

Given, the depth 24 inches; required, the sides to hold 6,56 bushels.

Then, 6,56 multiplied by 2150,4 equal to 14107,624; which, divided by 8, gives 1764, the square root of which is 42 inches; which is the length of the sides of the hopper wanted.

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## CHAPTER VI.

### ARTICLE 78.

#### OF THE DIFFERENT KINDS OF GEARS, AND FORMS OF COGS.

IN order to conceive a just idea of the most suitable form or shape of cogs in cog-wheels, we must consider that they describe, with respect to the pitch circles, a figure called an Epicycloid.

And when one wheel works in cogs set in a straight line, such as the carriage of a saw-mill, the cogs or rounds, moving out and in, form a curve called a Cycloid.

To describe this figure, let us suppose the large circle in Plate V, fig. 37, to move on the straight line from O to A; then the point O, in its periphery, will describe the arch ODA, which is called a Cycloid; and by the way in which the curve joins the line, we may conceive what should be the form of the point of the cog.

Again, suppose the small circle to run round the large one; then the point o, in the small circle, will describe the arch O b C, called an Epicycloid; by which we may conceive what should be the form of the point of the cogs. But, in common practice, we generally let the cogs extend but a short distance past the pitch circle; so that their precise form is not so important.

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### ARTICLE 79.

#### OF SPUR GEARS.

The principle of spur gears, is that of two cylinders rolling on each other, with their shafts or axes truly pa-

