ALLEN'S APPARATUS FOR FEEDING BLAST AND OTHER FURNACES.

This invention is an improvement in the feeding apparatus of a blast, cupola, or other like furnace of the class employing a cup and cone or a bell and hopper.

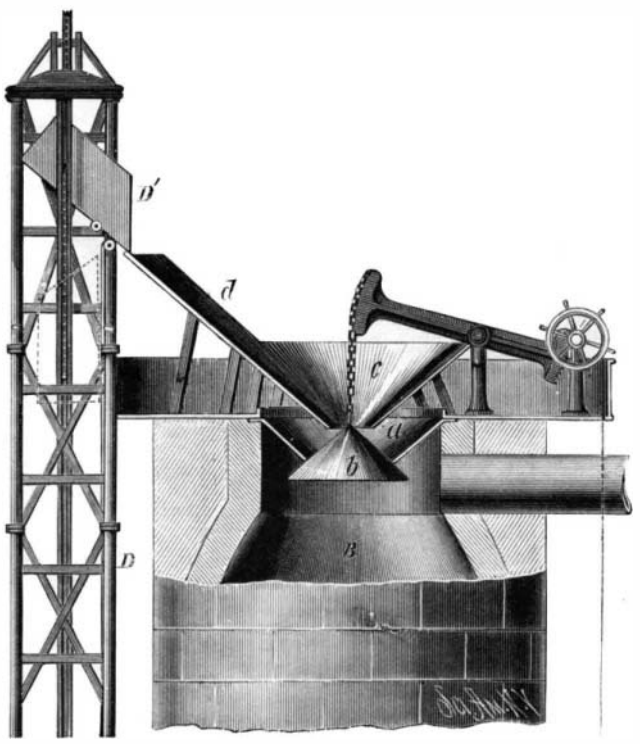
The design of the invention is to enable the ordinary feeding or charging operations to be performed from the ground. To accomplish this there is arranged immediately over the bell or cone, *b*, an open bottomed hopper, *c*, and so arranged with reference to the bell or cone that charges of material for the blast furnace, on being dumped or discharged into the hopper, *c*, will be delivered through its open bottom on to the bell or cone at or near its apex, and consequently will pass down the sides of the bell or cone uniformly all around, and so will be distributed with practical uniformity around the annular receptacle formed at the junction of the bell and lower hopper, *a*. Then, when the bell is lowered to discharge such material into the furnace, B, such charge will be supplied to the burden below uniformly all around, or practically so. Then, by the addition of a chute, *d*, from the elevator, D, to the auxiliary hopper, and of a self-tilting or dumping car, D′, so that the car containing the material shall be automatically emptied into the chute, the entire work of feeding is done without the necessary presence of workmen at the top or mouth of the furnace to do or superintend the feeding.

The material may be dumped in from barrows by hand in the usual way; but the inventor prefers to so organize the apparatus that the work of feeding may be done from the ground, and without the necessary presence of workmen for such purpose at the top or mouth of the furnace.

The engraving shows an elevator, D, which may be of any suitable construction, adapted to be operated from the ground, and to raise and lower the car, D′, loaded with the material to be charged or fed into the furnace. A suitable tilting mechanism is added, so that when it reaches the proper height it will be tilted, and its contents will be dumped into the chute, *d*, which discharges into the hopper, *c*. As soon as the car is thus emptied it may be lowered in the usual way and at the proper intervals. The bell, *b*, is also lowered from below by the use of a windlass and rope.

In the engraving the windlass, rope, etc., are on the side of the furnace opposite the elevator, but for ease and facility of operation, the bell lowering and raising appliances should be arranged over and down the side of the furnace near the elevator.

This invention has been patented by Mr. William H. Allen, of Pittsburg, Pa. (P. O. Box 943.)



ALLEN'S APPARATUS FOR FEEDING BLAST AND OTHER FURNACES.

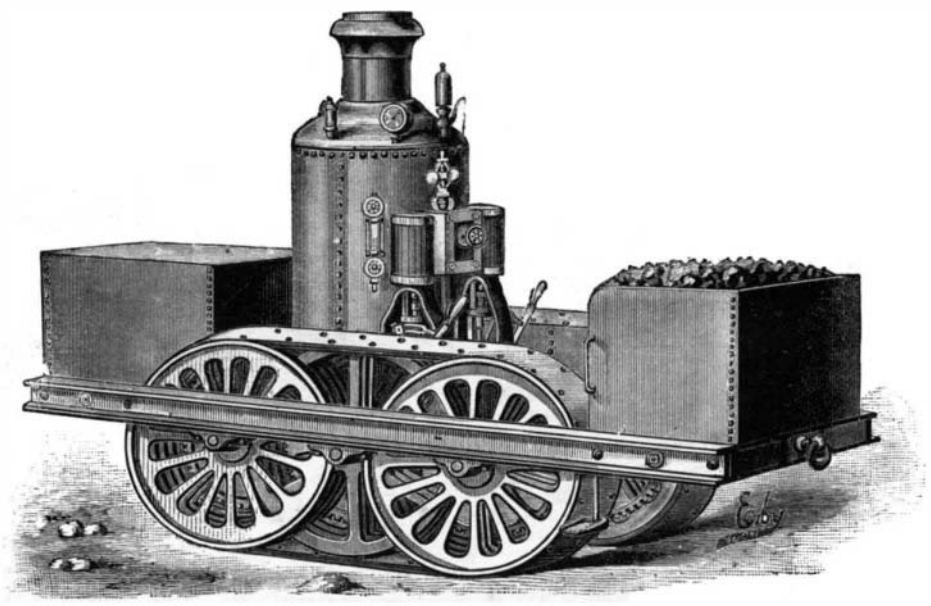
NEW TRACTION ENGINE.

This new engine is made for plowing, thrashing, road, mining, and yard transportation. The frame is constructed of four parallel T steel sills with cross beams at ends, and diagonal braces throughout, except at base of boiler, giving stiffness to frame, and supporting at ends the coal tender and water tank, thereby giving equal distribution of weight and balance on the tracks. The parallel sills are 24 inches apart from centers, to which are attached on the under side of sills, by adjustable boxes, three axles on each side. On these axles are firmly keyed three driving wheels of 2 and 3 inch faces, with a space of 2½ inches apart on axles. On the front and rear axles are four wheels; the first and fourth, or outer wheels, are 3-inch face, and are flanged with flanges on outside of wheels to prevent track from slipping off in turning. The center axles have three wheels of 2-inch face. The gangs of wheels intermesh or overlap each other; the tires of center gangs work close to the hubs of the front and rear gangs. Revolving over with these gangs of wheels are two tracks of rubber or other suitable elastic material composed of an outer and inner layer, between which are transverse metallic plates, secured through layers and plates by rivets or bolts, to retain tracks in shape transversely. The front and rear gangs of wheels are driven forward or backward, or one forward and the other backward in turning, by spur gears secured to inside of wheels; front and rear gangs are connected by idle gears on center axles. The center gangs are driven in the same direction by spur gears on axles, of the same diameter as those on front and rear gangs. Motion is given by long pinion to these gears from reversing yacht engine, one on each side of upright boiler for each track. The width of each track is 18 inches; thickness of rubber tracks, 4½ inches; height of wheels, 4½ feet; length of each track in contact with the earth, 60 inches; hence 60 × 18 × 2 = 2,160 inches of effective earth contact or traction, over which is distributed the 6 tons of weight of engine and track. A horse of 1,000 pounds weight has 48 inches of effective earth contact while pulling; hence 10 horses have 48 inches of traction.

The engines now on the market with two drive wheels of 8 to 10-inch tires, have 48 to 72 inches only of effective earth contact, consequently are useless for plowing, or hauling their own weight over spongy ground.

This engine's tracks have no suction or adherence when the tracks leave the ground, therefore no loss of power by carrying its tracks forward. The tracks cannot be broken by passing over an obstruction, as the rubber will give to wheels until the wheel rotates over, and then instantly return to place.

The adherence of the tracks to the periphery of the one-half of the front and rear gangs and the bottom and top of center gangs of wheels, insures no slipping of wheels on the tracks when worked to its fullest capacity on steep inclines. Patented in the United States, August 29, and in Canada, August 31, 1882, by Jacob Nixon, of Winfield, Kansas, who can be addressed for further information.



NIXON'S TRACTION ENGINE.

House Plumbing and Drainage.

This subject is well worn, but so important to the well-being of every household that we believe it is doing the greatest good to the largest number of our readers by calling their attention frequently to it.

The last annual report of the Massachusetts State Board of Health, Lunacy, and Charity contains some excellent suggestions in regard to this subject of house drainage. They are the result of much study and research, and until something better is proposed much good will result if they are followed by builders throughout the country :

1. All drain pipes inside the house should be of metal, and all joints of well-calked lead or solder. Metal is recommended in preference to stone-ware, owing to the difficulty in keeping tight the joints of the latter. All connections between lead and iron should be by a calked brass nipple and solder. It is best to keep drain-pipes in sight, or at least of easy access. They should never be *hidden* under the ground. If needed below the basement or cellar floor, they should be placed in a trench lined with brick walls, with movable covers on the trench. It is a good plan to paint the pipes white, so that any slight leakage of gas may be seen readily ; for such gas generally discolors the paint.

2. Changes of direction in iron pipes should be made mostly by Y branches, leaving an open hub, to be closed by a brass nipple calked in with a movable brass clearing screw as large as the drain, to be removed for inspection and cleaning. In straight reaches of fifty feet or more in length, these Y branches and clearing holes should be introduced at intervals of not over forty feet.

3 No T branches should be allowed, except in vertical pipes.

4. All pipes should be put together by a series of straight lines, and with a general direction as straight as possible.

5. All pipes should have a fall of not less than two per cent of their length, where no special apparatus is provided for flushing. All drains should be kept free from deposit ; and, if this cannot be effected without flushing, special apparatus should be applied for this purpose.

6. A trap should be placed on the main drain outside the house walls, made of glazed earthenware, with a vent hole as large as the pipe directly above the trap, communicating with the open air. This should be made accessible for cleaning out, and a rain-spout had best be discharged into it or into the drain at some point above it. This trap should be near the house, and can be alongside the grease tank, if convenient.

7. Every separate stack of soil or waste pipe within the house should extend out through the roof, at least four inches in diameter ; smaller pipes than this are liable to be choked with ice from condensation of steam in winter.

8. Separate traps should be placed under all receptacles of drainage, as close to them as possible, and no other traps allowed to intervene between these and the outside or main trap described above (6). Each one of these separate traps should have an air pipe of iron or lead connected just below the water seal, as large as the waste pipe, and either connecting at its upper end with the soil-pipe above all other branches, or passing through the roof independently, as found most convenient. Several traps can be served by the same vertical line of vent pipe.

9. No drain pipe from any safe pan under any tub, sink, bowl, or water closet should be connected below to the drain system, but should discharge over an open sink or cellar floor.

10. No waste pipe from an ice chest or refrigerator should be connected with the drains.

11. Rain water leaders should not be used as soil or drain pipes, nor should they be depended on to ventilate drains. If connected with the drains at all, care should be taken to so connect them below the water of some trap otherwise supplied with water, unless their upper ends are remote from windows.

12. A tank or small cistern should be provided in the upper part of the house, from which the kitchen boiler should be supplied, together with the bowls and sinks; also any water closets that happen to be close by. The drinking water should not be drawn from this tank, but from a separate tap on the supply pipe direct from the street main. The overflow of this tank should not be connected with any drain, but discharge as directed for safe drains above (9). It is common in mild climates to discharge such pipes through the house wall into the open air; but this plan would be worthless in frosty climates.

13. All water closets should be supplied by a small tank directly above them, and not by valves attached to the closets themselves, nor by pipes branched from those from which drinking water is drawn.

14. Concentrate the fixtures used for drainage—such as water closets, bowls, sinks, tubs, etc.—as nearly as possible in vertical groups, to avoid waste pipes passing across under floors, which are rarely satisfactory.

15. Never locate a fixture, especially a water closet, in a dark corner where a good ventilation cannot be had. If outer air cannot be got, seek to draw off the foul air from the closet by a pipe leading up through the kitchen fire flue to the chimney top, built into the chimney for the purpose, at least four inches in diameter. Small pipes branched into the fire flues for this purpose soon get choked with soot at their mouths, and become worthless, unless extending quite to the top of the chimney.

Underground Wires.

The laying down of the telegraphic wire which is to put Marseilles in direct communication with the capital, is being rapidly pushed forward. The distance is 536 miles. Two hundred and fifty workmen are at present employed on the right bank of the Rhone, following the high-roads as far as possible. The cable is inclosed in a cast-iron pipe, laid at a depth of 5 feet 6 inches under ground, the joints of the pipes being covered with india-rubber washers and leaden rings. About every 550 yards the cable passes through a covered chamber of cast-iron, fitted with a manhole, by means of which it can be inspected. About every 110 yards the pipes are connected by cast-iron boxes, which also enable the wires to be inspected and repaired. The expense of the whole work is estimated at forty million francs, or £1,600,000. When this line shall be completed it is intended to connect it with the Transatlantic and Mediterranean cables.