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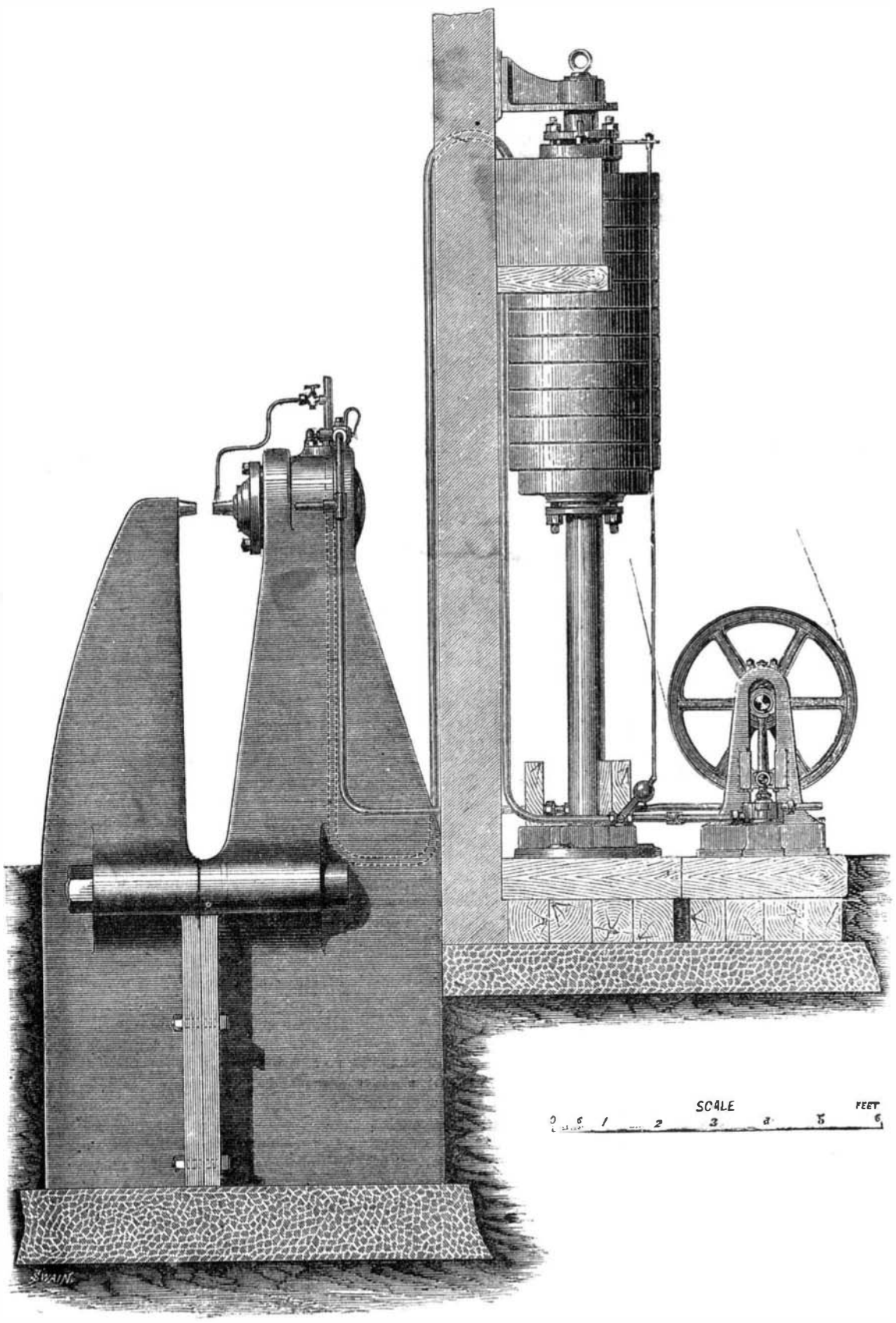
RIVETING BY HYDRAULIC POWER.

We illustrate herewith an hydraulic riveting machine, which is a representative specimen of the system which is now coming into extensive use abroad. It is clearly delineated in our engraving, which is selected from *The Engineer*, and requires but little description. It can deal with a row of rivets about 6 feet 6 inches long, and the compressing strain is about 80 tuns per rivet when the machine is doing its maximum, which can be reduced to 20 tuns by taking weights off the accumulator. This is by far the most powerful riveting machine ever made. One at Jarrow, England, can take in a seam 11 feet long; but the strain per rivet is only 30 tuns. The great range, however, of the Jarrow machine enables a marine boiler shell to be riveted straight off, without stopping to turn it end for end.

In the machine we illustrate, pressure is supplied by a two-throw 1¼ inch pump, which forces water into the accumulator, which is of the differential type, and loaded to 1,500 lbs. per square inch; when the accumulator is filled, a rod is caught by a tappet, stopping the suction pipe to the pumps. The water is led from the accumulator to the machine, and by a suitable valve the ram is worked. Only one valve is required for the whole plant, everything is above board and get-at-able, although, owing to the extreme neatness of the arrangement and the high pressure used, the head of the riveting standard is very small and out of the way of everything. The speed of these machines can be regulated from 25 to 2 rivets per minute. They require little or no foundation, the exhaust water returns to a small cistern, as shown, and from that it again goes to the pumps. It is needless to expatiate further on these machines, which are now in use at every large works, and in the dockyards of every European power.

The machine illustrated is one of several ordered for use in France, and is the invention and design of Mr. R. H. Tweddell, Delahay street, London, England.



TWEDDLE'S HYDRAULIC RIVETING MACHINE.

Sword Fish Exploits.

A few days ago, a couple of men. who were out in a boat, fishing in Lower New York Bay, observed a commotion among a shoal of small fish, and, rowing to the spot, found what they at first supposed, by its single fin above the water, to be a shark. They attacked the monster with a view to capture, and were astonished by the sudden piercing through of their boat bottom by the sword, 4½ feet long, of a large sword fish. They succeeded in noosing his tail, securing and killing the fish, after which he was towed ashore, and subsequently brought up to the city, to a restaurant in Park Row, a few doors from the SCIENTIFIC AMERICAN office. The New York *Express* states that the fish weighed 390 lbs., and measured 19 feet 8 inches in extreme length. It was certainly one of the finest specimens we ever saw.

The Liverpool *Mercury* has a report from Captain Harwood, of the brigantine Fortunate, lately from Rio Grande, to the effect that the vessel, while at sea, was struck and shaken by a sword fish. After discharging the cargo at Liverpool, the hull was examined and the sword of the fish found, broken off even with the outside planking. The fish had driven his sword completely through the four inch planking, leaving eight inches of the blade projecting within the vessel.

The sword fish is allied to the mackerel, which it resembles in form, and is a swift swimmer. The sword is a most formidable blade, consisting of a strong straight bone, sharp and flat, projecting horizontally from the nose, of which it is a prolongation.

The sword fish is found in considerable numbers off the island of Martha's Vineyard, coast of Massachusetts, at this season of the year. Its flesh is considered excellent food by many persons, and the annual catch is quite large. The ordinary length of the body of the fish at full growth is 14 feet, and its sword 6 feet, or 20 feet in all.

Velocity of Magnetization.

M. Deprez states that soft iron, malleable iron, and tempered steel give the same results to investigations for determining the rapidity of their magnetization and demagnetization. The duration of demagnetization is 0·00025, and of magnetization 0·00160, seconds, approximately. Gray cast iron gives still better results, the time of magnetization being reduced to 0·001 second. With this last metal, therefore, the highest possible rapidity in the transmission of signals may be attained. This is due, according to M. Deprez, to the molecular structure of the metal and not the proportion of carbon contained.

The Intensity of Different Colored Lights.

An experiment recently made at Trieste, to test the intensity of various colored lights, is worth recording in these columns, as it is naturally a matter of some interest to photographers. The experiment was a practical one, and designed for the purpose of discovering how far lights of different colors penetrate darkness, and whether they would be of any value for the lanterns of lighthouses Of course a white light is seen at a much greater distance than any colored illumination, and it is singular, too, as many of our readers have, no doubt, remarked, when viewing a fountain illuminated by various colors, hat when the white light is thrown upon the drops these appear at their best. At first we may admire the violet; then a ruby light is thrown upon the falling water, and we pronounce in favor of that; then, perhaps, green, orange, and blue illumination follow, all securing our admiration in turn, until, at last, the white light is again turned on, and its brilliancy and intensity give at once finer effects than the others. In the experiment at Trieste, half a dozen lanterns, with carefully selected glass, and all furnished with oil and wicks of a like character, were set burning on the beach, and then observations were taken by a party of sailors in a boat. At half a league distant the dark blue lantern was invisible, and the deep blue one almost so, so that there could be no doubt as to their unserviceableness for lighthouses or beacons. Of all the colors, the green was visible for the longest distance, with the exception of the red, which ranked next to the white in brilliancy. It is only the green and the red —such, indeed, as our railways make use of—that are capable of employment, and the green light the Trieste authorities only recommend in the vicinity of white and red lights, as from a short distance an isolated green light begins to look like a white one.—*The Photographic News.*

Vanadium in Rocks.

Dr. A. A. Hayes, in a paper read before the American Academy of Science, Boston, in January last, states that he had detected vanadium in many rocks associated usually with compounds of phosphorus and of manganese. His mode of examination for the detection of vanadium is described in detail, but no complete analyses of any rocks are presented. The author proposes in a future paper to give a tabulated list of the rocks. He also states the occurrence of vanadium in the well water of Brookline, near Boston.

A THICK solution of marine glue in wood naphtha is a good cement for fixing glass letters. The glass must be chemically clean and must be previously scrubbed with soda, then with whitening and water, followed by thorough rubbing.