure comprising a support, a rod supported by said support for longitudinal movement, link means pivotally connected to said support, a shaft extending transversely of said rod and pivotally supported by said link means, a roller rotatably supported by said shaft for engagement with a guide, second link means connected between said shaft and said rod to transmit pressure on said roller to said rod, an abutment fixed on said rod, a member slidably mounted on said rod between said abutment and said support, relatively strong stress counter-

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balancing buffer means between said member and said support to counter-balance stresses between said roller and support, and relatively weak compression buffer means between said abutment and said member to progressively resist movement of said rod and thereby oppose movement of said roller from the guide and its normal position.

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