(No Model.) 2 Sheets—Sheet 1.

A. P. BROWN.

ROLLING MILL.

No. 316,232. Patented Apr. 21, 1885.

Fig. 1.

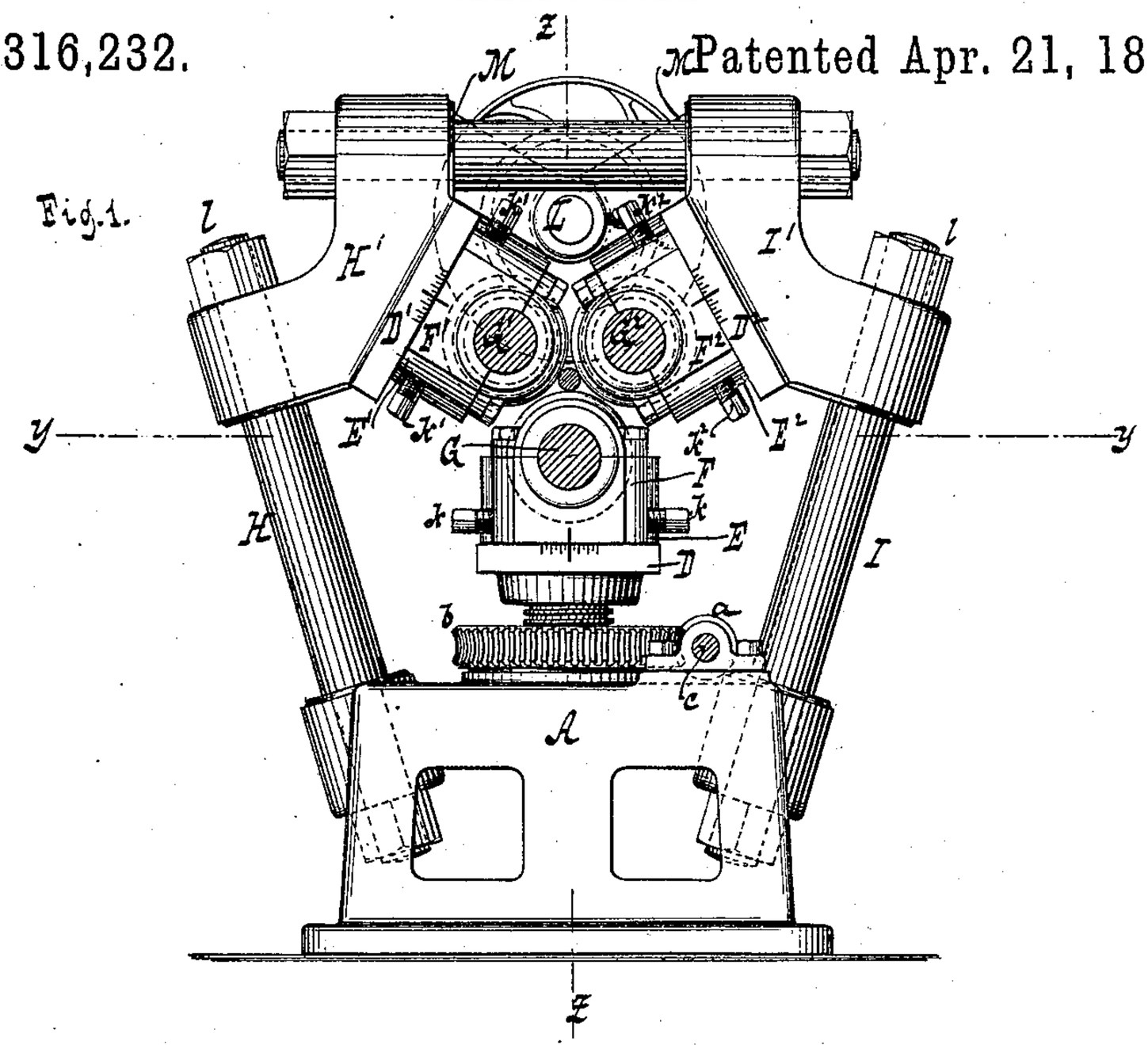
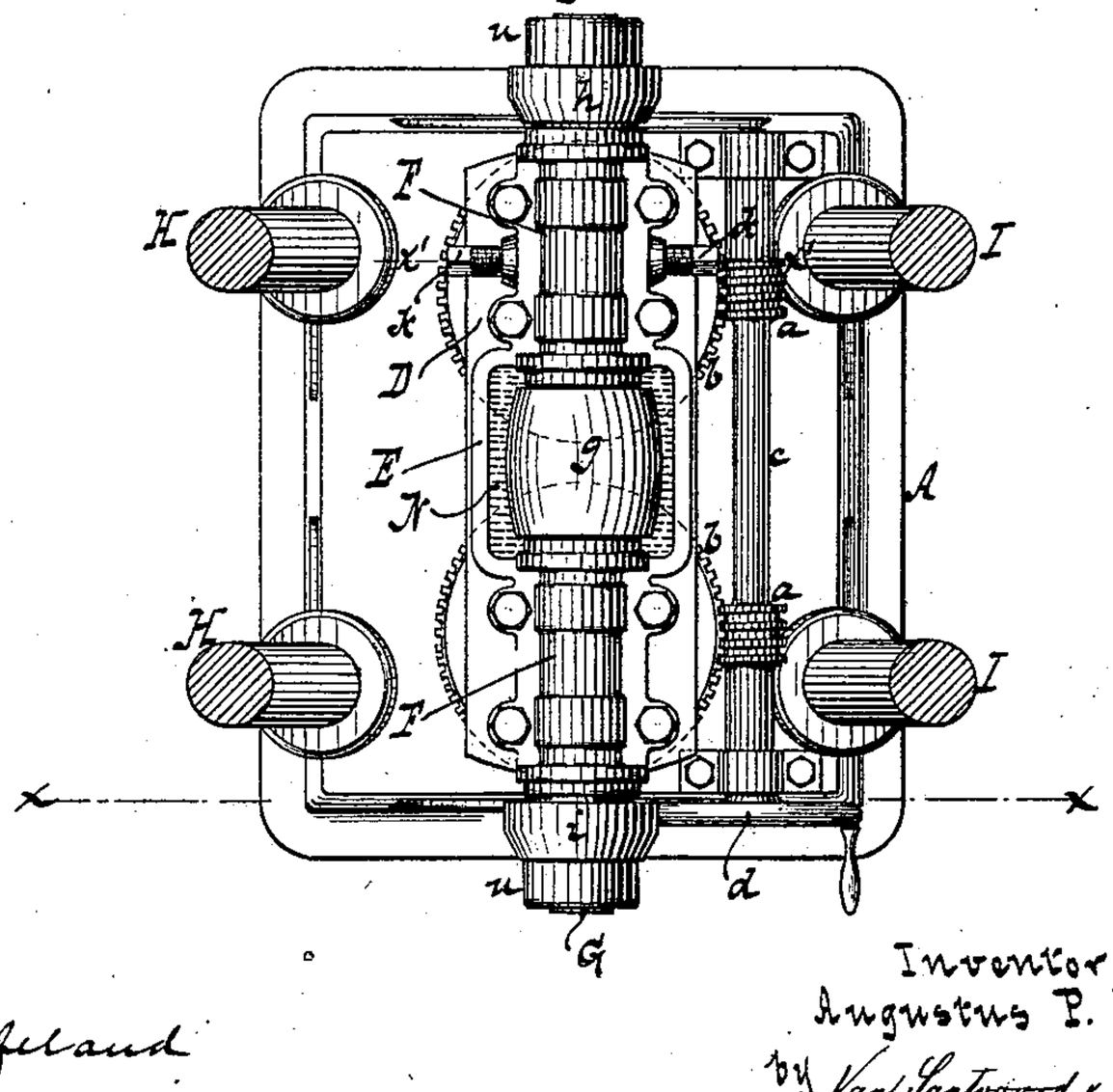


Fig. 2.



Witnesses
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William Miller

Inventor
Augustus P. Brown
by Van Santvoord & Hauff
his attys.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

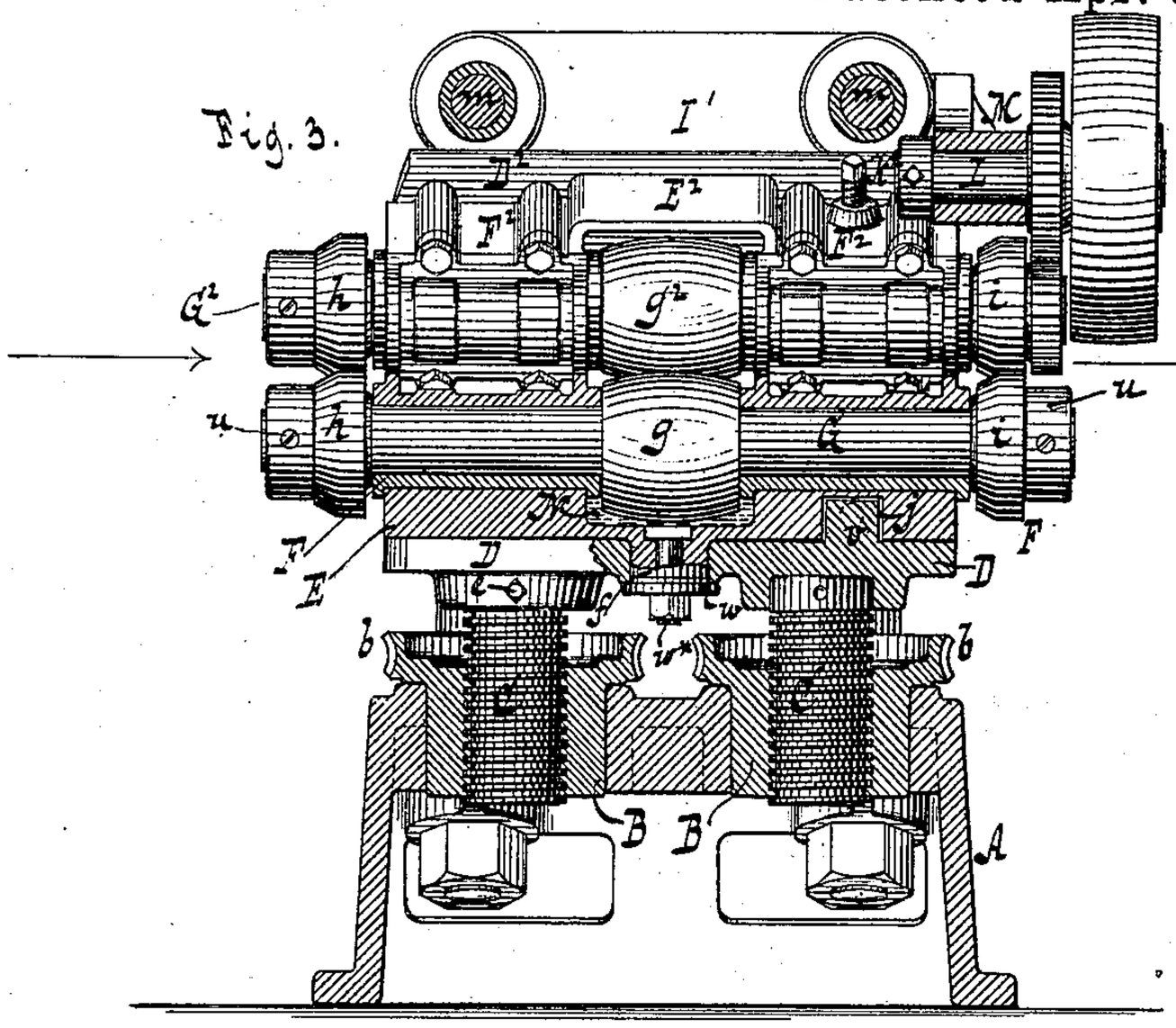


Fig. 4

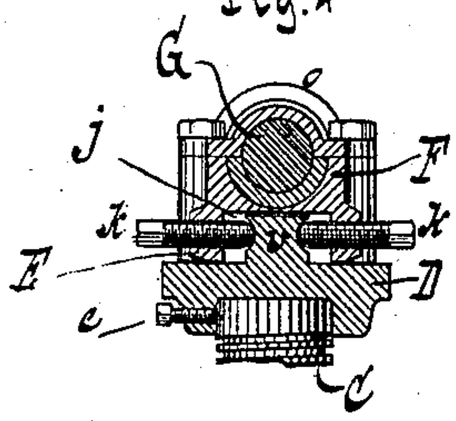
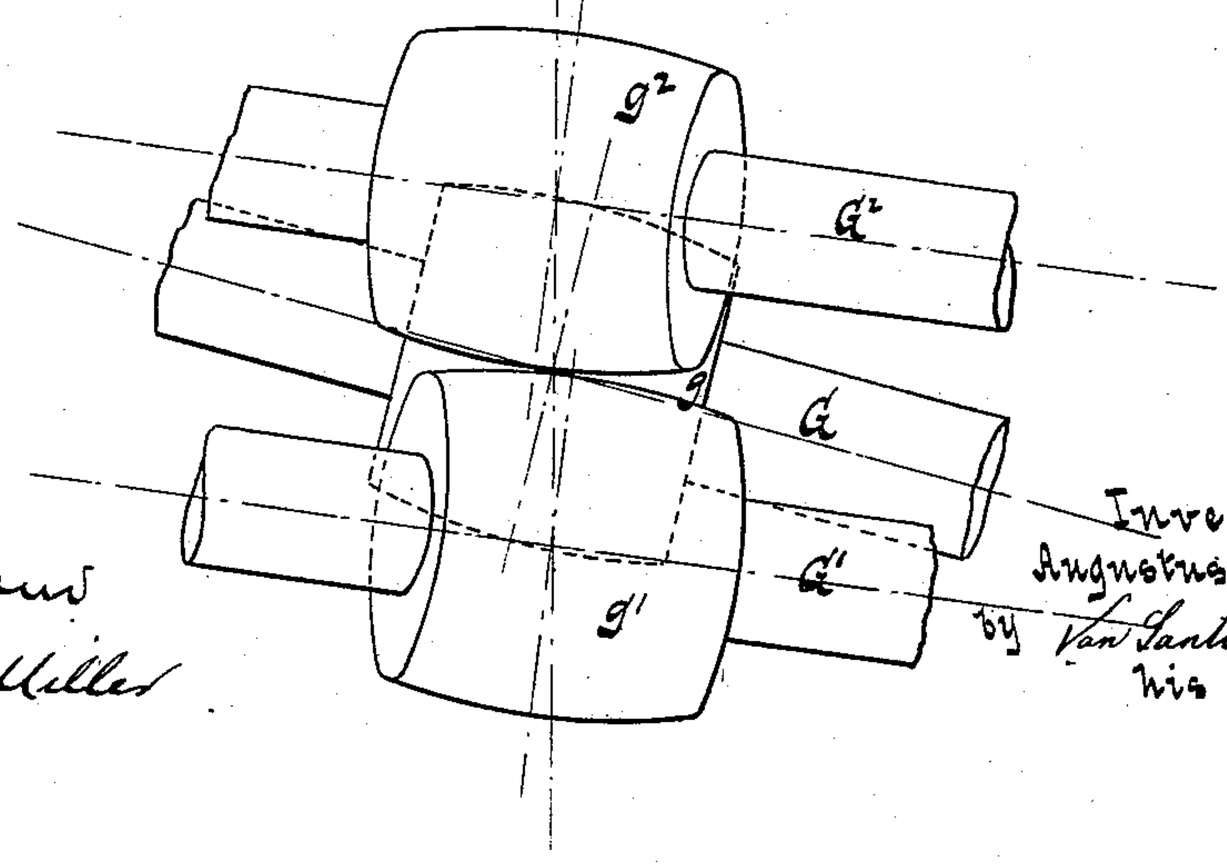


Fig. 5.



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UNITED STATES PATENT OFFICE.

AUGUSTUS P. BROWN, OF BROOKLYN, NEW YORK.

ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 316,232, dated April 21, 1885.

Application filed March 20, 1884. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS P. BROWN, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Rolling-Mills, of which the following is a specification.

This invention relates to mills for rolling metal articles of cylindrical form, in which three rolls are used which are mounted on divergent axles. The peculiar construction of my rolling-mill is pointed out in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 represents a transverse vertical section in the plane *x x*, Fig. 2. Fig. 2 is a horizontal section in the plane *y y*, Fig. 1. Fig. 3 is a longitudinal vertical section in the plane *z z*, Fig. 1. Fig. 4 is a transverse vertical section in the plane *x' x'*, Fig. 2. Fig. 5 is a diagram illustrating the position of the rollers in relation to each other on a larger scale than the previous figures.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates the base of my mill. This base is provided with two sockets, each to receive a nut, B, which can be turned in its socket in either direction. These nuts are geared together by worms *a a* and worm-wheels *b b*, (best seen in Fig. 2,) the worms being mounted or formed on a spindle, *c*, to which a revolving motion can be imparted by a hand-wheel, *d*. Into the nuts B B are fitted screws C C, which support a platform, D, that is fastened to the upper ends of the screws by set-screws *e*, or by any other suitable means.

Upon the platform D is placed a frame, E, which supports two pillow-blocks, F F, and which is provided in its middle with a cylindrical boss, *f*, turned off to fit a socket in the middle of the platform D, Fig. 3, so that the frame can be turned freely in either direction. A washer, *w*, and a screw-bolt, *w**, retain the frame upon the platform. From the platform rises a lug, *v*, which extends into a recess, *j*, formed in the bottom of the frame E, and through the sides of the frame extend set-screws *k k*, which act from opposite sides upon the lug *v*, Fig. 4. By manipulating these set-screws the frame E, together with the pillow-blocks F F, can be slightly turned in either direction and secured in the required position.

The pillow-blocks F F form the bearings for a shaft, G, which carries the roll *g* and the rollers *h i*, the roll *g* being situated between the two pillow-blocks and being firmly mounted on or formed out of one piece with the shaft, while the rollers *h i* are situated outside of the pillow-blocks and are loosely mounted on the shaft G, being retained in position by collars *u*.

In the base A are firmly secured four standards, H H I I—two on each side—and these standards support the angular castings H' I' respectively, which are held firmly in position by nuts *l l* and traverses *m m*.

On the inner side of the castings H' I' respectively are formed platforms D' D^2, Fig. 1, which are constructed like the platform D, and on which are fitted the frames E' E^2 respectively, each of which carries two pillow-blocks, F' F^2, respectively, and which turn on their respective platforms D' D^2, and are adjusted in the required position by means of set-screws *k'* k^2 respectively, in the same manner in which the frame E, with its pillow-blocks F, is adjusted upon the platform D by the set-screws *k*, as already described.

The pillow-blocks F' form the bearings for a shaft, G', and the pillow-blocks F^2 form the bearings for a shaft, G^2. Each of these shafts carries a roll, *g' g²*, respectively, in its middle, and two guide-rollers, *h i*, at its ends, which are disposed in the same manner as the rollers *g h i* on the shaft G. The rolls *g g' g²* are convex, so that when their shafts have been adjusted at the desired divergence the article to be rolled in passing through the mill comes in contact with each of the rolls theoretically only at one point, but in practice at a very short line, even if the divergence of the shafts is very small, and I have found that by making the rolls convex much power is saved. The shafts G' G^2 are geared together with the driving-shaft L, which has its bearing in a bracket, M, secured to the ends of the castings H' I', Figs. 1 and 3.

It must be remarked that the shafts G G' G^2 are shown parallel to each other in all the figures except Fig. 5; but before the operation of rolling commences the shafts G G' G^2 are adjusted at the desired divergence, (which,

however, is exaggerated in Fig. 5,) and then the platform D is raised or lowered by turning the hand-wheel *d* until the roll *g* is far enough from the rolls g' g^2 to allow the article to be rolled to pass through and to act on said article with the requisite degree of pressure. The article to be rolled is introduced between the guide-rollers *h*, and it passes out between the guide-rollers *i*, and these guide-rollers prevent the article, on passing out of the mill, ftom swaying to and fro and from becoming bent in its passage through the mill.

By employing convex rolls g g' g^2 the mill can be operated with comparatively little power, and it requires but a very trifling divergency of the shafts which carry said rolls to produce the desired effect upon the article to be rolled, such effect being to render the article perfectly cylindrical, to impart to it a smooth surface, and to cause the same to move through the mill by the action of the rolls.

The roll *g* turns by frictional contact and it dips into an oil-cistern, N, formed in the frame E, carried by the platform D, so that the article to be rolled is lubricated and the operation is facilitated.

I do not claim as my invention a rolling-mill with divergent rolls, such being well known.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the shafts G G' G^2, carrying the rolls g g' g^2 and the guide-rollers *h* *i*, with mechanism for adjusting said shafts in divergent lines, substantially as and for the purpose set forth.

2. The combination of the set of shafts, each carrying a convex roll, frames carrying journal-bearings for the shafts, and capable of turning on their axes to adjust the shafts in divergent lines, and means for turning the frames and holding them in their adjusted position, substantially as described.

3. The combination of the shafts G G' G^2, carrying the rolls g g' g^2 and the guide-rollers *h* *i*, with mechanism for adjusting said shafts in divergent lines, and with mechanism for moving the shaft G toward and from the shafts G' G^2, substantially as and for the purpose set forth.

4. The combination of platforms, frames carried thereon and capable of turning on their axes, journal-bearings carried by the frames, shafts mounted in the journal-bearings, and each having a roll, and mechanism for turning the frames to adjust the shafts in divergent lines, substantially as described.

5. The combination of platforms, frames carried thereby and capable of turning thereon, journal-bearings on the frames, shafts mounted in the journal-bearings, and each having a roll, and mechanism for adjusting one of the shafts to and from the others, substantially as described.

6. The combination of the shafts G' G^2, each carrying a roll, mechanism for adjusting said shafts in divergent lines, a frame carrying the shaft G with its roll, means for adjusting the latter shaft with respect to the adjustment of the other shafts, and screws for moving the said shaft-carrying frame to adjust the shaft to and from the other shafts, substantially as described.

7. The combination, substantially as hereinbefore described, with the shafts G' G^2, carrying the rolls g' g^2, of the shaft G, carrying the roll *g*, the platform D, resting on screws C C, the frame E, which supports the journal-boxes of the shaft G, the gears for turning the screws C C, and the adjusting-screws for turning the plate E.

8. The combination, substantially as herein described, with the shafts G' G^2, carrying the rolls g' g^2 and guide-rollers *h* *i*, of the shaft G, carrying the roll *g* and guide-rollers *h* *i*, the platform D, resting on screws C C, the frame E, which supports the journal-boxes of the shaft G, the gears for turning the screws C C, and the adjusting-screws for turning the plate E.

9. The combination, substantially as hereinbefore described, with the shafts G' G^2, carrying the rolls g' g^2, the frames E' E^2, supporting the journal-boxes of said shafts, the platforms D' D^2, and the adjusting-screws for turning the frames E' E^2 upon the platforms, of the shaft G, carrying the roll *g*, the platform D, resting on screws C C, the frame E, supporting the journal-boxes of the shaft G, and the gears for turning the screws C C.

10. The combination, substantially as hereinbefore described, with the shafts G' G^2, carrying the rolls g' g^2 and guide-rollers *h* *i*, the frames E' E^2, supporting the journal-boxes of said shafts, the platforms D' D^2, and the adjusting-screws for turning the frames E' E^2 upon the platforms, of the shaft G, carrying the roll *g* and guide-rollers *h* *i*, the platform D, resting on screws C C, the frame E, supporting the journal-boxes of the shaft G, and the gears for turning the screws C C.

11. The combination, substantially as hereinbefore described, with the shafts G' G^2, carrying the rolls g' g^2 and guide-rollers *h* *i*, the frames E' E^2, supporting the journal-boxes of said shafts, the platforms D' D^2, and the adjusting-screws for turning the frames E' E^2 upon the platforms, of the shaft G, carrying the roll *g* and guide-rollers *h* *i*, the platform D, resting on screws C C, the frame E, supporting the journal-boxes of the shaft G, the adjusting-screws for turning the frame E upon the platform D, and the gears for turning the screws C C.

12. The combination of the set of divergent rolls with the frame E, having the cavity to form the oil-cistern N, substantially as described.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

AUG. P. BROWN. [L. S.]

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.