



FIG. 3—ERECTION AND LAUNCHING DETAILS OF 60-FT., 85-FT. AND INGLIS BRIDGES

joists—or R.S.J.'s were used to make up the necessary span and strength.) Of these four general types, two—the Hopkins and Inglis—are through bridges, and the other two are known as the 60-ft. and 85-ft. spans. The two latter were half deck if used in one position, or deck type if inverted. All these bridges could be varied in length, below the maximum for which they were designed, simply by omitting sections. No field riveting was done, close fitting  $1\frac{1}{4}$ -in. diameter black bolts being normally used, and large pins in the Inglis.

#### Inglis Bridge

The Inglis was originally designed with a triangular cross-section and only a single top chord, but that proved inefficient, and the later Inglis type was rectangular in cross-section. In the Inglis bridge (See Drawing No. 3), the cross-beams, both ledgers and transoms, were R.S.J. sections, with four sockets in the vertical plane at each of their ends. These sockets were pierced by heavy cross pins. The members of the trusses were heavy steel 5-in. pipes, with solid projecting ends pierced by cross holes. These truss members were slipped into the sockets on the transoms and ledgers, and the cross pins inserted. The holes, however, were slotted, so there was way to take up, and a screw sleeve on the bars was turned to prevent movement.

The Inglis bridge was designed in identical 12-ft. panels and made a series of equilateral triangles of the Warren type. Its great advantages were (1) speed of its erection, and (2) portability. It was often used for a week or two until a heavier bridge was erected alongside, when it was dismantled and shipped by lorry further forward.

The well-known picture, "Canadians Bridging Canal du Nord, Arras-Cambrai Road, September 28th, 1918," shows

an Inglis bridge in use on the centre line of the highway. Later, two Hopkins bridges were erected on a diversion site close alongside. This Inglis bridge was good only for a Class C load of 8 tons per axle at a span of 120 ft., but it was good for a Class A load of 17 tons per axle at 72 ft. The span was about 108 ft., but the original civilian girder bridge had been dropped bodily into the shallow water directly beneath, and on the visible few inches of its top chord, a crib had been erected to support the Inglis bridge, and therefore, with a maximum span of, say, 60 ft., it could have been used for any British gun, but not for tanks.

The history of its erection is briefly this: The canal was crossed at 5 a.m., September 27th, on a dry bottom about three miles south of the highway. The attacking Canadians then passed north and consolidated on the far side at approximately 8 a.m. Barrel-pier and pontoon bridges were rapidly thrown over, and by noon our field artillery were fully two miles in advance of the canal. The erection of the Inglis was commenced about noon. In addition to its true nine spans, this length required a counterweight of six more spans, in addition to a "trolley" span (in the centre) which acted as a carriage for the progression of the whole in launching. The 16 spans were not completed until dark, and as it was unwise to use lights owing to hostile aircraft, the launching was postponed until dawn. The bridge was in commission about 11 a.m., September 28th, and was used for several weeks.

The method of launching the Inglis was slightly different from that of launching the other types. All spans over 30 ft. were built on shore and launched without falsework in the river, but this type had a two-wheeled trolley, secured by jacks, just back of its rear "bridge seat." Back