

account, viz., the lubrication of the crank-pin. If the pressure upon it be so great as to expel the oil from between the surfaces of the pin, and the bearing-in end of the connecting-rod, then heating and cutting will be sure to follow.

The length of the crank-pin in inches, multiplied by its diameter in inches, and by five hundred, should be equal to the total pressure in pounds which comes upon the piston. When this is the case, and the rubbing surfaces are in good condition, heating will not be caused by excessive pressure, and the size will be such as to render it almost unnecessary to make any calculation for strength.

(To be continued.)

ONTARIO COTTON MILLS.

The Ontario Cotton Mills Co's large mill in Hamilton will soon be in full running order, the difficulties experienced with the motive power, as originally put in, having been got over by replacing the steam engines by a pair of Harris' Corliss high pressure condensing engines, made by the well-known maker, W. A. Harris, of Providence, R. I. The engines are coupled to same main shafts, with cranks at right angles to each other.

The cylinders are 18 inches diameter, and the length of stroke is four feet. The engines will make about 71 revolutions per minute, and with steam of 90 lbs. pressure admitted to the cylinders, and cutting off at about one-quarter stroke, will be capable of developing over 500 horses power, should the demands of the mill machinery require it. The valve gear is an improved form of the celebrated Corliss automatic cut-off, and in its proportions, and accuracy of workmanship, is an excellent illustration of good fitting and careful designing. The crank shaft is of steel, the bearings being about 10 inches diameter and 16½ inches long, the shaft being stiffened towards middle of its length, where the weight of fly wheel and stress of the work have a tendency to bend it.

The driving gear is leather belting running on face of the fly wheel, which is about 18 feet in diameter and broad enough to take two belts, each 24 inches wide, if required.

The engines are fitted with condenser and air-pump, but can be worked as ordinary non-condensing engines. The air pump is horizontal, and both it and the condenser are placed underneath the floor level, and the arrangement of driving gear, for air pump and of pipe connections seems admirable and well adapted for the work to be done.

Steam will be supplied by six steam boilers, made of steel plate, each about five feet diameter and twelve feet long, with tubes 3 inches diameter, and with furnaces adapted for coal-burning.

These boilers will be worked at a steam pressure of 100 lbs. per square inch, and will also supply steam for the dye house and for heating the mill in the winter time.

The use of steel for boiler making is rapidly coming into use in this country, and when of proper quality and judiciously handled has many advantages over ordinary iron boiler plate.

Inside the mill much of the machinery is already in use, the shafting having been kept in motion by a temporary arrangement of portable engines until the new Corliss engines were ready. The machinery is chiefly from England, and is throughout of the very best manufacture and most improved design.

Many of the machines are fitted with electric stop apparatus, by means of which, in event of the breakage of even one of the many threads of cotton which are being spun or twisted together, the machine is brought at once to a stand still until the attendant has remedied the defect. In this way inferior quality of work and irregularities in the yarn produced are prevented, as well as a great diminution effected in the quantity of "waste" produced.

The power from the engines drives a heavy length of shafting, strongly supported by iron columns and beams, and carrying pulleys 8 feet diameter and over 48 inches wide. The

shafting generally throughout the mill has been designed and erected in accordance with the modern principles of high speed, with light shafting and short distances between the bearings, the brackets and hangers carrying the bearings being of such design that the inequalities arising from the bending of the floor beams, or settling of the walls, may be readily taken up and the shafting adjusted to run perfectly true.

The various flats are all well lighted, with high ceilings, and have a bright and cheerful appearance as compared with many other mills the writer has seen.

There are three main stairways communicating with each of the main flats, so that in event of an alarm of fire, ample means of escape for the workers would seem to have been provided.

Throughout the whole main building the "automatic sprinkler" fire extinguishing apparatus is provided, and as this contrivance has proved one of the most efficient ever invented for the prevention of the spread of a fire in a large mill, this should be a good risk for the fire insurance companies.

We congratulate the company on their having a mill so well arranged and fitted with machinery so excellent in workmanship and design, and trust their energy and enterprise will be duly rewarded.

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