

May 10, 1842.

The PRESIDENT in the Chair.

“Description of a Flax Mill recently erected by Messrs. Marshall and Co. at Leeds.” By James Combe, Assoc. Inst. C. E.

Flax Mill. The mill described in this communication consists of one room, 396 feet long by 216 feet wide, covering nearly two acres of ground. The roof is formed of brick groined arches 21 feet high by 36 feet span, upon cast-iron pillars: an impermeable covering of coal-tar and lime is laid on a coating of rough plaster over the arches, and upon that is a layer of earth 8 inches thick, sown with grass. This immense room is lighted and ventilated by a series of skylights 13 feet 6 inches diameter; one at the centre of each arch. A vaulted cellar with brick pillars extends under the whole of the building, and contains the shafts for communicating the motion from a pair of engines of 100 horses' power, to the machinery in the mill; the flues and steam cases for warming and ventilating; the revolving fan for urging the air into the room, with the gas and water pipes, and the remainder of the space is appropriated for warehouses.

The heating and ventilating are effected by a large fan, which forces the air through the pipes of two steam chests, each 10 feet long, and containing together 364 pipes of $3\frac{1}{4}$ inches bore: the temperature can be regulated by the quantity of steam which is admitted into the chests, or by allowing a portion of cold air to pass by without traversing the pipes; valves and doors in the flues permit any temperature which is desired to be obtained, or that degree of moisture which is essential for some part of the process of working flax.

The general details of the construction of the building are given with the dimensions of the brick and stone work; the cast-iron pillars and caps, the wrought-iron tie-bars, with the reasons for adding a second set after the accident occurred to the first set; the mode of drainage from the roof; and the striking the centres of the arches, &c.

The total cost of the mill including the ornamental stone front was £27 443, which is stated to be about the same cost as that of a good fire-proof mill on the common plan; but as this mode of construction was novel to the workmen, it is probable that a second building of the kind would be less expensive.

The advantages resulting from the plan are, convenience of super-

vision, facility of access to the machines, the power of sustaining uniformity of temperature and moisture, the absence of currents of air which are so objectionable in other mills, the simplicity of the driving gear, and the excellent ventilation which is so desirable for the health of the workpeople.

The paper was illustrated by two drawings with a sheet of reference, and an appendix contained the result of some experiments upon the strain on the tie-bolts, the pressure on the arches, and the deflection of the bolts, &c.

Mr. Smith was much pleased to find this description of building Mr. Smith, of Deanston brought before the Institution, as he had been the first to adopt it for a weaving shed of the extent of half an acre; the columns for carrying the arches were 30 feet 6 inches apart, and the skylights were 8 feet in diameter; some of the arches were of brick, with stone springers; others were entirely built with rubble stone well grouted, which latter mode of construction he found succeeded quite as well as brick: the settlement of the arches on striking the centres after standing four days was only $\frac{3}{4}$ ths of an inch: The arches were thickly plastered with common mortar and at first were only covered with a coating of boiled coal-tar pitch and lime $\frac{3}{4}$ ths of an inch thick, but as the wet penetrated, the thickness of coal-tar pitch was increased to $\frac{3}{4}$ ths of an inch, with a mixture of sharp sand, which had proved perfectly water-tight: for some months there was an appearance of moisture, which proceeded from the interior of the brickwork, as it could not escape outwards on account of the impermeable covering; after some time the copious ventilation carried off this moisture and the building became perfectly dry. Over the coal tar a thickness of earth is laid, which is cultivated, and has proved a prolific garden: in severe weather the frost has not reached above $1\frac{1}{2}$ inch deep in the soil, while it has penetrated to the extent of 12 inches in other situations.

The construction of the floor is peculiar: it is desirable in such weaving sheds to have a boarded floor, to prevent the small parts of the machinery from being broken by falls, and also on account of the health of the persons employed; but the vibration of an ordinary wood floor is objectionable. In order to meet these views, a bed of concrete was laid throughout the building, a series of small deal spars $1\frac{1}{2}$ inch deep by 1 inch wide were set flush into the concrete whilst it was wet, and the whole surface was smooth plastered: upon this bed, when it was perfectly dry, a floor of boards $1\frac{1}{4}$ th inch thick was nailed to the spars: it was found to combine the solidity of pavement