Fig. II. is a perspective view of the conveyer, as it lies in its troughs, at work; and shows the manner in which it is joined to the pulleys, at each side of the elevator.

Fig. III. exhibits a view of the pulley of the meal elevator, as it is supported on each side, with the strap and buckets descending to be filled.

Fig. IV. is a perspective view of the under side of the arms of the hopper-boy, with flights complete. The dotted lines show the track of the flights of one arm; those of the other following, and tracking between them. A A are the sweepers. These carry the meal round in a ring, trailing it regularly all the way, the flights drawing it to the centre, as already mentioned. B B are the sweepers that drive it into the bolting hoppers.

Fig. V. is a perspective view of the bucket of the wheat-elevator; and shows the manner in which it is fastened, by a broad piece of leather, which passes through and under the elevator-strap, and is nailed to the sides with little tacks.

CHAPTER XI.

OF THE CONSTRUCTION OF THE SEVERAL MACHINES.

ARTICLE 95.

OF THE WHEAT ELEVATOR.

To construct a wheat-elevator, first determine how many bushels it should hoist in an hour, and where it shall be set, so as, if possible, to answer all the following purposes:—

1. To elevate the grain from a wagon or ship.
2. From the different garners into which it may be stored.
3. If it be a two-story mill, to hoist the wheat from the tail of the fan, as it is cleaned, to a garner over the stones.
4. To hoist the screenings, to clean them several times.

5. To hoist the wheat from a shelling-mill, if there be one.

One elevator may effect all these objects in a mill rightly planned, and most of them can be accomplished in mills ready built.

Suppose it be wished to hoist about 300 bushels in an hour, make the strap $4\frac{1}{2}$ inches wide, of good, strong, white harness leather, in one thickness. It must be cut and joined together in a straight line, with the thickest, and, consequently, the thinnest ends together, so that if they be too thin, they may be lapped over and doubled, until they are thick enough singly. Then, to make wooden buckets, take the but of a willow or water birch, that will split freely; cut it in bolts, 15 inches long, and rive and shave it into staves, $5\frac{1}{2}$ inches wide, and three-eighths of an inch thick; these will make one bucket, each. Set a pair of compasses to the width of the strap, and make the sides and middle of the bucket equal thereto at the mouth, but let the sides be only two-thirds of that width at the bottom, which will make it of the form of fig. 9, Plate VI.; the ends being cut a little circular, to make the buckets lie more closely to the strap and wheel, as it passes over. Make a pattern of the form of fig. 9, by which to describe all the rest. This makes a bucket of a neat form, to hold about 75 solid inches, or somewhat more than a quart. To make them bend to a square at the corners e c, cut a mitre square across where they are to bend, about 2-8ths through; boil them and bend them hot, tacking a strip of leather across them, to hold them in that form until they get cold, and then put bottoms to them of the thin skirts of the harness leather. These bottoms are to extend from the lower end to the strap that binds it on. To fasten them on well, and with despatch, prepare a number of straps, $1\frac{3}{4}$ inches wide, of the best cuttings of the harness leather; wet them and stretch them as hard as possible, which reduces their width to about $1\frac{1}{2}$ inches. Nail one of these straps to the side of a bucket, with 5 or 6 strong tacks that will reach through the bucket, and clinch inside. Then take a $1\frac{1}{2}$ inch chisel, and strike it through the main strap

about a quarter of an inch from each edge, and put one end of the binding-strap through the slits, draw the bucket very closely to the strap, and nail it on the other side of the bucket, which will finish it. See B in fig. 2, Plate VI. C is a meal-bucket fastened in the same manner, but is bottomed only with leather at the lower end, the main strap making the bottom side of it. This is the best way I have yet discovered to make wooden buckets. The scraps of the harness leather, out of which the elevator-straps are cut, are generally about enough to complete the buckets.

To make Sheet-Iron Buckets.

Cut the sheet in the form of fig. 8, Plate VI., making the middle part c, and the sides, a and b, nearly equal to the width of the strap, and nearly $5\frac{1}{2}$ inches long, as before. Bend them to a right angle at every dotted line, and the bucket will be formed :—c will be the bottom side next to the strap; and the little holes a a and b b will meet, and must be riveted to hold it together. The two holes c are for fastening it to the straps by rivets. The part a b is the part that dips up the wheat, and the point, being doubled back, strengthens it, and tends to make it wear well. The bucket being completely formed, and the rivet holes made, spread one out again, as fig. 8, to describe all the rest by, and to mark for the holes, which will meet again when folded up. They are fastened to the strap by two rivets with thin heads put inside the bucket, and a double burr of sheet iron put on the under side of the strap, which fastens them on very tightly. See A, fig. 2, Plate VI. These buckets will hold about 1,3 quarts, or 88 cubic inches. This is the best way I have found to make sheet-iron buckets. D is a meal-bucket of sheet-iron, riveted on by two rivets, with their heads inside the strap; the sides of the buckets are turned a little out, and holes made in them for the rivets to pass through. Fig. 11 is the form of one spread out, and the dotted lines show where they are to be bent at right angles to form them. The strap forms the bottom side of these buckets.

Make the pulleys 24 inches in diameter, as thick as the strap is wide, and half an inch higher in the middle than at the sides, to make the strap keep on; give them a motion of 25 revolutions in a minute, and put on a sheet-iron bucket for every 15 inches; then 125 buckets will pass per minute, which will carry 162 quarts, and hoist 300 bushels in an hour, and 3600 bushels in 12 hours. If you wish to hoist faster, make the strap wider, the buckets larger in proportion, and increase the velocity of the pulley, but not to above 35 revolutions in a minute, nor place more buckets than one for every 12 inches; otherwise, they will not empty well. A strap of 5 inches, with buckets 6 inches long, and of a width and proportion suiting the strap, (4½ inches wide,) will hold 1,8 quarts each; and 35 revolutions of the pulley will pass 175 buckets, which will carry 315 quarts in a minute, and 590 bushels in an hour. If the strap be 4 inches wide, and the wooden buckets 5 inches deep, and in proportion to the strap, they will hold ,8 of a quart: then, if there be one for every 15 inches, and the pulley makes 27 revolutions in a minute, it will hoist 200 bushels in an hour. Where there is a good garner to empty the wheat into, this is the size they are commonly made, and is sufficient for unloading wagons.

Plate VI., Fig. 6, represents the gudgeon of the lower pulley; fig. 7, the gudgeon for the shaft on which the upper pulley is fixed. Fix both the pulleys in their places, but not firmly, so that a line, stretched from one pulley to the other, will cross the shafts or gudgeons at right angles. This must always be the case to make the straps work fairly. Put on the strap with the buckets; draw it tightly, and buckle it; put it in motion, and if it do not keep fairly on the pulleys, their position may be altered a little. Observe how much the descending strap swags by the weight of the buckets, and make the case round it so curved, that the points of their buckets will not rub in their descent, which will cause them to wear long and work easily. The side boards need not be made crooked in dressing out, but may be bent sufficiently by sawing them half way, or two-thirds, through, beginning