

CANADIAN ELECTRICAL NEWS

AND
STEAM ENGINEERING JOURNAL.

VOL. I.

TORONTO AND MONTREAL, CANADA, JULY, 1891.

No. 7.

MR. JAMES BAIRD.

THE accompanying portrait is designed to make familiar to our readers the features of another engineer who is deemed worthy of a place in the ELECTRICAL NEWS portrait gallery, viz., Mr. James Baird, President of the Canadian Marine Engineers' Association.

Mr. Baird, who is about 30 years of age, was born in the "land of brown heath and shaggy wood," and served his apprenticeship in "Glasgow town." He was employed for some time as engineer in the merchant marine. Five or six years ago he came to Canada and to the city of Toronto, and by the way, since coming, has succeeded in persuading a fair daughter of the Dominion to unite her fortunes with his.

About three years ago Mr. Baird became a member of the Canadian Marine Engineers' Association. The active interest which he manifested in its welfare led to his appointment last year to the office of vice-president, and to his promotion this year to the position of chief executive officer of the organization.

Mr. Baird is employed as chief engineer of the Steamer "Africa," which is engaged in the lumber trade between Parry Sound and Buffalo.

STEAM ADMISSION.

II.

HAVING determined that the steam pipe is large enough to keep up the boiler pressure or very near that pressure at the speed the piston is to travel, the next point to examine is the size of the steam chest or valve chamber. In some engines the chamber that contains the valve is made so small relatively to the size of the valve, that the steam cannot freely pass the valve to enter the ports. In some slide valve engines the steam can enter the end of the cylinder quite freely, but the valve seriously obstructs its passage to the other end. This sometimes explains the fact that a fairly good diagram can be got from one side of the piston and a very poor one from the other.

The port for the admission of the steam should be at least as large in area as the steam pipe. If the same port is used for the discharge of the exhaust steam it should be larger. How much larger, is a point upon which engine designers differ, but if made of such size that the steam when passing out as exhaust need not travel faster than seventy feet per second, good results will be obtained. From the rule given for the size of the steam pipe, the exhaust passages and pipe may be obtained by simple proportion, making the statement thus: as forty-two is to sixty, so is the area of the steam pipe to the area of the exhaust pipe and of the exhaust parts. Having the valves and the ports of the right size, the valves should be made to open and close the passages as quickly as possible. One method of doing this is to make the port as wide as possible, so that a small movement of the valve will open a large area. Another method is to make what is usually called a grid-iron valve, that is, having two or more openings into the main port. For example, in a cylinder

eighteen inches diameter, and requiring a port twenty-seven inches in area, the port might be made eighteen inches wide by one inch and a half in the direction of the travel of the valve. To open this fully the valve must travel one inch and a half, but if two openings be made, each three-fourths of an inch, then the valve need only move half the distance, and if six openings be made, a travel of one-quarter of an inch will open as full a port as in the first case required one inch and a half. In high speed engines and engines cutting off steam automatically, this is a very important element, as it is necessary to get the steam into the cylinder as quickly as possible and then close the valve sharply. Take an engine making 120 revolutions per minute and cutting off steam at one quarter of the stroke, in what time must the steam valve open and close again? At 120 revolutions per

minute, two revolutions are made in each second. In order to make a revolution, two steam valves have to be opened and closed, this reduces the time for each to one-quarter of a second if carrying steam full stroke, and when cutting off at one-quarter stroke the whole operation of opening the steam valve and closing it again must be done in one-sixteenth of a second.

Automatic cut-off engines of large size often make 80 revolutions per minute, and cut off as early as one-sixth of the stroke. When thus running there are 160 valve openings per minute, and as the cut-off is at one-sixth of the stroke, the valve must open and close in the one-nine hundredth and sixtieth part of a second.

The necessity for large steam pipe, plenty of port area, and a quick movement of the valve apparatus is clearly seen, when the time for the admission of the steam into the cylinder is taken

into account. The importance of having the valve set to open exactly at the right instant in relation to the position of the piston is made plain by this way of looking at the matter.

It is found to be good practice to have the steam valve begin to open before the piston is quite to the end of the stroke. In slide valve engines many engineers set the eccentric so that the steam port will be about one-sixteenth of an inch open when the crank is on the dead centre. This early admission of steam forms a cushion, and takes up all the slack motion in the moving parts, before they begin to reverse their motion, and so prevents pounding or knocking.

It is difficult to get the position of the eccentrics and valve gear so as to give the exact amount of lead to the valve, because when set the engine is cold and there is no strain on the parts. A useful and practical rule is to allow one-sixteenth of an inch for each joint between the eccentric block and the valve. That is if there are two joints in the rod, the valve when cold would be set with one-sixteenth of an inch lead for each joint and for actual lead, making apparently one-quarter inch of lead. When engine is running the lead will only be about one-sixteenth of an inch. Where a grid-iron valve is used, the lead may be divided among all the openings or made to be at only one of them.



MR. JAMES BAIRD.