

All flange steel at 2½ cents per pound	\$5 92
126.5 feet 2½ inch diameter tube at 15 cents per foot.....	18 98
Rivets, 75 pounds, at 34 cents per pound.....	2 63
82 stay-bolts at 20 cents each.....	16 40
Fusible plug.....	75
Total for material.....	\$44 68
Total for labor.....	49 00
Total for material and labor.....	\$93 68

30 per cent. for fixed charges.....	\$28 10
Profit, 10 per cent. of total.....	12 18
	\$133 96

The total estimate for the repairs would be quoted at \$135.

The stay-bolts in this estimate are quoted at 20 cents each, but can be made for less than this. They may be made like rivets in the rivet header, six being squared on the

head and cut off at each heat. With a good long heat on the bar and the fires kept full, a man can make from 300 to 500 per hour. A handy man at 18 cents per hour will thread 120 per hour on a good machine.

In the early part of this article the writer has not given the material, as that is always an easy matter to work out; it is the time that is the most uncertain thing to figure on. We must know our men when we are working out our estimates and decide who will be the best man to put on each class of work. —The Boiler Maker.

New Plant of Berlin Machine Works

Well Equipped Plant Making Woodworking Machinery Just Started Operations in Hamilton, Construction of Buildings. Equipment of Machine Shop and Foundry.

The new plant of the Berlin Machine Works, Limited, Hamilton, has now been in operation for some months. This factory is owned by the same interests as the Berlin Machine Works, Beloit, Wis., makers of wood working machinery. The same machinery will be made in Hamilton as is made in Beloit. This is one more United States manufacturing firm who has realized the possibilities in Canada, and as a result have established a Canadian factory in order that their business in Canada can be handled to the greatest advantage. These works form a large and important addition to Canada's industries.

The company have selected an excellent location for their factory, as Hamilton is practically the centre of manufacture in Canada and has exceptionally good shipping facilities. Shipping facilities for the plant include direct connection with the Grand Trunk Railway and the Canadian Pacific Railway, and as well good facilities for shipping by water.

The factory occupies a twenty acre tract at the intersection of the Grand Trunk and Toronto, Hamilton and Buffalo Railways, and the company's private tracks connect with both lines. In order to expedite shipments, the company maintains its own locomotives and has more than a mile of track to secure direct connection with the Grand Trunk and Toronto, Hamilton & Buffalo Railways.

This manufacturing plant is one of the most complete, well designed and well equipped plants in Canada. The buildings are well constructed; floors are excellent; there is a wonderful amount of floor space; cranes have plenty head room; lighting is excellent; buildings are well heated and ventilated. There is good fire protection; and the atmosphere in the shops is such as to make working in them a pleasure.

GENERAL FEATURES OF CONSTRUCTION.

The buildings are of steel and concrete, on concrete foundations. All buildings are completely equipped with a sprinkler system, which is connected to the city mains and also to an auxiliary reservoir of 100,000 gallon capacity. The system was installed by the Automatic Sprinkler Co., Montreal.

The floors in the machine shop, stock room, etc., are a feature of the construction. The foundation for the floors is cinders and tar. On top of this is laid a rough flooring running

at an angle; and the hardwood floor is placed on top of this. All the tools in the shop are placed on this floor without further foundation; as well all the machines built are tested on this floor without further foundation. This is good indication of the stability of this flooring.

THE MACHINE SHOP AND TOOL ROOM.

The largest building is the machine shop which is built of steel and brick. It has almost 100,000 square feet of floor space. The roof is of "saw tooth" design, giving admirable light as well as furnishing fine ventilation. A gallery in this building has over 10,000 square feet of floor space, and is used for a tool room.

The tool equipment for the machine shop, with the exception of more or less special tools, was supplied by the London Machine Tool Co., Hamilton. This equipment included some large lathes and planers and an 8-foot high power boring mill.

The Cincinnati Milling Machine Co. supplied the milling machines, and the American Tool Works Co., Cincinnati, the radial drills. A cylindrical grinding machine for grinding the feed rolls for the woodworking tools was supplied by the Norton Grinding Co., Worcester, Mass. The turret lathe equipment was supplied by the Jones & Lamson Machine Co., Springfield, Vt. B. F. Barnes, Rockford, Ill., supplied the drill presses. The machine shop is served with two Pawling & Harnischfeger electric travelling cranes. In addition to regular shop equipment there are several special tools designed specially for work carried on in this shop. One of these is a floor drill for boring the large machine frames. Another is a special tool for milling the slots in the cutter heads. Another is a special machine for grinding band saw wheels absolutely true after the spokes have been welded in. To have these wheels true is very important, as upon that depends the smooth running of the band saw and the wear.

The tool room equipment includes London Machine Tool planer, B. F. Barnes drills, Hendey Machine Co. lathe, Cincinnati Milling machine and tool grinder, and American Tool Works planer. Repair work and some manufacturing is done in this room.

The tools in the machine shop are group driven with the exception of the 8-foot London Machine Tool boring mill, which is

driven direct by D.C. variable speed motor. Nine changes of speed can be secured, 3 to 1 in the motor and 3 to 1 in the gear box. The group drive is by induction motor.

THE FOUNDRY.

The foundry building, separate from the others, is splendidly lighted from roof and sides. The building is high, giving plenty of head room for the crane. Up-to-date equipment is the feature of the building. The main moulding floor covers 28,000 square feet. The floor is served with a 20-ton Pawling & Harnischfeger electric travelling crane, and the side floors with ten jib cranes. There are two 66 inch cupolas, one a Whiting Foundry Equipment Co., and the other a Northern Engineering Works.

One part of the moulding floor is equipped with Pridmore stripping plate moulding machines for moulding pulleys and gears.

A feature of the wood-working machinery turned out by this firm is the one piece frame. They use no bolted frames. This means some large work in the foundry in frames. All the large moulds are skin dried.

The foundry equipment included a set of W. W. Sly Mfg. Co., Cleveland, O., steel exhaust tumbling mills and patent dust arrester.

The Berlin Works are fortunate in having moulding sand on their grounds, there being a supply not many yards from the foundry door.

Castings are taken from the foundry to the machine shop by industrial railway, and in fact there is an industrial railway system throughout the plant.

BLACKSMITH SHOP.

The blacksmith shop is equipped with Buffalo Forge down draft forges, Hurlbut Rodgers cutting off machine, a special shaft straightening machine and a Williams-White & Co. trip hammer. Next the blacksmith shop and also next the machine shop is the stock room.

THE POWER PLANT.

Power is received from the Cataract Power Co., at 22,000 volts. This is transformed to 220, and at that voltage is applied to the induction motors throughout the plant. A motor generator set supplies direct current for the boring mill motor for the crane motors and for the lighting. The distribution is