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### ENGINES OF THE ITALIAN RAM ETNA.

The Italian navy is now supplied with several vessels of the most formidable construction and armament. Among others is the ram Etna. The engines of this ship have 7,700 indicated horse power. They are the latest English type of compound engines; the general arrangement will be readily understood by a glance at our engraving. The engines were built by R. & W. Hawthorn, Newcastle-on-Tyne.

### To Retin Old Copper.

Take some common clay and mix with it salt and sal ammoniac, say one-tenth part of salt and one-twentieth part of sal ammoniac. Or take the dry clay, pound it up fine, then salt it to taste, as the cook books say, and mix it into a soft paste with strong sal ammoniac water. Spread some of this paste on a piece of old copper, place over a charcoal fire, and heat to redness. If the paste takes off all the old tin or solder, it is all right; if not, make it stronger by sprinkling on more powdered sal ammoniac and salt until it is strong enough. The copper can be cleaned by scouring with salt and sand, and should be dried by being plunged into dry sawdust and rubbed until it is perfectly dry, or the air will form oxide of copper on the surface.

To tin the copper have a dish of powdered sal ammoniac and a bunch of tow—nothing else will do as well. Wet the surface of the copper with ordinary soldering acid, into which a little powdered sal ammoniac has been dissolved. Place the article over a charcoal fire (an old dripping pan with the bottom punched full of holes set on two bricks will do well), and as soon as the copper is hot enough to melt the tin or solder, which is supposed to have been put on, rub over with the bunch of tow, which is to be frequently dipped in the powdered sal ammoniac, and the copper will look as good as new, and perhaps better. If the copper is allowed to get too hot, the tin will look yellow. Do not get in a hurry, but try to have the copper at an even heat, and you will have a good job. If the article has had holes soldered in it, hold over the fire before using the paste, and wipe off the old solder.—*The Ironmonger.*

### Water Blasting.

The value of water as an aid to blasting when used in connection with explosives is rapidly becoming recognized in this country, as well as in the larger mines and quarries of Europe. Ordinary blasting with gunpowder in coal mining is done by boring a hole in the face of the coal about two inches in diameter and four or five feet deep. Into this is inserted the powder cartridge, together with the slow fuse, when the hole has been well tamped, filled with any dry refuse rammed in tight, then fired by lighting the fuse. In this operation (and we have described it thus not to show any new ideas connected with it, but for comparison) a very dangerous flame, especially in gaseous pits, is created, and appalling results often ensue; carbonic acid and sulphurous acid gases are generated, very dangerous to miners and to mining properties. When it is desired to blast with water together with gunpowder, the process is conducted by inserting into the bore hole a powder cartridge with the fuse attached as in the ordinary way; next to the powder cartridge is inserted into the bore hole a tube containing water. These tubes must be as large as the bore hole will admit, and of any length convenient to handle, the larger the better; they may be made of any cheap material convenient, cheap thin tin plate, or stout brown paper turned around on a wooden roller, after being well pasted together, the ends closed with corks. The bore hole is now tamped in the ordinary manner, the fuse lit, and the cartridge fired in the usual manner. As a result of this process the following points of excellence, among many others, may be briefly mentioned: the powder, in exploding, bursts the tube containing the water, and, careful estimates show, with increased power or explosive violence, as the rending force is extended through the water in accordance with the well known principles of hydrostatics practically demonstrated years ago by Brahma, over the enlarged interior area of the bore hole, due to the space occupied by the water tube. A much larger quantity of the material to be mined or quarried is thereby brought down or loosened with a smaller quantity of the explosive used. The heat given off by the burning of the powder and surrounding gases converts a larger proportion of the water into steam, the elastic force of which assists in the operation of blasting; the steam and remaining water together extinguish the flame and flash of the powder, and absorb and neutralize the greater portion of the gases and smoke resulting from explosion. It will readily be seen that by this process are met together economy, power, and safety, the system being simple and effective and not attended with anything inconsistent with the well known laws of explosion. It is to be hoped that, in the best interests of humanity, our large and intelligent body of miners and quarrymen will not be slow to adopt an amelioration in the present crude and dangerous processes of blasting which will tend, in no small measure, to render premature explosions in mines a thing of the past, rather than one of almost daily occurrence.—*Coal Trade Journal.*

### The Petrified Forest.

The visitor to the petrified forest near Corizo, on the Little Colorado, will begin to see the signs of petrifaction hours before he reaches the wonder; here and there at almost every step in the road, small pieces of detached limbs and larger stumps of trees may be seen almost hidden in the white sand. The road at a distance of ten miles from Corizo enters an immense basin, the slope being nearly a semicircle, and this inclosed by high banks of shale and white clay. The petrified stumps, limbs, and, in fact, whole trees, lie about on all sides; the action of the waters for hundreds of years has gradually washed away the high hills roundabout, and the trees that once covered the high tablelands now lie in the valley beneath. Immense trunks, some of which will measure over five feet in diameter, are broken and scattered over a surface of 300 acres.

THE youngest member of the Cotton Exchange in this city is a youth of fifteen summers, and the oldest a veteran of eighty-two years.

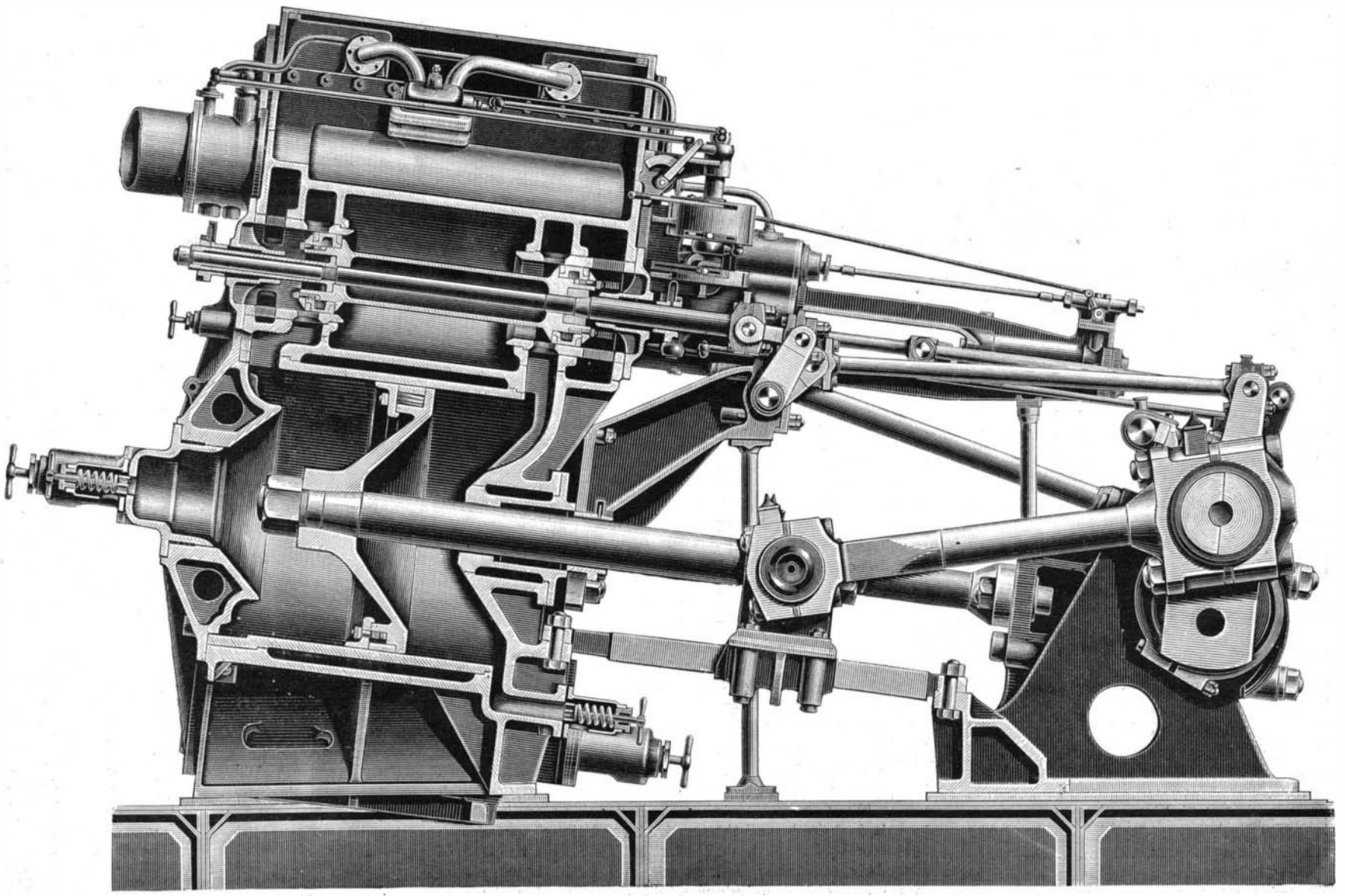

**Fig. 1.—COMPOUND TWIN SCREW ENGINES (7,700 I.H.P) OF THE ITALIAN RAM ETNA** —[See also page 182.]