REYNOLD'S PUMPING ENGINES AT ALLEGHANY, PA.

We are indebted to the *American Engineer* for the accompany illustrations and description of the above engines.

These engines, two in number, are vertical, three-cylinder compound, rotative machines, built by Edward P. Allis & Co., of the Reliance Works, Milwaukee, Wis., from designs by Mr. Edwin Reynolds, general superintendent of the Reliance Works. Each engine is of six million gallons capacity in twenty-four hours, at a plunger speed of 120 feet per minute, and they are alike throughout. Taking water from one central horizontal suction pipe, situated between the two sets of pumps, they deliver into a horizontal force main located directly above the suction pipes.

FIFTY TON FLOATING GRAIN ELEVATOR.

The elevator illustrated has been constructed for use in the harbour of Dunkerque, France, to the order of Messrs. L. Dewulf Cailleret et Fils, and is made for discharging grain in bulk from ships into barges for transit inland. As will be seen from the engravings, the machinery is contained in a wooden tower which is erected on a strong barge. A condensing engine of 15 nominal horse-power is fixed in the hold to drive the gear, and is supplied with steam from a Cochran boiler. Two outside elevators (Figs. 1 and 2) are suspended on universal joints from the outer end of a strong steel shoot or trunk of ∩ section, the inner end of the trunk being hinged on a shaft *a* which is mounted on rollers, and traverses a curved roller path *b* from back to front of the tower. In the trunk is an india-rubber carrying band, running over terminal pulleys *c d* at either end. This band is driven from a pulley *e* below the deck in the centre of the tower, and as the curve of the roller path is struck from the centre of this pulley, the band is driven equally well at all points of its traverse. The outside elevators are driven by this band, through Ewart's patent drive chain. In consequence of the varying draught of ships and barges, it is of course neccssary that the elevators should have a certain vertical range, and from this it follows that at times the band will form a considerable angle with the horizontal line both up and down; special arrangements are therefore needed for putting and keeping the grain on the band. This is most effectually done by means of (1) a feed apparatus *f* which lays the grain on the band at the same speed at that which it is travelling, and (2) by means of inclined carrying rollers *g*, which give a trough-like shape to the top side of the band. The carrying capacity of the band is also thus increased and waste is entirely prevented.

The trunk and elevators may be moved horizontally or vertically while the machine is at work, being under the complete control of one man on the deck, or when out of use may be run back and completely housed inside the tower as shown by dotted lines at *h* (Fig. 2). In the tower are fixed four of Pooley's automatic weighing machines, a Barnard and Lea's separator or cleaning machine, two internal elevators of ordinary construction, an exhaust fan, a sack hoist, and all the necessary gearing for hoisting or lowering the trunk or racking it in or out.

Having now described the machinery, a few words are necessary to explain the way in which the grain is dealt with. After being raised from the hold of a ship and brought into the tower by the outside elevators and band, it is passed through the largest of the weighing machines, which is capable of weighing the maximum quantity the machine can deliver; it then falls into an elevator bottom and is raised to the top of the tower, passes through the separator, and after being cleaned is weighed again in the smaller machines. From these it may either be received in the sacking hoppers and sacked, or be again elevated to a convenient height and thrown out into barges alongside. The machine is capable of discharging grain at the rate of fifty tons per hour, and at a much lower cost per ton than is possible by hand labour.

The builders, Messrs. Spencer & Co., of Melksham Foundry, Melksham, Wilts, make a speciality of this class of machinery for discharging vessels or warehousing corn, and have supplied it to several leading firms of merchants and millers both at home and abroad. It is constructed under Gillett's patent.—*Eng.*

THE brain is the palest of all the internal organs, and the heart the reddest. Whatever cames from the brain carries the hue of the place it come from, and whatever comes from the heart carries the heat and color of its birth-place.—*Holmes.*

THE CONVEYOR.

Very little appears in print about the conveyor. There are several reasons for it. One is, that every one familiar with the mill is expected to know what a conveyor is like, and how constructed. The other reason may be assigned to the prevalent practice of neglecting such objects that are simple in their very expression, and that do not bespeak for the writer superior knowledge in order to elucidate his theme.

To despise little things is surely a great mistake. When rightly endorsed, the most gigantic structure of any kind is but a combination of simple parts. Piece by piece, and day by day the additions are made, and at last the work is completed, in its fullness eliciting admiration and wonder. Visitors to a modern well-equipped mill invariably express astonishment at the net-work of contrivances and the bewildering array of machinery. The millwright and the miller look at the scene with different eyes. They know how from a small beginning the simple parts, by gradual and systematic progression, developed into an intricate but perfect whole.

Even if simple, the conveyor plays a very important part in the mill. In some instances the elevator can be made use of to do the work that is done with the conveyor, but not without extra expense and at the sacrifice of room and convenience. The bolting chest, however, could not dispense with the conveyor at all. The fact that in many cases three are preferred to two conveyors, under each reel, gives evidence of how well the conveyor is appreciated in this one particular. At the present time especially, when every vacancy in the mill must be filled with machinery, and the material carried to and from these localities, is the conveyor found to be a valuable contrivance for the purpose. The new mill, of course, does not need as many conveyors as the same sized old mill, which has been remodelled. To the majority of the machines the product is spouted direct from the elevator. When all the machinery is arranged according to a well executed plan, the use of so many conveyors can be avoided. Though the conveyor, like the elevator, is indispensable in the mill, too many are an annoyance and a great inconvenience.

The wooden conveyor is the first to claim attention. This conveyor was introduced as an improvement upon the drag-belt. For general mill use nothing better can be substituted. The wooden shafts with wooden flights are preferable in bolting chests and for all the products of the wheat. Especially when the conveyors may in the course of time, be made to empty at different places is the wooden conveyor the most desirable. With little trouble the flights are changed, and the material in transit is conveyed a different direction. No conveyor shaft should ever be fitted into the box, unless it has the flight holes bored both ways. At the time the conveyor is made, there may be no reason for doing so, but when the conveyor is once in the bolting chest, or out of easy access somewhere else in the mill, considerable effort and work is often required to change the flights, and it frequently occurs that a change is imperative where least anticipated.

The two sizes, ten and twelve inches, are most commonly used. The ten inch box measures about eight inside, and the other about ten. The twelve inch box is probably the most used. For a mill over one hundred barrels capacity, and for bolting chests over fourteen feet in length, the twelve inch box will be found best adapted in capacity. The conveyor that is working full under ordinary circumstances, is too small for the place. Allowance should be made for the maximum load. While it is always better to err in the direction of surplus capacity than otherwise, it is ludicrous to see a small bolting chest with an immense conveyor under it. Where there is no possibility of using a large conveyor, there is nothing gained in placing anything except what can be properly utilized. For a twelve inch conveyor the shaft should be four and one-half inches, and the flights two and one-quarter inches, thus giving one-half play on all sides. If the conveyor is constructed perfectly true, and the shaft sections not over six or eight feet in length, the shaft could be made heavier still, without reducing the size of the flights. The less material can lodge in the conveyor box, the better for the product of the entire mill. To keep the mill free from bugs and worms, conveyors should be so accurately constructed that their contents are continually being disturbed and replaced by new stock. If there is not too much space between the heads of the flights and the sides and bottom of the conveyor box, the conveyor will keep clean enough to not become infested with infested with insects. Millers are often puzzled as to