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"On Hauling out and Launching Vessels Sideways."

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THE slip-ways at the ship-building yard of the Imperial and Royal Danube Steam Navigation Company, at Alt-Ofen in Hungary, extend along the water-side for a distance of nearly 650 feet, and have a depth inland of about 280 feet. The slip-ways are arranged in three separate groups, A, B, and C, Plate 8, Fig. 1, each of which can be used at discretion for building or repairing the steamers, about eighteen to twenty barges and other vessels belonging to the Company finding accommodation at one time. The number of new boats built and launched yearly seldom exceeds sixteen to eighteen, while sixty steamers and barges are annually drawn out of the water for examination and repair. This is effected by hauling the vessels broadside out of the water by chains connected with geared winches and blocks (Fig. 2), the weight of the hulls being taken up by cradles, placed under water at the end of slipways to receive them. In the drawing the height of the water, which varies in the course of the year 10 to 12 feet, is shown at 8 feet above datum, which is rather under the average, the slip-ways with this height of water being submerged about 69 feet at the ends. There is no current. It will be seen that the formation of the ground is artificial, having been raised at the back in the neighbourhood of the wall to 25 feet 10 inches above datum, in order to get the necessary incline, the level of that part of the yard immediately adjacent being the same as that of the roadway, E. Only the lower portions of the slipways are permanent, and partially laid on rough stonework, the length of this part being about 150 feet. That part of the ways situated on the higher level can be removed after the vessels are hauled up and relaid when required for launching. In case, however, a vessel remains only a short time ashore, the ways are not removed. Fig. 1 shows the general disposition of the whole arrangement, the eight slip-ways of the central portion being usually reserved for the larger steamers, which are hauled up broadside on by means of the four

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winches and blocks; the upper and lower portions have each seven slip-ways, which are worked indirectly by the same winches, by suitable sheaved blocks and other arrangements. Along the whole length of the ground runs a line of rails, shown at F F, provided with lorries, for facilitating the manipulation of the chain used in hauling. These chains are $\frac{7}{8}$ inch diameter, best quality, short-linked, that used for the slings (round the hulls) being of the same description, but $1\frac{1}{8}$ inch diameter.

The motive power is derived from a 10-HP. engine used at the same time for working punching and shearing machines and other machinery. Fig. 2 shows the mechanical arrangements employed on a somewhat enlarged scale. The lower barge (Fig. 1) is represented in the act of coming in contact with the submerged cradle, prior to the hauling out commencing. The second barge is being hauled up the slip-ways, and the third barge is represented as having been made clear of the cradle, and placed fair on cross-blocks of wood, ready for examination and repair. The speed at which the vessels are hauled out varies from 1 to $1\frac{1}{4}$ feet per minute, the motion being continuous and exceedingly smooth throughout. With regard to the class of vessels thus dealt with, the barges have mostly a length of 180 to 190 feet, with 24 feet beam and $8\frac{1}{2}$ feet depth, having a displacement without cargo of 120 tons. These barges have been built in recent years entirely of steel. The largest steamers are 220 feet to 250 feet in length, with 25 feet to $27\frac{1}{2}$ feet beam and 10 feet depth at the sides, having a light displacement of 440 to 460 tons. Two small monitors, belonging to Government, are likewise hauled out from time to time. These, on account of their weight being distributed over a shorter length, are more trying to the ways, but no difficulty has arisen either in hauling them out or re-launching them. The winches, four in number, are shown in Fig. 2, and are double-gearred 9 to 1; they are driven by a line of shafting in the rear in connection with the engine. The slings, after being firmly secured to the hulls, are attached to four pairs of blocks, the lower or movable one running on wheels on the incline on a way laid down for it. The number of pulleys in each block is three. By means of the mechanical arrangements described the power gained is very great, and has been in all cases more than sufficient for the work to be done, the cost of labour being reduced at the same time to a minimum.

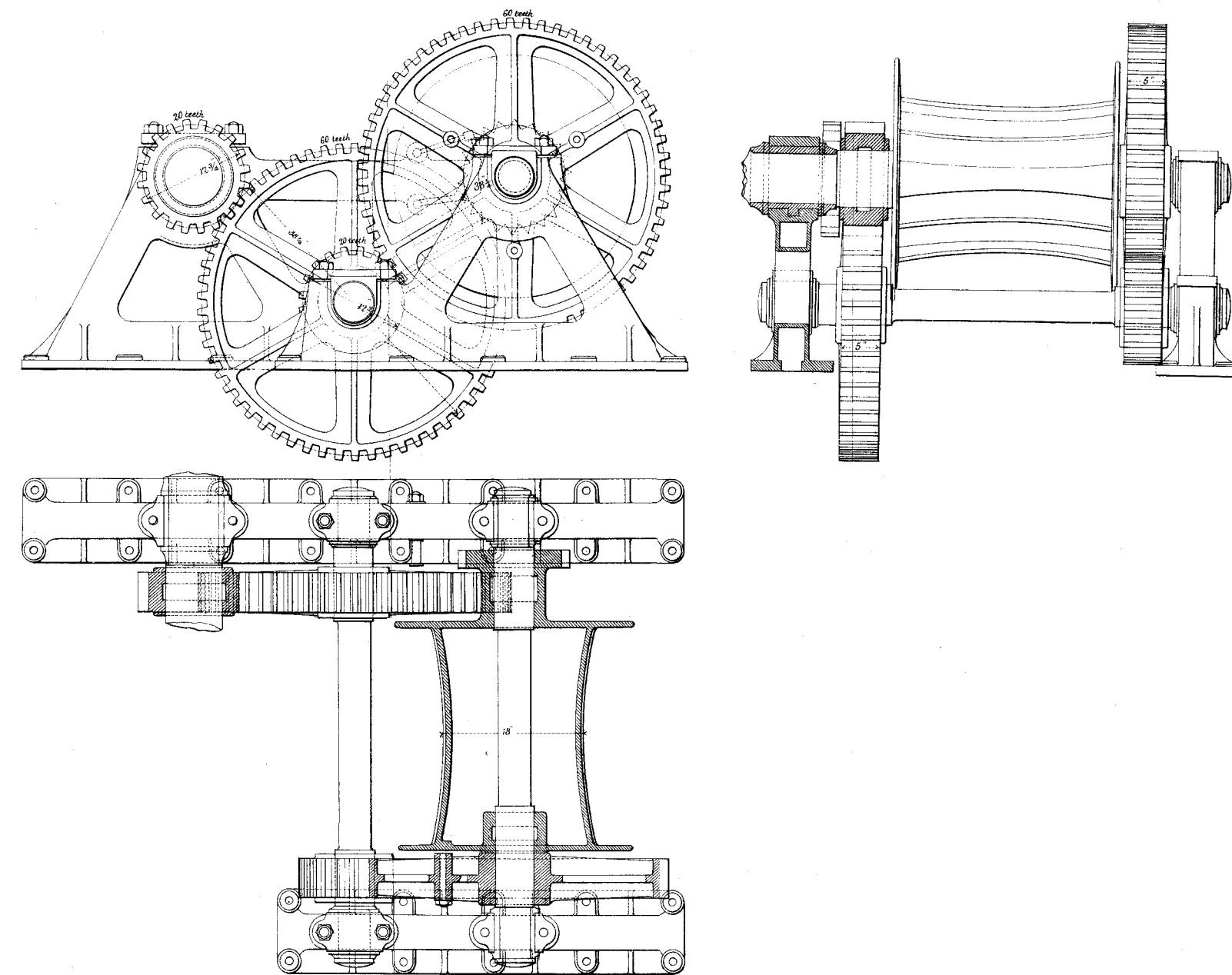
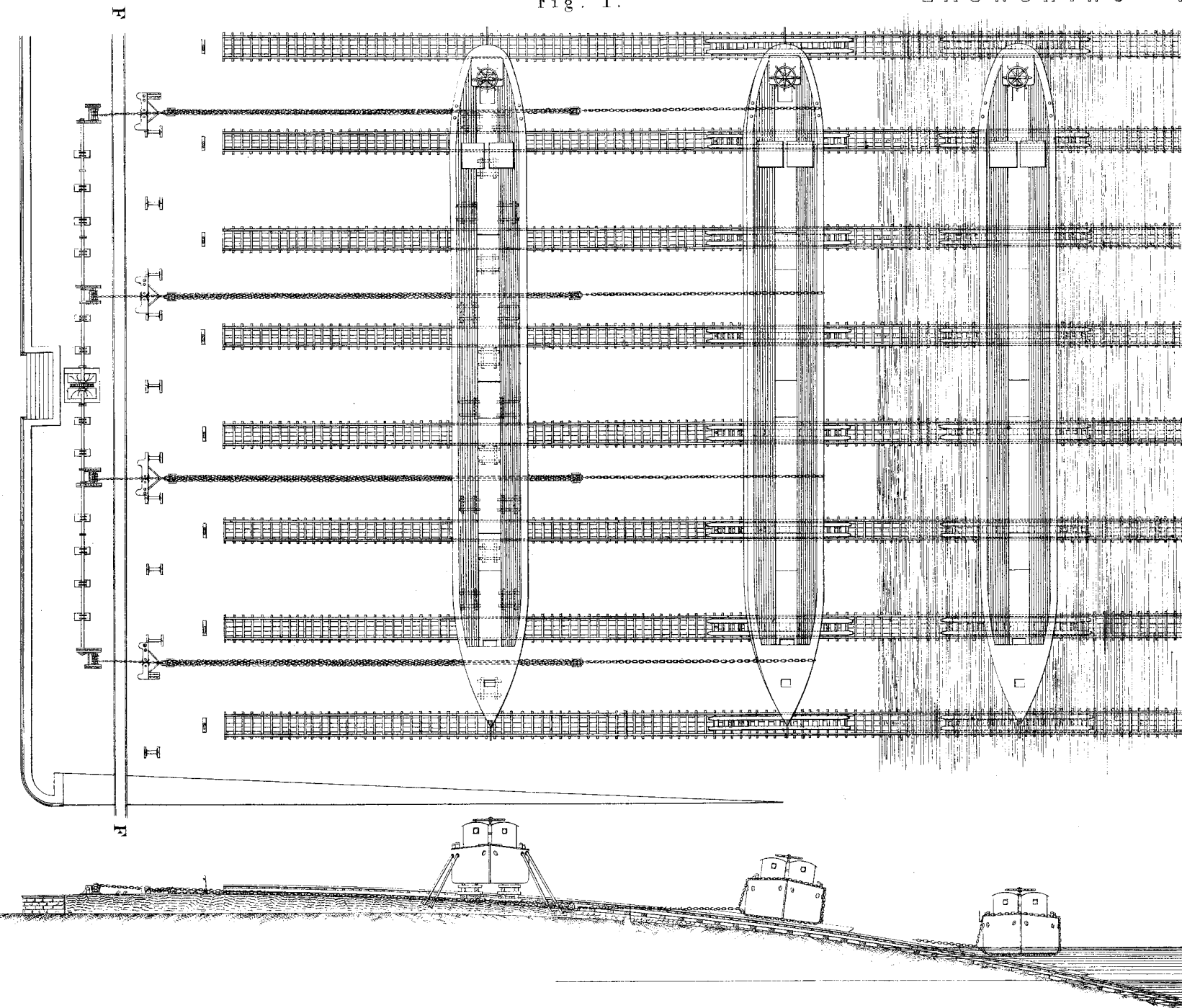
The communication is accompanied by a series of drawings, from which Plate 8 has been compiled.

Fig. 1.

LAUNCHING VESSELS SIDWAYS.

Fig. 2.

PLATE 8.

Scale, $\frac{2}{3}$ Inch = 1 Foot.