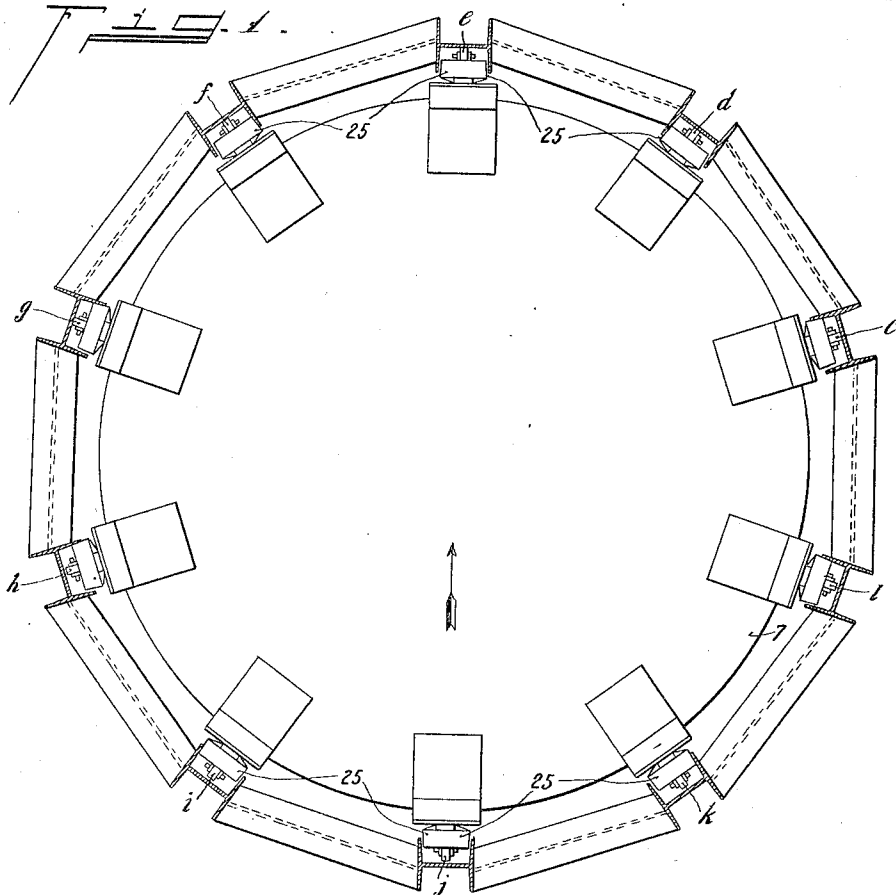
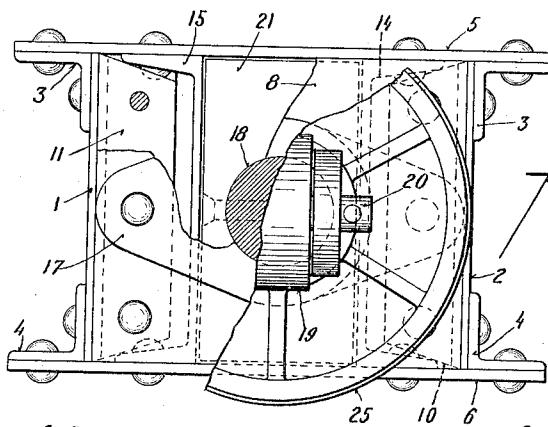


H. J. STOFFELS.
GUIDE FRAME FOR GAS HOLDERS.
APPLICATION FILED NOV. 29, 1912.

1,089,090.

Patented Mar. 3, 1914.

2 SHEETS—SHEET 1.



Witnesses

Chas. B. Kaiser
Emma Spener

By

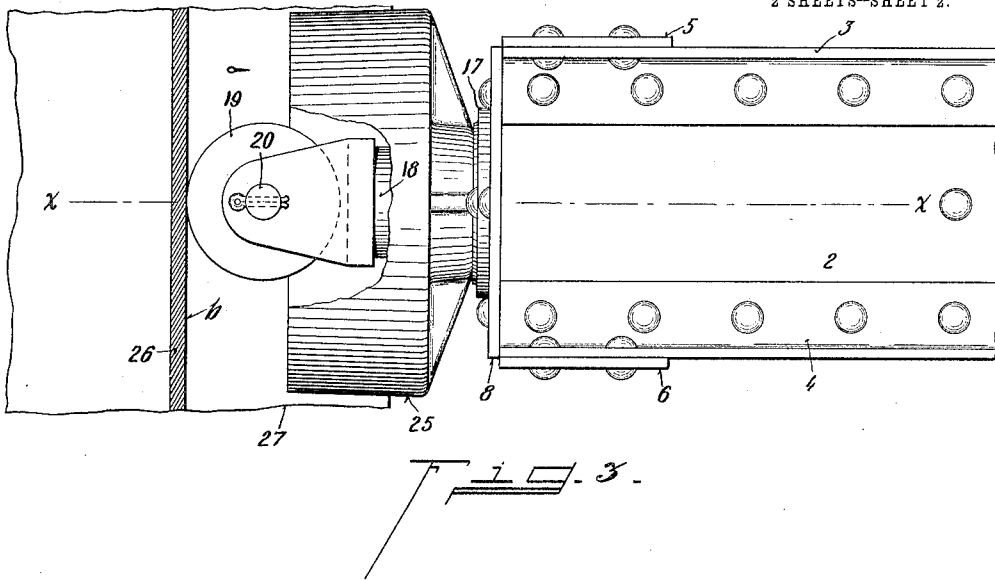
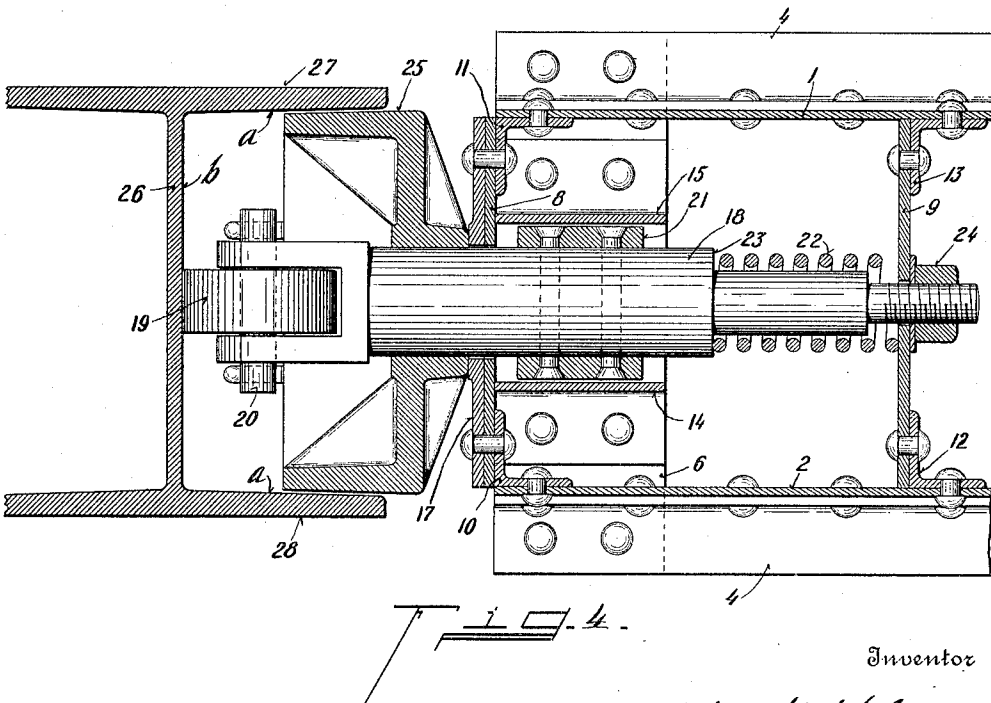
Henry John Stoffels
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2 SHEETS—SHEET 2.



Inventor

Witnesses

Oliver B. Kaiser
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UNITED STATES PATENT OFFICE.

HENRY JOHN STOFFELS, OF NORWOOD, OHIO.

GUIDE-FRAME FOR GAS-HOLDERS.

1,089,090.

Specification of Letters Patent.

Patented Mar. 3, 1914.

Application filed November 29, 1912. Serial No. 734,225.

To all whom it may concern:

Be it known that I, HENRY JOHN STOFFELS, a subject of the German Emperor, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Guide-Frames for Gas-Holders, of which the following is a specification.

My invention relates primarily to guiding means for gas holders constructed and arranged in such a manner that if the holder is subjected to sudden and severe wind currents the beating of the holder against its guides is avoided, also, an easier riding is obtained and the holder is restored to its perpendicular plane when relieved of such pressures.

An object of my invention is to provide a gas holder with a circumferential series of guiding carriages, each having a radial roller normally engaging a guiding surface of the column to center or maintain the holder in its perpendicular plane, and a tangential roller capable of alternately engaging oppositely disposed guiding surfaces relatively in a tangent plane to the periphery of the roller, whereby the pressures of the holder, due primarily to wind currents, are symmetrically transmitted to substantially the entire series of guiding columns.

Another object of my invention is to provide a gas holder with a series of rollers, each adapted to engage a guide-way and movable radially upon the holder toward and from its axial line and under a yielding pressure directing the roller toward its guide to center or maintain the holder perpendicular when relieved of horizontal pressures.

Another object of my invention is to provide a gas holder with a series of rollers, each having its diametrical line tangent to the circumference of the holder, upon which it is mounted and journaled, with its periphery intervening and capable of traversing alternately upon oppositely disposed parallel guiding surfaces having a plane tangent to the periphery of the rollers. The rollers of the series are relatively disposed and arranged in opposing sets on diametric or holder bisecting lines, and of interval series in its multiple arrangement circumferentially around the holder to symmetrically distribute the holder pressures to one guiding surface of each column, which is disposed at an angle to the direction of the strain, relieving those rollers moving in

parallelism with the strain to prevent any wedging or binding tendency of the roller between its guiding surfaces.

Another object of my invention is to provide a pair of guiding rollers having their diametric lines disposed at right angles to each other to traverse between guide ways bounding the rollers, mounted on the same axial plane, and one concentrically on the supporting shank of the other, and means for preventing rotation of the shank to prevent disturbing the traversing plane of its roller.

Another object of my invention is to provide a guiding column or support, having multiple guide ways, two oppositely disposed and one at right angles thereto, between which guiding rollers traverse. The columns utilized in series polygonally, arranged and placed so that the axis of the maximum moment of inertia and the maximum section modulus of the guiding column fall in a radial line with the holder and not in a line tangent to the holder, as heretofore in use. The preferable column is the Bethlehem H column, offering right angled reinforcements for each of the guide ways.

The features of my invention are more fully set forth in the description of the accompanying drawings, forming a part of this application, in which:—

Figure 1 is a top plan view of a gas-holder, guiding rollers and their supports, with the column shown in section. Fig. 2 is an enlarged end elevation of the rollers and their supporting frame, with a portion of the roller and frame broken away to more clearly illustrate the construction of the frame, which, in such view, is hidden by such parts. Fig. 3 is a side elevation of the frame and rollers and a central vertical section through the column. Fig. 4 is a section on line $x-x$, Fig. 3.

In the drawings I have illustrated a series of ten holder guiding carriages, and a like number of columns, one for each carriage, but it is obvious that the number can be modified and their relative disposition changed according to the particular usage and size of the holder. The carriages are shown mounted or secured upon the crown of the holder, but they can be arranged to be mounted upon the sides or at such positions and utilized for such purposes as is contemplated in the particular position and use preferably herein disclosed. Each carriage is provided with one radial and one

tangential roller. The radial rollers, yieldingly or movably mounted in radial planes, and in series, function primarily to center the holder or move it to its perpendicular plane when not subjected to wind pressure. In case of sudden wind currents the radial rollers prevent a beating of the holder against its guides and impart wind pressures to the guide frame, only to the capacity of their spring, then the tangential rollers come into action.

The guide frame of a gas-holder, as a rule, is constructed to withstand a wind velocity of one hundred miles per hour, and the roller pressures due to such a windload are so far in excess of what the springs can sustain that the strains in the guide frame caused by the radial rollers can be entirely neglected. The tangential rollers mainly are used to impart the holder wind pressures to the guide frames, and in the arrangement illustrated these pressures are symmetrically distributed to the guide columns or frames within substantially the circumferential holder area. This permits a material decrease in the weight of the support or guiding structure, and this is still further decreased in the preferred form of construction of the guide columns herein disclosed. The carriage structure herein disclosed and the mounting of the rollers also possess features of mechanical advantage to increase the efficiency of the entire structure, offering compactness and stability, and a reduction in the number of parts. The carriage frame is preferably built up from structural and angle iron, which materially reduces the weight and provides reinforcements. It is of rectangular form and comprises the side plates 1, 2, each having top and bottom angle plates 3, 4, riveted thereto with the side plates connected by the top and bottom cross plate 5, 6. The extension of the lower angles 4 are riveted to the crown of the holder 7.

8, 9, represent front and rear cross plates, the front plate riveted to angle plates 10, 11, which in turn are riveted to the side plates 1, 2. The rear cross plate 9 is riveted to angle plates 12, 13, which are riveted to the side plates 1, 2, and form a rear support for the stem or shank, supporting the radial roller.

14, 15, represent channel plates relatively spaced from each other and secured intermediate of the side plates 1, 2, to the top and bottom cross plates 5, 6. This provides a rectangular opening or housing against which a square bushing is engaged to prevent rotation of the radial roller shank 18.

17 represents a bearing plate secured to the front plate 8 and provided with a bore forming a bearing for the radial roller shank 18, with the rear end of the shank supported in the rear frame plate 9. The forward

end of the shank 18 is yoked to receive the radial roller 19 journaled upon an axle 20 mounted in the yoke limbs of the shank 18.

21 represents a square bushing engaging between the channel plates 14, 15, and rigidly secured to the shank 18 to prevent the same from rotating or swiveling, but allow a longitudinal or radial movement of the shank within said guide or channel plates 14, 15, in a movement of the holder and carriage toward the guide columns.

22 represents a spring encircling the shank, one end engaging the shoulder 23, formed on said shank, with the opposite end of the spring engaged against the rear frame plate 9. This spring yieldingly urges the shank 18 toward the guide columns to maintain the radial roller in engagement with the guiding surface of the column, with the spring pressure utilized for centering the holder when not subjected to end pressure. The rear end of said shank is screw threaded to receive the nut 24, offering a means for maintaining the parts in an assembled position during the erection of the structure, and has practically no utility in the operation of the carriage. It also serves as a means for inserting the spring in position under compression, adding convenience in mouting the parts.

25 represents a tangential roller journaled upon the shank 18, with its hub adapted to engage the bearing plate 17, relieving the shank from some of the strains when the tangential roller becomes active. The periphery of the tangential roller 25 projects between two guiding surfaces *a* of the column, which, in the preferred form of construction, is of H-form, producing three relatively right angled bearing surfaces, two of which are parallel or substantially so, and radial relative to the holder, and comprised in the limbs 27, 28, of the H-beam or column, and the tangential surfaces *b* comprising the cross strut 26 connecting the limbs 27, 28. The columns are connected by the side beams 30, whereby the structure as a whole presents a frame of polygonal outline with the columns forming the corners thereof.

The tangential roller is journaled concentrically with the shank of the radial roller centralizing the action of both rollers, producing a balanced condition, preventing binding tendencies with the guiding surfaces of the column and thereby do not offer counter resistance against each other. This, together with the circumferential disposition of the column prevents the tangential rollers from binding between the guiding surfaces or in any wise interfering with the free and easy operation of the holder.

Fig. 1 of the drawings diagrammatically illustrates a holder with ten guiding carriages and columns therefor, in which it will

be seen that they are arranged in opposing sets along diametric or bisecting lines of the holder symmetrically spaced around the circumference of the holder and with the tangential roller guiding surfaces parallel with the axial line of their respective carriages. Therefore, assuming that the arrow, indicated on said figure, directs toward the leeward side of the holder, with the barbed end of the arrow toward the windward side, the radial rollers *c, d, e, f, and g* on the leeward side bear against their respective column guides, while the radial rollers *h, i, j, k* and *l* on the windward are moved away and do not engage their respective column guides and are not subjected to any pressure whatever. The springs for these latter rollers having moved the bushings 21 into engagement with the front cross plate 8 of its carriage frame. The tangential rollers, it will be noticed, all bear against their respective guide surface of the column toward the leeward side, except the two central tangential rollers or the two parallel with the direction of the wind, from which it will be seen that the wind forces are distributed to all the columns, which are in any degree transverse to the direction of the wind, and it can therefore be said that the stresses or forces are symmetrically distributed to substantially all of the columns of the series surrounding the holder. Such distribution of pressure enables a material reduction in the weight of material, in the construction of the columns or guide frame, which is further reduced by the particular form illustrated. The radial rollers when yieldingly mounted materially prevent quivering actions of the holder or sudden transmission of its lateral strains to the columns, being resisted in such movements to the capacity of the springs.

It is obvious that the radial rollers could be dispensed with, as in the construction illustrated, they serve only one purpose, that of centering or restoring the holder to its perpendicular position, and do not impart any wind pressures to its column, owing to its yielding function. The holder cannot sway a sufficient distance to move the tangential roller parallel with the wind direction sufficiently to move the same into engagement with its opposing guide surfaces or the shoulder on the shank of the radial roller, for the reason that the remainder tangential rollers of the series would have subsequently engaged a guide surface of their respective columns, preventing such excessive movement. It is obvious, however, that the radial rollers could be utilized in conjunction with the tangential rollers for receiving and transmitting the radial strains and forces to the columns, and such use is comprehended under the disclosure herein, and in which instance the yielding

feature of such roller might be dispensed with. With the yielding form of radial roller when the holder is not subject to any wind pressure, and is in its normal perpendicular position, the tangential rollers are practically relieved and the holder guided in its vertical movement solely by the radial rollers. This provides easier riding of the holder. It will also be seen that the points of contact of all the rollers with their respective guiding surfaces are all in the same horizontal plane, which is accomplished by mounting the tangential rollers concentrically with the supporting shank of the radial roller, which provides a compact structure and has mechanical advantages in its manufacture, as well as in its utility.

The H-form of guide-way provides a very rigid structure and a material saving of material over known structures commonly employed and in which the guiding limbs in such arrangement are each reinforced by limbs at right angles thereto, which limbs also function as guiding surfaces, rendering it possible to use lighter weight material, offering cheapness in its manufacture and simplicity in its construction. The position of the H-beams or columns is also very important to achieve the best results, and which is preferably as shown in the drawings, in which the web connecting the flanges of the beam is substantially parallel to a tangent to the holder, presenting the flanges radially to the holder. In such position the axis for the greatest moment of inertia and section modulus falls in a line with the radius of the holder. This produces a channel facing the holder and provides three guiding surfaces. The radial roller engages with the one and the tangential roller one of the two opposing sections, depending upon the direction of movement of the holder.

The serial use herein illustrated is preferable for guiding gas holders, but it is obvious that the guiding instrumentalities may be individually employed for other uses and, therefore, I do not wish to be limited herein to the multiple or serial form and the geometric relative disposition of mounting. Having described my invention, I claim:—

1. The combination with a gas-holder and guiding means therefor, comprising a series of guide columns each of H-form in cross-section arranged around the holder, a series of guiding carriages on the holder, each supporting a roller normally engaging the web surface of a column, and a second roller having its axis co-planar with the axis of said first-named roller intervening the oppositely disposed flange surfaces of the column to engage the same independently coördinate to the direction of lateral movement of the holder.

2. The combination with a gas-holder and

guiding means therefor, comprising a series of guide columns disposed around the holder, each having opposing guide surfaces in parallelism with a diametric line of the holder, and a guide surface joining the same at right angles thereto, a carriage for each column mounted on said holder, a pair of rollers journaled thereon with their axes coplanar and relatively transverse to each other, so as to engage a guide surface of the column in parallelism with the peripheral face of a roller.

3. The combination with a gas-holder and guiding means therefor, comprising a series of guide columns surrounding the holder, each having guide surfaces radially and tangentially disposed relative to the holder, a radial roller for each guide column yieldingly mounted on said holder to normally engage with a tangential surface of the guide column, and a tangential roller mounted on said holder, having its axis coplanar with the axis of said radial roller intervening said radial guide surfaces of a column to engage therewith coördinate to the latter movement of the holder to symmetrically transmit the holder strains to substantially the entire series of guiding columns.

4. A guiding carriage of the class described, having a plurality of guiding rollers, with their diametric lines disposed at right angles to each other, with their axes coplanar, said rollers arranged to traverse within a channel, the walls of which provide a guide surface for the periphery of the roller parallel therewith.

5. A guiding carriage of the class described, comprising a frame, a roller supporting shank movably mounted on said frame, a roller journaled transversely thereon at one end, and a second roller concentrically journaled about said shank.

6. The combination with a gas-holder of a series of guiding columns therefor, each of H-form in cross-section disposed and united in polygonal arrangement around the holder with the axis of the maximum moment of inertia and maximum section modulus of each guiding column in a radial line with the holder and roller means intermediate the holder and each guiding column.

7. A structure of the nature disclosed combining a vertically movable holder, a polygonal sided frame surrounding said holder, vertical guide columns of H-form in cross-section, forming the corners of the polygon and disposed with the axis of the maximum moment of inertia and the maximum section modulus of each column in a diametric line with the holder, to provide two opposing guiding surfaces approximately in parallelism with the holder diametric line, and rollers journaled on said holder, one for each column, each intervening said guide section of a respective column, with its pe-

riphery capable of engaging said surfaces independently.

8. A structure of the nature disclosed combining a guiding track, a member to be guided, a roller journaled upon said member and engaging said track having its axis movable longitudinally, a second roller journaled transversely about the axis of said first roll, adapted to engage with said track, and tension means interposed between said member and second roller.

9. A structure of the nature disclosed combining a guiding track having two relatively opposing parallel ways and a third way transversely intermediate of the first named ways, a member to be guided, a roller journaled thereon adapted to alternately engage with said parallel ways and a second roller axially coplanar with said first named roller adapted to engage with said transverse way.

10. A structure of the nature disclosed combining a guide column of H-form in cross section, a member to be guided, a roller journaled upon said member projected intermediate of the parallel limbs of said H-column, a second roller axially coplanar with said first named roller adapted to project intermediate of said parallel limbs and engage with the transverse limbs of said H column.

11. A structure of the nature disclosed combining a circular gas holder, a series of guiding columns each of H-form in cross section disposed around said holder unitarily combined to form a polygonally sided structure, with the opposing limbs of each column in parallelism with a diametric holder plane, a series of rollers journaled upon said holder each in a diametric plane therewith adapted to engage between the parallel limbs of a respective column, and a second roller for each first named roller of the series journaled transversely and axially coplanar therewith each adapted to engage the transverse connecting limb of its respective guide column.

12. A structure of the nature disclosed combining a guiding track, a member to be guided, a roller supporting element movably mounted on said member, a roller on said supporting element adapted to engage the said track, a second roller journaled concentrically with said roller supporting element adapted to engage said track transversely to said first-named roller.

13. A guiding frame of the nature disclosed comprising a polygonal-sided structure, its apexes provided with vertical guide columns, each having a web normal to the radius line passing through its center and each having two flanges parallel with and equidistant from said radius line and extended to opposite sides of said web.

14. A guiding gas-holder frame comprising a polygonal-sided structure, its corners

provided with guide columns of H-form in cross-section, with the web of each column tangentially disposed relative to a circular holder.

5 15. A structure of the nature disclosed combining a guiding track, a member to be guided, a roller supporting element on said member, a roller journaled thereon engaged with said track, and a roller journaled concentric about said roller supporting element
10 engaging said track at right angles to said first-named roller.

16. The combination with a gas-holder and guiding means therefor, comprising a
15 series of guide columns each of H-form in cross-section arranged around the holder, a series of guiding carriages on the holder, a roller journaled upon each carriage normally engaging the web surface of a respective column, and a second roller for each
20 carriage having its axis co-planar with the axis of said first named roller intervening the oppositely disposed flange surfaces of a respective column and engaging the same independently coördinate to the lateral movement
25 of the holder.

17. The combination with a gas-holder and guiding means therefor, comprising guide columns, each of H-form in cross-section
30 arranged around the holder, a roller for each column journaled upon the holder normally engaging the web surface of a respective column, a second roller for each column journaled upon the holder having
35 its axis co-planar with the axis of said first-named roller intervening the oppositely disposed flange surface of the column to engage the same independently coördinate to the lateral movement of the holder.

18. The combination with a member to be guided and a channel track therefor, of a pair of rollers supported upon said member, their peripheries engaging respective
40 surfaces within the channel of said track, having their diametric lines disposed at right angles to each other, and their axes co-planar.

19. The combination with a member to be guided and a channel track therefor, of
50 a roller mounted on said member radially movable, and a second roller journaled transversely to said first-named roller with the axes of said rollers co-planar, and both rollers engaging respective surfaces within
55 the channel of said track.

20. The combination with a member to be guided, a guide member of H-form in cross-section with its opposing flanges extending radial relative to the guided member,
60 and its connecting web transverse thereto, a roller radially journaled upon said guided member engaging said web sur-

face, and a second roller transversely journaled on said guided member having its axis coplanar with the axis of said first-named member engaging the opposing
65 flanges of said guide member.

21. A structure of the nature disclosed combining a member to be guided, a guide member, a pair of rollers having their axes
70 co-planar journaled upon said member to be guided, one of said rollers yieldingly movable radially, and the second roller journaled transversely to said radially movable roller.

22. A structure of the nature disclosed, a circular gas-holder, a guiding structure of polygonal-sided form, its corners provided with H-beams disposed radially with the axis of the maximum moment of inertia and
80 maximum section modulus of each H-beam in a radial line with the holder to produce guiding channels facing the holder, roller supporting means projected radially from the holder toward each beam channel, a
85 roller journaled upon said supporting means, one for each channel engaging the surface thereof parallel to a tangent to said holder, a second roller for each channel journaled upon said supporting means at
90 right angles to said first-named roller and traversing between the surfaces radial to the roller and capable of engaging only one of said surfaces at an interval, and axially co-planar with a respective first-named
95 roller.

23. A structure of the nature disclosed, a circular gas-holder, a guiding structure of polygonal-sided form, its corners provided with H-beams disposed vertically with the
100 axis of maximum moment of inertia and maximum section modulus of each beam in a radial line with the holder producing guiding channels facing the holder, roller supporting means projected radially from
105 the holder toward each beam channel, a roller journaled upon said supporting means, one for each channel engaging a surface thereof parallel to a tangent to said holder, and yieldingly connected to said holder, to provide
110 for independent radial movement of either holder or roller to relieve the beam of such direct radial strains, a second roller for each channel journaled upon said said supporting means at right angles to said
115 first-named rollers traversing between the guide surfaces radial to the holder engaging the same independently.

In testimony whereof, I have hereunto set my hand.

HENRY JOHN STOFFELS.

Witnesses:

OLIVER B. KAISER,
EMMA SPENER.