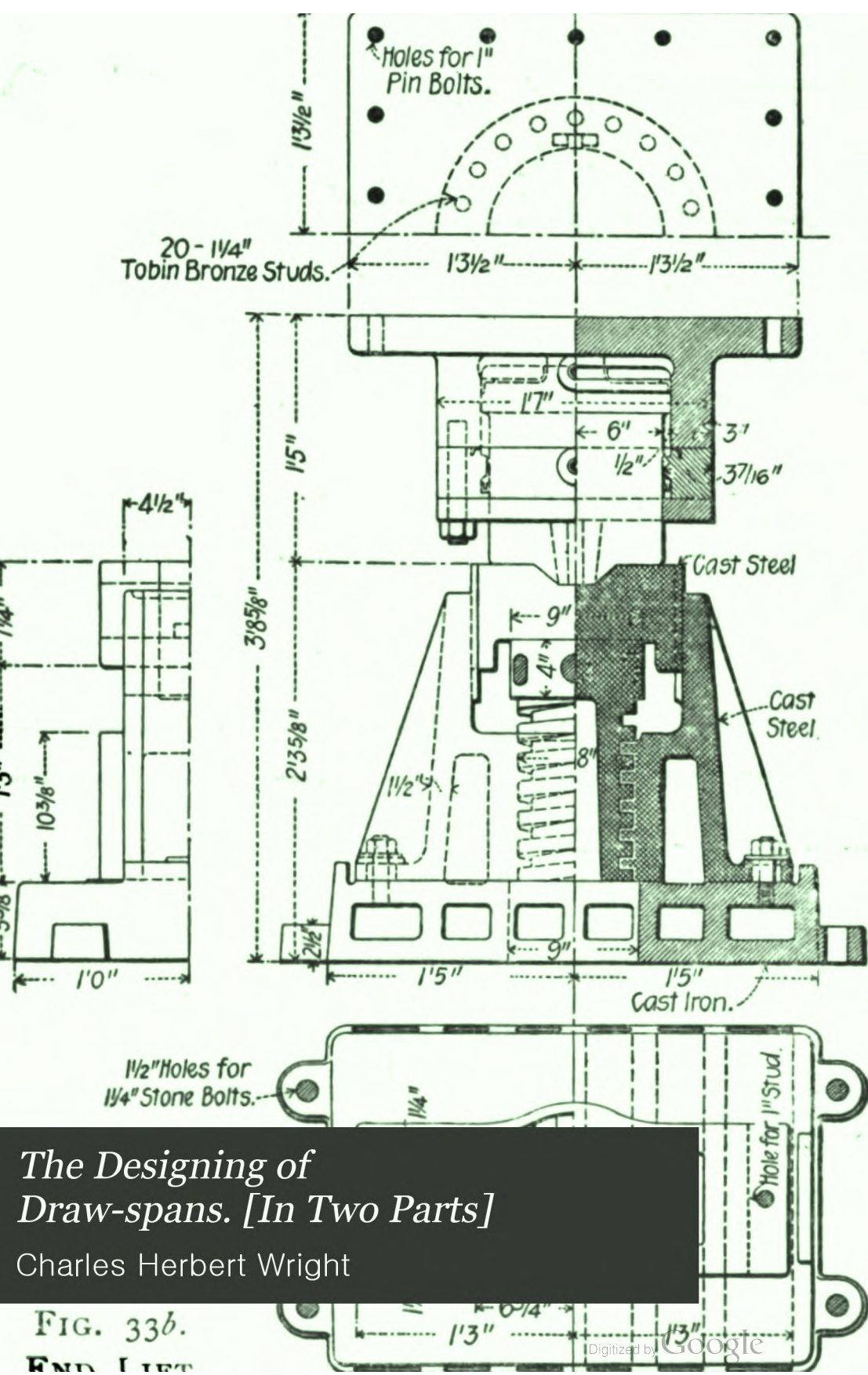

The Designing of Draw-spans. [In Two Parts]

Charles Herbert Wright

FIG. 33*b*.

entire structure is 5000000 lbs. Two 50 H. P. engines are used for operating the turning and lifting machinery. Brake-wheels and bands control the main shaft, the bands being operated by separate steam-cylinders. Either engine will turn the bridge if necessary alone, extra gears being used in this case, which reduce the speed one half and consequently the power required. All the gearing is made of cast steel. Two minutes are required to turn the draw when both engines are used. The end-lifting machinery is designed to lift 270000 dead load and support 784000 lbs. of live load. See Fig. 78 for further details.

Brake.—As a precaution a brake of some style is usually added to the machinery of draws of considerable length. The one shown in Fig. 40 was used on the 290-ft. span shown

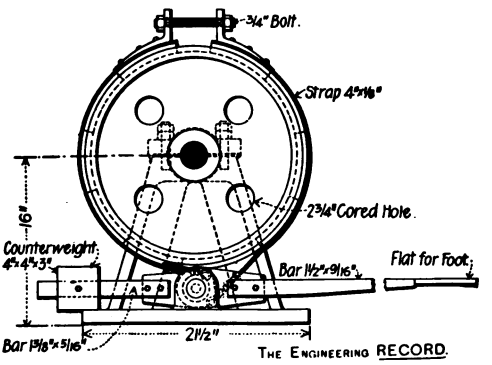

FIG. 40.

in Plates C and D; it was found, however, that perfect control of the bridge could be secured by means of the clutches used in reversing and throwing the various parts in and out of gear, so that the brake has so far proved unnecessary.

Weed Street Draw, Chicago (designed by Wm. Harman).—Two or more draws similar to the one shown in Fig. 41 have been built over the Chicago River. The floor is in two parts, hinged, as shown. When the draw is opened the two parts are lifted up and folded together in a manner similar to the closing of an open book. There is a counter-

weight at each tower, and a wire rope passes from this weight over the pulley *P* and around the cam *C*, to which it is made

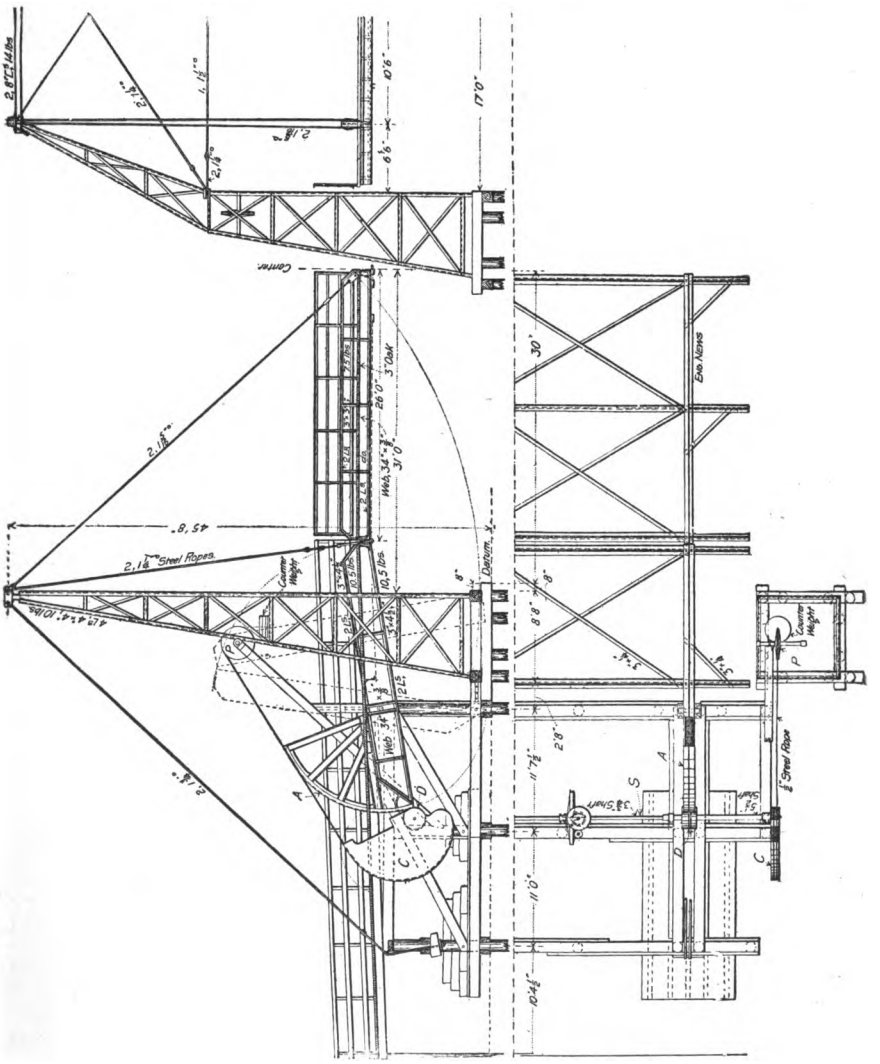

FIG. 41.

FOLDING-FLOOR DRAWBRIDGE OVER THE CHICAGO RIVER AT WEED ST., CHICAGO, ILL. Snailer & Schniglau, Engineers.

fast. On the shaft with C is a drum D; to this drum is fastened a second rope which runs over the segment A, which is attached to the rear leaf of the floor. The leverage of the counterweight is adjusted by the cam to the resistance to be overcome, so that the bridge will balance in any position. The power is applied to the shaft S by means of gearing and one man can easily handle the bridge. When open the bridge forms a perfect guard against teams, etc. The cost of operating is very small, as no engine is required and only one man to tend the bridge. The cost was about $16000, which, compared with other bridges over this river, is very low.

It would seem, however, that this type of draw is hardly suited to heavy traffic or for railroad use, as there must of necessity be a considerable amount of vibration and unequal deflection under heavy concentrated loads, particularly as there is no connection at the centre.

Folding Draw.—Fig. 42 shows the folding draw as used by the B. & M. R. R. at Boston. The girders revolve in a horizontal plane about a pivot at one end of each girder. The rails are fastened to the top of the girders by clamps, no ties being used. There are struts hinged at the ends which hold the girders parallel to each other, but do not prevent the closing together of the girders as the bridge revolves. The outer ends of the girders are held up by guy-rods, which are fastened to the top of a steel tower, the point of attachment being vertically over the axis of rotation of the girder supported, so that the girder will remain in a horizontal plane as it revolves. The girders are made of sufficient width to be rigid under the passage of the heaviest engines. The simplest method of operating is by means of cables attached near the outer ends and running to suitable drums, which are turned either by hand or by engines or motors. A rack and pinion working under a prolongation of the girders over the masonry, or a strut with a rack and pinion attachment, might be used. As no weight need be lifted, the power required is not great.

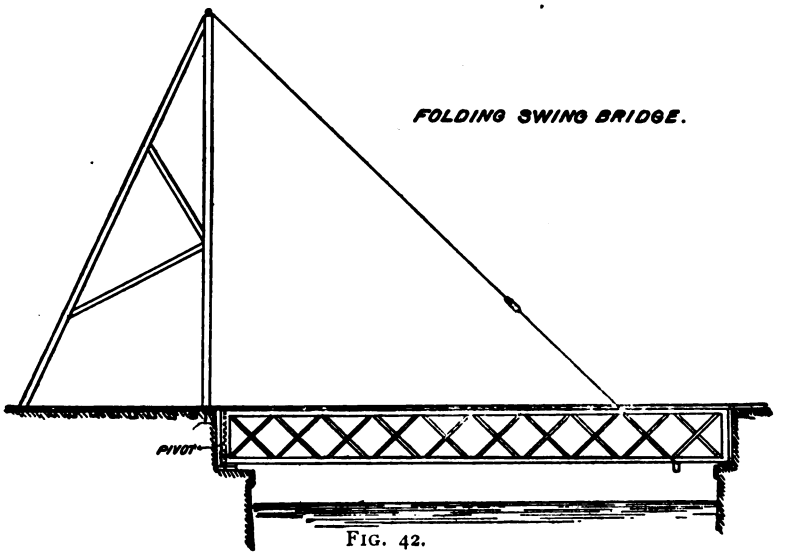

FIG. 42.

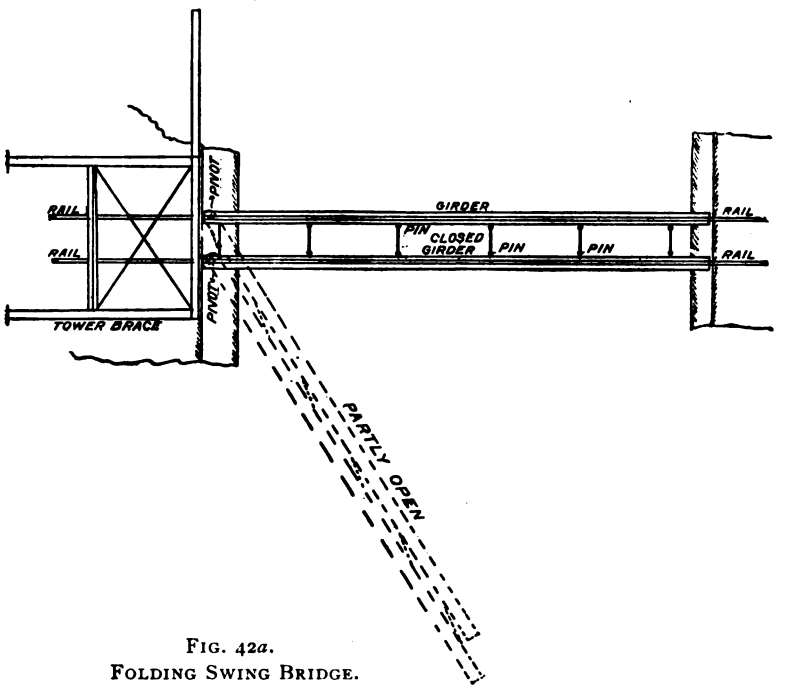

FIG. 42*a*.
FOLDING SWING BRIDGE.