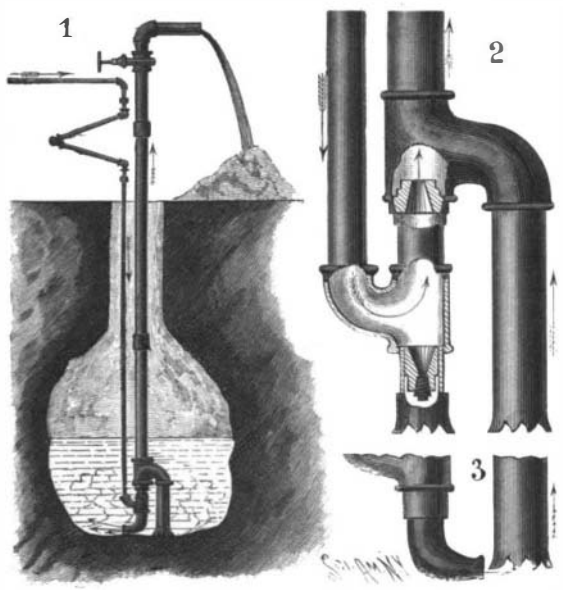
A DREDGE EJECTOR.

The illustration represents an apparatus for use in certain kinds of dredging, placer mining, etc., for loosening sand, mud and gravel, and discharging the loosened material at any desired place. It has been patented by John E. Melcher, of Wisner, Neb. Fig. 1 shows the apparatus in operative position, Fig. 2 being a sectional view and Fig. 3 representing a modified form of arrangement at the bottom of the force pump pipe and the inlet of the discharge pipe. An inlet pipe, as shown in Figs. 1 and 2, is connected at its



MELCHER'S DREDGE EJECTOR.

upper end by a hose or by variously coupled iron pipes with a force pump and at its lower end with a nozzle casing, whereby water under pressure may be discharged upwardly into a casing at the lower end of a discharge pipe, the latter casing having a valve and a downwardly leading extension connected with a suction pipe. At the lower end of the first casing is a short pipe, normally closed by a plug, and adapted to discharge water into a cutter at its lower end, there being a similar cutter on the lower end of the suction pipe. When it is desired to bring extra pressure to loosen some of the ground, the gate valve near the top of the discharge pipe is closed and the plug valve is removed, when the water under pressure passes out around the cutters at the bottom of both pipes, the opening of the gate valve again causing a suction to draw up the loosened material, it being understood that the lower valve has a considerably smaller opening than the upper one, whereby the bulk of the water will be taken up through the upper valve, just below the connection with the suction pipe. The connection of the force pump with the supply or inlet pipe is so made by flexible hose or jointed couplings that the pipe may be moved sidewise or up or down as desired, so that the apparatus may be moved in all directions from the pump, and the supply pipe may be swung as required around the suction pipe, the whole turning on the nozzle casing. As shown in Fig. 3, a short pipe or nipple at the lower end of the inlet pipe casing has its mouth in alignment with the cutters at the lower end of the suction pipe.

A LOCOMOTIVE AND ITS EQUIVALENT IN RAW MATERIALS.

We have received from Mr. F. W. Webb, the locomotive superintendent of the London and Northwestern Railway, England, an extremely interesting photograph which is herewith reproduced. It shows a freight locomotive—one of a very successful class of eight-coupled machines designed by Mr. Webb some years ago for handling the coal traffic—and gathered in front of it, each in a separate pile by itself, are the various raw materials which would be consumed in the manufacture of one of these engines.

The piles of material show graphically the relative bulk of the materials, and the subjoined table gives their weight in pounds:

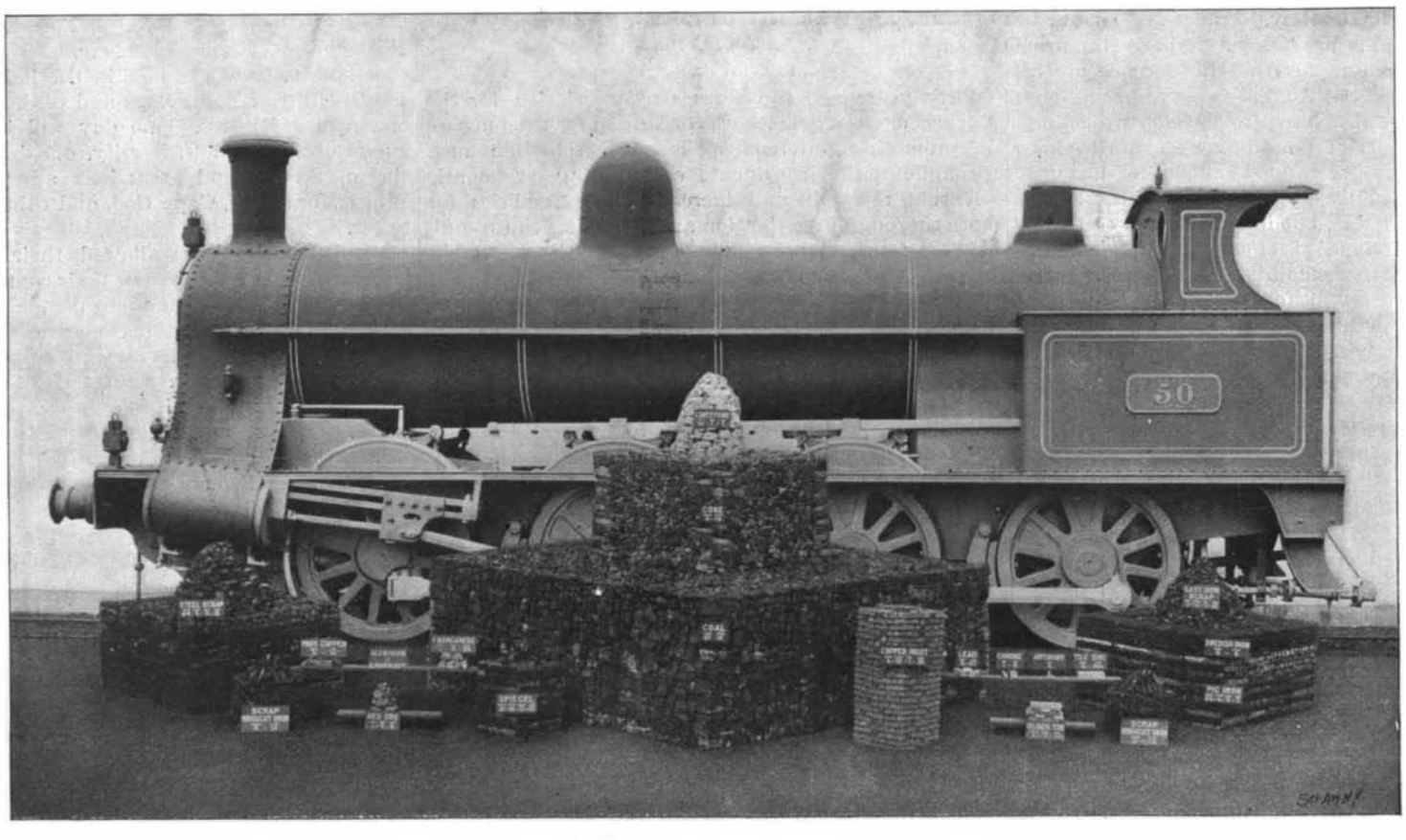
	Pounds.
Coal	128,800
Steel scrap	63.043
Pig iron	54,215
Wrought iron scrap	16.352
Swedish iron	14,448
Copper ingot	11,137
Coke	10,304
Spiegel	6,373
Cast iron scrap	3,403
Limestone	2,045
Block tin	546
Ferro-manganese	132
Red ore	120
Lead	83
Tile zinc	76½
Phosphorus copper	70
Chrome	30
Aluminum	13
Antimony	4
Total	311,194½

The total weight of the raw materials, then, is about 155½ tons. The finished engine weighs only about one-third as much, so that about 100 tons of material are either consumed or disappear as waste in the various processes of manufacture.

The exhibit is, we believe, quite unique, and is eminently instructive. It may not be known to our readers that the London and Northwestern Railway Company has long been considered as one of the chief, if not the chief representative railroad of Great Britain. Its works at Crewe are entirely self-contained, practically everything required for the various branches of the railroad equipment being manufactured by the company in one vast establishment; so that it is probable Mr. Webb would not have to send outside of the works for any of the material represented in our engraving.

The small size of the cylinders relatively to the locomotive is accounted for by the fact that the latter is a compound, with two outside high pressure cylinders and one inside low pressure. The outside cylinders, 15 inches in diameter, are connected to the second pair of drivers, and the 30-inch low pressure cylinder is located beneath the smoke box and between the frames, and drives the third pair of wheels by means of a crank turned in the center of the axle. The drive wheels are 51 inches in diameter and the stroke of both high and low pressure cylinders is 24 inches.

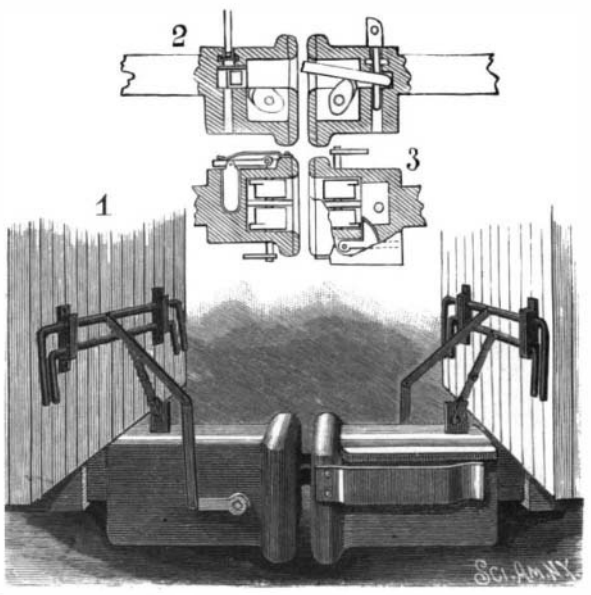
A compound express engine of this type was shown at the World's Fair, Chicago. Mr. Webb has built a great variety of compound locomotives on his system during the past twenty years, and they have invariably shown very economical results. A four-cylinder compound is one of the latest developments in the Crewe shops, and, as it is to be tested against an identical locomotive as respects weight, size, etc., of the simple type, the results will be awaited with much interest by the locomotive world.



A FINISHED LOCOMOTIVE AND ITS EQUIVALENT IN RAW MATERIALS.

AN IMPROVED CAR COUPLING.

In the car coupler shown in the illustration the ordinary pins and links are used, but they are operated by means of rock shafts on the ends of the cars, obviating the necessity of trainmen passing between the cars.



DUTCHBURN'S CAR COUPLING.

The invention has been patented by Christopher Dutchburn, of Highfield, Ontario, Canada.

Fig. 1 represents the device in use, Figs. 2 and 3 being sectional views. Extending transversely through each coupling head is a shaft on which are two lifting cams located in cavities adjacent to the drawhead throats, the cams serving to lift the links, as indicated in Fig. 2. The pins slide vertically through passages in the rear of the coupling heads, a horizontally sliding plate crossing each such passage to hold up the pin, and the plate being pivoted to a wing hinged to one side of the coupling head and pressed against by a leaf spring. Each wing has a lug projecting through an orifice into the drawhead throat, so that an entering link, as the cars meet, engages the lug, by which the plate is withdrawn and the pin drops into engagement with the link. At each end of the car are two rock shafts having at their ends crank arms, an intermediate portion of each shaft also having a crank arm, the crank arm of one shaft being adapted by link connection to raise the pin, while that of the other shaft operates a crank on the shaft carrying the cams by which the link is lifted. By these means both the links and the pins may be readily manipulated without requiring the trainmen to pass between the cars.

THE Société des Laboratoires Bourbouze, of Paris, offers scientific courses to workingmen, free of charge, on Sunday, from nine to eleven o'clock. Physics and chemistry will be taught in the laboratories, the courses being adjusted to the practical needs of the students.