

A SIMPLE WRENCH OF NOVEL FORM.

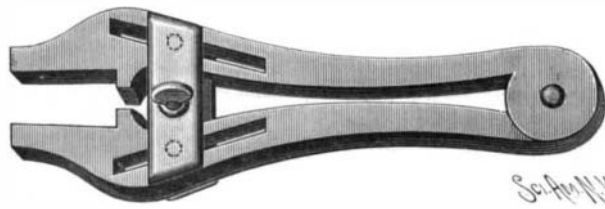
The subject of the illustration presented herewith, is an ingenious wrench, in which the jaws can be quickly adjusted and locked with the use of but one hand. The inventor of the wrench is Phineas R. Coleman, of 164 William Street, Newark, N. J.

The wrench consists primarily of three parts—two jaws pivoted together at their ends, and a transverse adjusting and locking member. The jaws, it will be observed, are formed with divergent slots, receiving tongues on the upper and lower plates of which the locking-bar is composed. The plates are connected and made closely to hug the slotted jaws by means of a set-screw. When the set-screw is loosened and the adjusting member is drawn inwardly or outwardly, the jaws are respectively drawn together or forced apart to receive the nut or other object which is to be turned. After adjustment the jaws can be rigidly locked in place by means of the set-screw.

Simplicity of design, cheapness of manufacture, and durability of construction are the features of merit which characterize this wrench.

back of each dorsal fin—and is known as the Port Jackson shark. It is a sluggish form, lying coiled up among the rocks much of the time, coming out at night, which explains the ease with which the specimen was caught.

A fish trap was handed to the diver, together with a scoop-net and a chisel. The trap was a little smaller than a flour barrel, and made of wire, one circular end being so arranged that it could be opened and lowered. Down the diver sank again, followed by a stream of bubbles. Once on the sandy floor, he walked a short distance and then entered the kelp forest, the glass-bottomed boats moving directly over him, where they



THE COLEMAN WRENCH.

DIVING FOR ZOOLOGICAL SPECIMENS.

BY CHARLES FREDERICK HOLDER.

The Bay of Avalon, California, on which is the Santa Catalina aquarium, is virtually the mouth of a large cañon which descends gradually to the coast and is the collecting ground of numberless marine animals.

The water deepens rapidly in the bay, and to obtain star fishes, echini, holothurians, deep-water serpulæ and other forms, the writer suggested the use of a diver, with most interesting results. A diver of wide experience was employed, who secured many specimens. A large double-ended surf boat, in which the pump was placed, was towed to the scene of operations, generally off the rock known as Sugar Loaf, and anchored firmly, bow and stern. The surf boat was followed by a number of observation boats, provided with glass bottoms, through which every movement of the diver could be observed.

As soon as the diver was ready to descend, a boy handed him a scoop-net and a spike with which to secure specimens. Stepping down, round by round, he finally pushed off and slowly sank to the bottom in about twenty-five feet of water. Through the glass bottom of the observation boats every movement could be plainly seen, as the diver walked through the weed, parting it on each side with ease. Stopping before a group of rocks in the crevices of which were echini, sea urchins, as black as jet, with spines five or six inches in length, he carefully pried away the stones, picked up one of the animals and dropped it into the net. On a rock near by lay a sea cucumber nearly a foot in length, which from above looked like a huge caterpillar; and so clear was the water that it could be seen contracting as the diver took it up.

The men in the surf boat now slackened out rope and hose as the diver moved over the bottom. The glass-bottomed boats followed, and presently the diver was seen to push aside the great vines of the kelp forest, which might tangle his lines, and stop before some rocks covered with a beautiful carpet of moss-green, lavender and red, matted with the coils of serpulæ, whose breathing organs were of every color of the rainbow. Stooping, he carefully overturned the rocks, holding his scoop-net in readiness. Suddenly he dropped it, made a quick movement, and was seen to have a fish over two feet in length by the tail. It was a powerful creature and struggled violently, trying in vain to bite its captor, who now walked back to the boat.

The capture had been seen distinctly, and was announced to the followers on shore by the occupants of the glass-bottomed boats. Reaching the boat, the diver was hauled up to the ladder and slowly came above the surface, like some uncanny sea monster. He had a shark under his arm, and held it up to those on the boat. The shark was a singular fellow, peculiar to the Pacific, spotted, and with two spines—one

could follow his every action. Dropping the net beside a pile of rocks, he threw himself down at full length upon his face. Overturning some stones, he took out several sea urchins, which he crushed, placing the pieces in his trap; remaining perfectly quiet, his hand on the door of the trap, leaning on his elbows.

Almost the very moment the sea urchins were crushed the fishes darted forward, crowding around the trap; and when the diver held out his hand, they dashed at the bait, tearing it in pieces. As he did not wish for the adults, but the young fish, which are dotted with rich blue splashes—among the most beautiful of fishes—he gently pushed them aside. They paid no attention to him, so to get rid of them he propped the trap door open, grasped the hand net and swept it over three of the large angel fishes, then rose to his feet and brought them to the surface. When he again descended, he found several gold and blue fishes in the trap, and slipping the door, easily caught them. Later, he held the wire trap in his lap and broke up some bait, enticing the little fish into it.

As a result of this walk, he brought up angel fishes, star fishes, holothurians, echini, a number of large univalve shells, a living shark, numbers of small shells. Then he walked out into the bay to investigate



THE CATALINA AQUARIUM DIVER "SWINGING OFF" TO LOOK FOR SPECIMENS.

an old pile, which had long been used as a float and was richly incrustated with serpulæ. The water rapidly deepened, and he was now seen in thirty or forty feet, strolling along on the sandy bottom. He carried a wire basket and picked up various shells as he went. Finally reaching the pile, he was hoisted up and held at various points while he pried off the crust of the wood which had been almost completely filled with the tubes of teredos, and the surface of which blossomed with marvelous flower-like serpulæ of every hue. At least twenty pounds of this "bark" were removed—enough to cover the bottom of a large tank. The result of two days' work demonstrated the value of this method of collecting specimens, as in using a dredge many of the most delicate forms were injured. Here

it was not necessary to take them from the water, the specimens being transferred in the water from the wire collecting basket to a glass jar.

Not the least interesting feature of the experiments was the attitude of the various animals toward the diver. It may be said that the fishes paid no attention to him; they ate from his hand, fought for the broken bits of echini which he held, and, apparently, as Young suggested, considered him as a huge crab whose provender they could loot at pleasure.

These experiments, as previously suggested, proved beyond question the value of the diver in work of this kind, as the ground covered was a veritable forest of macrocystis, in which groups of rocks were scattered, making work with a dredge impossible.

Petroleum-Fired Locomotives on Russian Railroads.

Locomotives are fired by petroleum residue on 13 per cent of the Russian railroads, and its use is exclusive on the lines of the Volga, and on the Trans-Caspian and Trans-Caucasian systems. The conditions for the naphtha used are complete purity, without sulphur, water or sand. It must be of a greenish color, never black, and its specific gravity is not to exceed 0.911 at 17½° C., with a boiling point not below 140° C. Its combustion should take place without any appreciable residue. In order to provide combustible during the winter period, when the transportation becomes difficult or impossible, the lines of railroad using naphtha have, in certain places, a series of cisterns which contain up to 2,500 tons. The locomotives carry their supplies under the water tank of the tender, and can thus place 5,000 kilogrammes. The filling of the reservoirs is carried out by a system of pumps and piping, these being protected against cold and also against the action of steam. A series of metallic filters are placed in the cisterns and reservoirs to retain sand and foreign substances.

A STRASBURG engineer has invented a substitute for gutta percha. In ordinary temperatures the mass is hard like pitch, and while not being brittle is firm against pressure. It does not break when hammered even at the freezing point. Thin plates were subjected to the action of sea water with good results.

The Current Supplement.

The current SUPPLEMENT, No. 1277, has many articles of great interest. "Relation of Height, Weight and Strength to the Cephalic Index" is by D. A. Sargent, M.D., Director of the Hemenway Gymnasium at Harvard, and is accompanied by twenty illustrations. "The Raft of Ulysses" is a study in ancient construction and carpentry. "The Means of Defense in Animals," by Prof. Philip P. Calvert, Ph.D., of the University of Pennsylvania, is the third installment of this remarkable paper, and deals with the protection of food supply. "The Electric Automobile" is by A. L. Ricker. "The Terraces of the Automobile Club" describes a remarkable example of gardening upon a roof. "Liquids Under High Pressure" is by B. H. Hite. "An Outline of the Development of the American Locomotive" is concluded in the present number. The article is accompanied by five illustrations. "Health Conditions in the Hawaiian Islands" is by Charles E. Davis, M.D.

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