

DUNBAR AND RUSTON'S "STEAM NAVVY."

(See pages 200 and 201.)

We illustrate on page 200 an engraving of Messrs. Dunbar and Ruston's "steam navy," the perspective view showing the arrangement of working it with the wagon roads on each side.

As the machine advances excavating its own gullet it fills alternately, first on the one side and then on the other, one of the empty wagons in position for being filled. The lines of rails are arranged for the wagons so that there is always a train of empty wagons standing on a central road behind the "navvy," and from whence they are drawn over a short jump road into position on the side roads for filling, while the filled wagons run back from the machine on the side roads. The "navvy" illustrated is capable of excavating and filling into wagons at the rate of 60 cubide yards per hour, two men and one boy being required to work it.

This machine, as will be seen on reference to the detailed drawings, is constructed mainly of wrought iron, so as to withstand the heavy work that it has to encounter. The mode of working it may be briefly described as follows. The engine-driver, who has the control of all the moving parts, is directed by the man who has charge of the scoop, and who stands on the circular platform at foot of the jib in front of the machine. When the jib is swung to the position required, the scoop is lowered till the mouth of it rests upon the ground. The man on the circular platform by means of a foot-brake and gear holds the scoop in that position, so fixing the length of the scoop handle from a pivot or point on the jib. The scoop is now drawn forward by means of a chain and winding drum, thereby cutting all before it, recording to the radius described by the length of the scoop handle. As soon as the scoop is filled, the man who has charge of it eases the foot-brake, allowing it to come out of its cut. When lifted high enough, the jib is then swung round until the scoop is brought over the wagon to be filled; the attendant now by means of a trigger line draws the spring catch bolt, allowing the hinged bottom to drop down, discharging its contents into the wagon. The jib is then swung round again, the scoop lowered, and the operation repeated.

After the machine has excavated all that is within its reach, the anchor screws are slackened off, extra sleepers with a short length of rails are then laid down in front of it, and by means of the propelling gear it is moved forward the required distance. The anchor screws are then screwed down in order to prevent the machine from slipping back when at work.

The construction of the whole machine is so clearly shown in the illustrations that its arrangements will be readily understood.

In conclusion, we may state that Messrs. Ruston, Proctor, and Co., of Lincoln, are the sole makers of these machines; they have already constructed and set to work in Great Britain, three eight and fourteen of ten horse power.—*"Engineer."*

A CRIMINAL lately gave to a reporter of the New York *Herald* the following mode of introducing powder within a safe for the purpose of blowing open the doors: "What tools did you use in drilling the holes?" asked the reporter. "Good cracksmen don't use tools," answered the burglar. "I'll show you how to blow open any safe in New York without any tools. Just take me to a safe." There happened to be a safe in Judge Kilbreth's private room, and the writer acquainted the magistrate with the prisoner's proposal. "By all means," said he, "let us learn;" and in a moment the room was filled with spectators. The prisoner knelt beside the safe, which was locked. "Look," said he, "at this door. It fits so tightly that no instrument can be introduced in the cracks and powder cannot be inserted. So far so good. The burglar," continued he, "simply sticks putty all along the cracks except in two places, one at the top of the door and one at the bottom, where he leaves about an inch of space uncovered by the putty. At the lower place he puts a quantity of powder and he sucks out the air from the upper place, either by a suction pump, which is the better way, or by his mouth. The vacuum created in the safe draws in the powder in the small crack below. The entire work does not occupy more than five minutes."

THE scheme for supplying Simla with water from the springs at Mahasso has received the sanction of Government, and the necessary public works surveys are already being made. This project will entail the laying down of iron piping for a distance of over fourteen miles, and as several hill ridges will have to be crossed, the expenditure will amount to a considerable sum.

THE EAST RIVER BRIDGE.

(See page 197.)

The engravings which we publish on page 33, will give an idea of the progress of the work upon the East River Bridge, New York. After the first cables had been laid across from tower to tower, stages or cradles 48 ft. long were attached to them in such a position, that when the main cables are being laid, they will be within easy reach of the men employed in arranging the wires. The cradles are of oak, braced with wire, and are made as open as possible so as to offer less resistance to the wind. Access to the stages is obtained by means of the temporary foot bridge shown in the engraving. This platform is constructed as in Figs. 2, 3, and 4, of oak strips 3 in. wide and 1½ in. thick, laid directly upon the cables, and held together by oak longitudinals 3 in. wide by 1½ in. At intervals bent bolts pass through the longitudinals, and round the cables, being secured by nuts to cross top plates as shown. This structure was laid in 12 ft. lengths. Besides its attachment to the cables, it is secured by wind ties as shown, a very necessary precaution to check its oscillation in the exposed situation it occupies, 210 ft. above the river. The chief span is 1620 ft.

ENGLISH PATENT-OFFICE DRAWINGS.—The Commissioners of Patents have just announced that for legal or other purposes they are willing to supply, at the undermentioned rates, full-size copies of drawings belonging to specifications printed under the new system by the process of photo-lithography:—

In cases where from the use of colour or other causes a satisfactory photograph cannot be obtained from the original drawing, an extra charge will be made to cover the expense of taking a tracing. There will also be a small additional charge for colouring the copies of colored original drawings. Applications, stating the number of copies required and accompanied by a remittance sufficient to cover the cost, should be addressed to the clerk of the commissioners.

THE GERMAN PATENT LAW.—The bill for the amendment of the German Patent Law has at length passed the German Parliament. It is a great improvement upon that hitherto in force. As matters now stand, patents will be granted for fifteen years, the longest theoretical period for which a grant could be made under the former Prussian law. We say "theoretical" period, because, as is well known, it was not the practice to grant a patent for more than two or three years. An applicant will now obtain an equivalent for our provisional protection, upon making his application and giving discovery to the authorities of his invention. The subject matter of the application will then be referred to a board of examiners, by whom it must be admitted to be new. The examiners will at first make their own examination, after which, if necessary, they may be assisted by the inventor, who will have an opportunity of bringing evidence upon the subject. Thus, it will be seen, it is intended to afford an inventor all possible facility for carrying his point. If the examination prove satisfactory, a patent will be granted, which will be subject to a condition that the invention must be carried into operation within three years. It is pleasant to find the principle of reward for invention so fully approved in a country which not long ago pronounced so strongly against it.

"AN AUTOMATON DOCTOR."—We have been rather amused at this title, which has been given to a neat little cabinet intended to be used in private houses as a Turkish or hot-air bath. Such a thing will undoubtedly be very much appreciated, for it is not every one who can afford the expense of the public Turkish baths, if, indeed, they live within reach of them. This ingenious apparatus stands in the corner of a bedroom, and can be wheeled on castors to any convenient place and used at a few minutes' notice, at the cost of a few pence. In many serious cases of illness it will be invaluable, and we believe nothing will tend more to keep a person in good health than a regular use of this bath.

A HEAVY BLAST.—A successful blasting operation has been performed at one of the quarries of the South Cornwall Granite Company, situated near St. Blazey. About 700 tons were thrown down with very little breakage, and one block now standing in the quarry contains 8,000 cubic feet, or nearly 600 tons, without a flaw or joint of any kind or any discolouration. There are several smaller blocks of from 30 tons to 60 tons weight.

A SIXTEEN-WHEEL stateroom sleeping car, called the York, has just been placed upon the Chicago, Burlington, and Quincy road. It is said to be a very elegant vehicle. Sixteen wheel cars were not uncommon some years ago; now there are few of them.