CONTRACTORS' PLANT.

We give engravings of several machines for hoisting and handling heavy materials. They are especially adapted to the wants of contractors, and find extensive use in quarries in elevating materials for building, for working derricks, and for numberless purposes that need not be mentioned.

In Fig. 1 of the engravings is shown a horse power and boom hoister for working a derrick, a powerful machine, by which a horse can raise eight or ten tons, and at the same time raise the boom while the whole weight is on the derrick, or lower it if required, or one part can be worked independently of another, or the several parts of the machine can be worked together, thus enabling the builder to place a stone exactly where he may require it. The brake is so simple and powerful that little effort is required to hold a very heavy stone within an inch of where it is to be laid, and the brake on the boom drum enables the attendant to lower the boom to any desired place with the greatest speed.

With a long boom it gives great facilities in work, and the boom hoister does away with the tedious old way of raising the boom by hand. For quarrying this machine is peculiarly adapted. A stone can be placed in or out, the full sweep of the boom giving the stone cutter great advantage in his work. The machine is also very effective in loading stone on a truck or car placed anywhere within range of the boom.

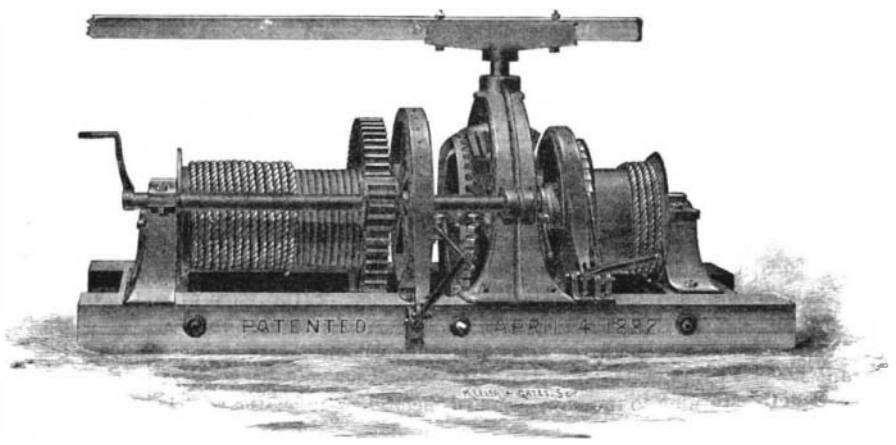

Fig. 1.—DERRICK HORSE POWER AND BOOM HOISTER.

Fig. 2 shows a horse power, without boom hoisting attachment, for raising or lowering stone or any heavy material. It is small, easily handled, durable, and light working. It works on cast steel shafts, and has no clutches to throw out or in gear. The gear wheels can be put out or in gear while the horse is in motion. There are flanges on pitch line of gears to prevent them from breaking. The machine has gearing attachment to take up slack rope by hand, and a powerful brake to hold the stone wherever required. The manufacturers inform us that a stone three or four tons weight can easily be handled by this machine.

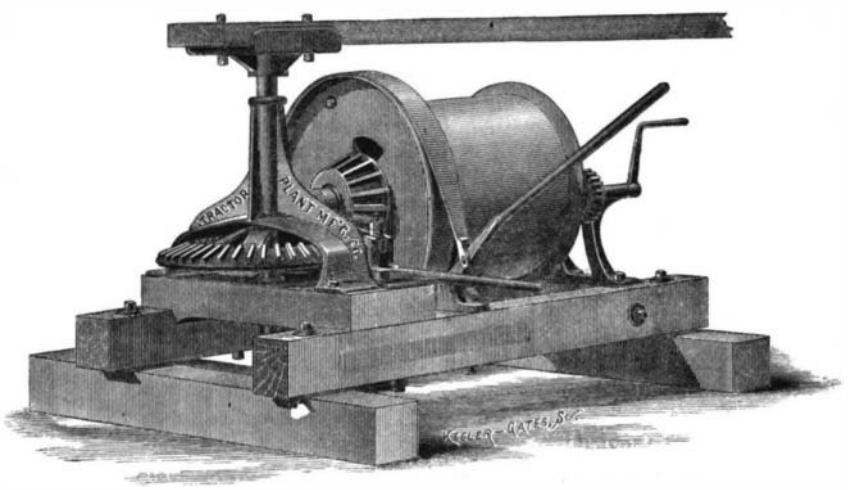

Fig. 2.—HORSE POWER FOR CONTRACTORS.

Fig. 3 represents a horse-power machine for raising a bucket or weight weighing from three to five hundred pounds seventy-five feet per minute. It is designed principally for mining purposes, or raising building material in the erection of high buildings. The machine is small, light, and easily handled, but sufficiently strong to do the desired work. It can be thrown out or in gear while in motion. A powerful brake-band is applied to the drum, so that in case of an accident to the driving gear the drum still remains wholly under the control of the driver. He can hold the weight where it may be required, or lower it at any desired speed. This machine has an attachment on the drum to take up slack-rope by hand.

For further information, address the Contractors' Plant Manufacturing Co., 296 Exchange Street, Buffalo, N. Y.

Animal Charcoal Filters.

Animal charcoal has been generally regarded as one of the best materials for packing filters intended for the purification of water for drinking and culinary purposes, but Professor Frankland, in a recent letter to the London *Times*, gives the results of his investigations concerning it as follows: My first experiments on the filtration of water through animal charcoal were made on the New River Company's supply in the year 1866, and they showed that a large proportion of the organic matter was removed from the water. These experiments were afterward repeated, in 1870, with Thames water supplied in London, which contains a much larger proportion of organic matter, and in this case also the animal charcoal removed a large proportion of the impurity. In continuing the use of the filter with Thames water, however, it became evident that the polluting matter removed from the water was only stored up in the pores of the charcoal, for, after the lapse of a few months, it developed vast numbers of animalcules, which passed out of the filter with the water, rendering the latter more impure than it was before filtration. As a memoer of the Royal Commission on River Pollution and Domestic Water Supply, I reported in 1874 on these experiments as follows: "Myriads of minute worms were developed in the animal charcoal, and passed out with the water, when these filters were used for Thames water, and when the charcoal was not renewed at sufficiently short intervals. The property which animal charcoal possesses in a high degree of favoring the growth of the low forms of organic life is a serious drawback to its use as a filtering medium for potable waters." Animal charcoal can only be used with safety for waters of considerable initial purity; and even when so used, it is essential that it should be renovated at frequent intervals, not by mere washing, but by actual ignition in a close vessel.

The Food Supply of Europe.

Notwithstanding the enormous outflow of population from Europe, and the simple if not scanty diet of the poorer masses that remain, the problem of food supply is already a serious one. The increase of population is about 3,000,000 a year, while the annual food product is equal only to eleven months' consumption. The rest, aggregating nearly 800,000 tons of meat and 8,500,000 tons of grain, has to be imported. The chief deficit is in the British Islands, which have import every year nearly 300,000,000 bushels of grain and 650,000 tons of meat.

An Arizona High Bridge.

The completion of the iron bridge of the Atlantic and Pacific Railway over the cañon Diablo, in Arizona, adds another to the list of high bridges. It spans a dark gloomy gorge some 250 feet deep. The bridge is 240 feet above the water, 541 feet long, weighs 837,130 pounds, and cost $200,000.

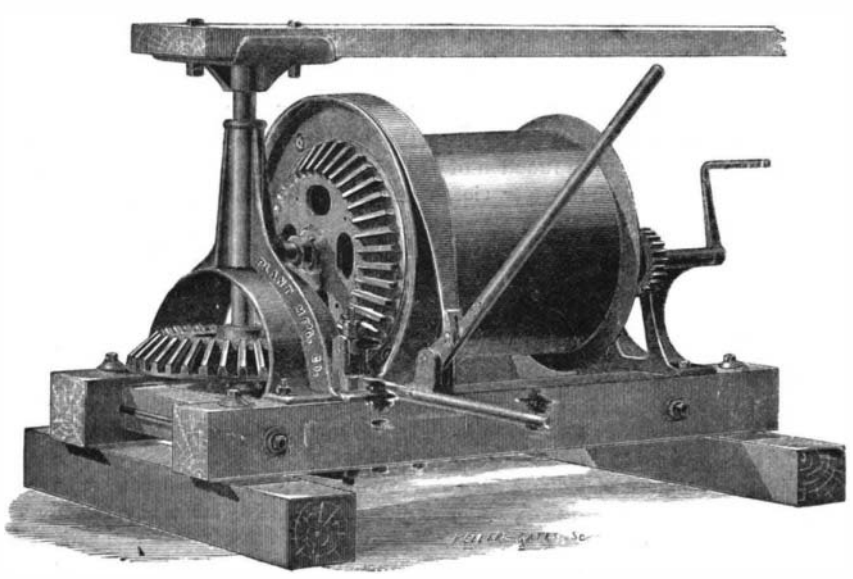

Fig. 3.—HORSE POWER FOR MINERS AND BUILDERS.

Impervious Walls.

Every builder knows the tendency there is in a warm house to draw up the damp from a saturated soil. It has, indeed, been remarked by Prof. Rolleston and others that every warm building has the effect of creating a kind of barometric pressure, by which the gases and vapory particles in the soil rise within the area covered. We have seen the application of asphalt to foundations and areas covered become a pretty general measure of precaution in preventing these effects; but it is rather remarkable to find no preventive means taken to arrest the absorption of damp into walls above the roof level, and into cellars and basements. We rarely find asphalt, or any other bituminous material, like the "hygeian rock" composition used for any but horizontal courses.

Mr. E. Christian, not long since, called attention to the use of asphalt placed vertically, and it is strange to find architects and builders going on building basements in damp soils, and taking no other precaution than using Portland cement upon puddle or clay. Very often, as in the case of houses at Oxford, Salisbury, and other marshy places, the cellars of houses are surrounded at all times by water, or rather the supersaturated soil. But builders and architects seem to think in such places that walls below the ground level may be damp without detriment, so long as they put a course in to check its course upward beyond the ground floor. The remedies are in the hands of architects. Cases, indeed, here and there of cellars being incased by asphalt may be found as early as 1857, and in one case a depth of five feet of water was kept out of a basement by the use of Claridge's asphalt. We also know of some dock stores treated with this material several feet below water, the asphalt being applied to the walls as well as the floor. In building cellar walls of houses the best plan is to connect the horizontal layer with the vertical casing of this material; the damp proof or horizontal course ought to be made to extend beyond the side of wall on the outside by forming a set-off on the footing, so that at the junction of the vertical casing with the horizontal course a good filleting of the asphalt may be made. Walls with vertical courses may also be constructed in two half-bricks, or a brick on flat and one on edge, and the cavity filled up with the new bituminous compound, the hygeian rock composition. Such a wall is stronger than a solid one of mortar, as the material binds the two thicknesses together by running into the joints partly.

We have, therefore, two excellent plans of rendering cellars impervious; but there are other positions in which the vertical lining is not used as it ought to be. We mean in parapet walls and copings and chimney-stacks. The best material for this purpose is Claridge's asphalt. Let us take a house with a coped parapet. Here the asphalt ought to be placed below the coping stones, then brought down the parapet on the inside, and finished at the flashing with a fillet. Even a skirting of the material may be adapted, and lead work and gutters saved. The work is best done by raking out a joint of mortar of the wall so as to form a key for the asphalt. Another important application of the vertical impervious lining is the protection of gable walls, which ought always to have asphalt worked under the copings and brought down below the slates, or to the level necessary to insure dryness. Chimney-stacks and all vertical brickwork above the roof let in as much wet from porous bricks as the foundations, and may be defended by courses of asphalt as a coping, and just below the roofing surface. so as to intercept absorption downward.—*Building News.*

Explosive Alloys of Zinc and Platinum.

Osmium, is the only one of the platinum metals which does not retain zinc when its alloy with a large excess of zinc is treated with an acid capable of dissolving this metal The others retain obstinately about 10 to 12 per cent, and the metals insoluble in *aqua regia* (rhodium, iridium, and ruthenium) remain in the state of peculiar products, without metallic luster, which seem to be an allotropic modification of the true alloys. It is impossible to comminute the osmides by mechanical action. A triple alloy of osmium, iridium, and zinc, if heated to about 300°, takes fire suddenly, almost with explosion, diffusing fumes of zinc and of osmic acid.—*H. Sainte Claire Deville and H. Debray.*