

The Canadian Engineer

Vol. VI.—No. 12.

TORONTO AND MONTREAL, APRIL, 1899.

PRICE, 10 CENTS
\$1.00 PER YEAR.

The Canadian Engineer.

ISSUED MONTHLY IN THE INTERESTS OF THE
CIVIL, MECHANICAL, ELECTRICAL, LOCOMOTIVE, STATIONARY,
MARINE, MINING AND SANITARY ENGINEER, THE SURVEYOR,
THE MANUFACTURER, THE CONTRACTOR AND THE
MERCHANT IN THE METAL TRADES.

SUBSCRIPTION—Canada and the United States, \$1.00 per year; Great Britain
and foreign, 6s. Advertising rates on application.

OFFICES—62 Church Street, Toronto; and Fraser Building, Montreal.

BIGGAR, SAMUEL & CO., Publishers,

E. B. BIGGAR Address—Fraser Building,
R. R. SAMUEL MONTREAL, QUE.
Toronto Telephone, 1392. Montreal Telephone, 2589.

All business correspondence should be addressed to our Montreal
office. Editorial matter, cuts, engravings and drawings should be
addressed to the Toronto Office, and should be sent whenever
possible, by mail, not by express. The publishers do not undertake to
pay duty on cuts from abroad. Changes of advertisements should
be in our hands not later than the 1st of each month to ensure
insertion.

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FOR THE CANADIAN ENGINEER.

RAILWAY ENGINEERING.*

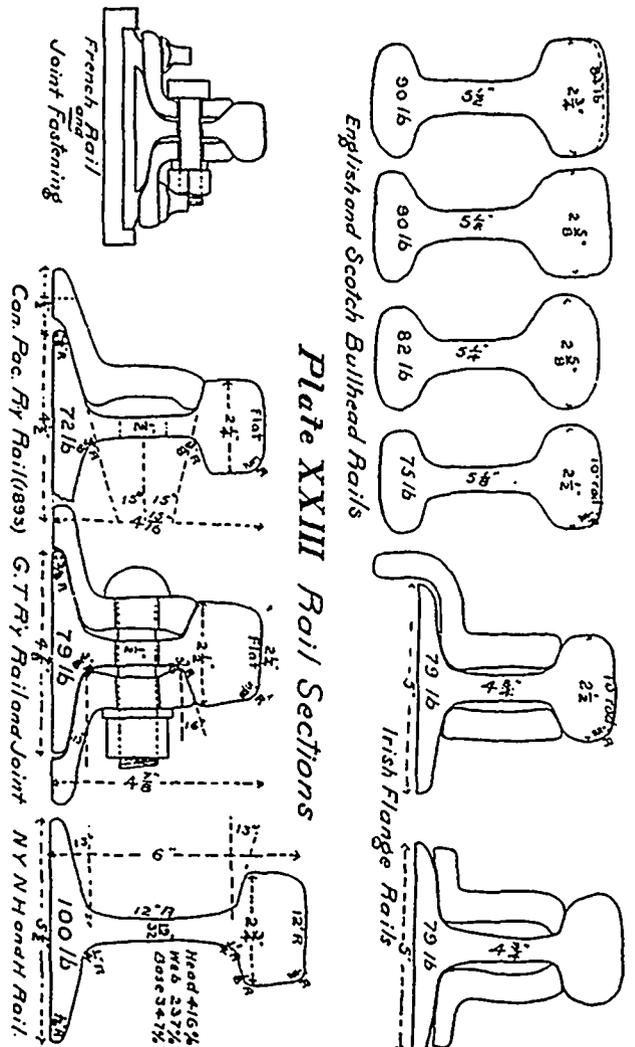
BY CECIL B. SMITH, MA. E., MEM. CAN. SOC. C.E., LATE
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UNIVERSITY.

ARTICLE 4.—RAILS.

The progressive history of rails from the first longitu-
dinal wooden sleepers up to the present would be interest-
ing but not in place here. We have arrived at two types,
one used in England and Scotland, and in some British
colonies and dependencies, etc., i.e., the bullhead or
double-headed rail, resting in cast-iron chairs, the other
used in the world generally, otherwise, (i.e.), the Vignoles
or flanged rail, which is self-supporting.

(A) Plate XXIII. gives sections of bullhead rails, and
on Plate XXV. is shown a cast-iron chair for fastening the
rail to the ties, and which adds \$1,500 to \$2,000 per mile to
the cost of the track. The original idea involved in the
use of this section was to obtain a reversible rail which
would double the wearing value if it could be turned over
and used again after one head had worn down, but when
it was found that the chairs damaged the rail so that they
could not be reversed advantageously, this idea was
abandoned, and the section now used has a much larger
per cent. of metal in the head than in the base of the rail.
The British railways use rather heavy rails considering
the light rolling stock, but space their ties 2 feet 6

inches apart, centres, due to the superior supporting quali-
ties of the cast-iron chairs; and, in general, the tracks are
very solid and first class, the rails being held to the chair-
seats by long tapering oak keys which are tightened



occasionally, while the chairs themselves are fastened to
the ties with wood screws and bolts, and even those few
British or Irish roads which use flanged rails use the same
fastenings with tie plates, not trusting to spikes except at
every other tie at the most. A special advantage in using
rail chairs is that creosoted pine ties become available,
and they are probably the most durable and economical
tie in use, where it becomes possible to fasten the track
securely to them.

(B) *Flanged Rails.*—The objections urged against
flanged rails, that they cut into the ties, and that they
cannot be held properly for heavy traffic with spikes, are
overcome by adopting tie plates and screws or bolts for
fastenings, and the idea that they are not rigid on curves
is shown to be erroneous, as witness the very heavy engines
of America running at high speed around much sharper
curves than are used in England.

Plates XXIII. and XXIV. give sections of flanged rail-
of various designs and origins. In detail they will be
found to vary widely, but with the exception of the New

*Now issued in book form.