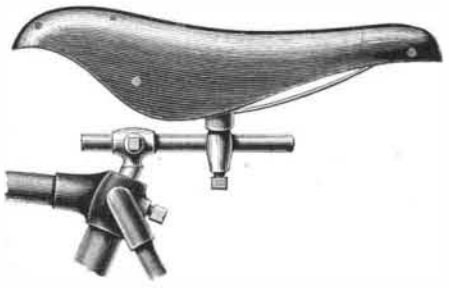
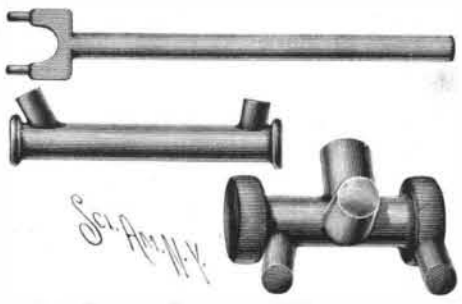
THE LOVELL DIAMOND CYCLES.

In mechanical construction the Lovell diamond cycles of 1894 maintain the degree of excellence which has given them their well-earned reputation. The material used in constructing these cycles is all special stock, and by means of expensive testing machinery in their factory, they not only test all of their stock, but keep record of it from year to year. They use in their wheels the fewest joints and parts possible, and they have to-day fewer brazed joints than other wheels. The best English weldless steel tubes are used, and all connections are solid steel drop forgings. The ball races are easily removed and the balls are held in place by ball-retaining washers. The front and rear wheels are removable without taking out bolt or nut. These cycles contain many improvements, most of



SADDLE AND SLIDING SEAT POST.



SPECIAL DROP FORGINGS BEFORE FINISHING.

which are original mechanical devices, such as pedals, adjustable seat bar, absolutely dust proof bearings, high frame, and narrow tread.

They are all finished in two coats of bright enamel, striped in gold, and highly polished; bright parts nickel-plated on copper and highly polished.

Their line of cycles covers track racer, weighing 19 lb.; road racer, 25 lb.; lady's wheel, 31 lb.; convertible, 31½ lb.; and light roadster, model 19, which we illustrate.

The wheels are 28 inches, having light crescent steel or wood rims as preferred. Full nickeled, tangent spokes of fine steel wire, swaged, are secured in the rims by nipples, and tied at the first crossing, making them very stiff and durable. The head is 10 inches long and made of one piece drop forging, with forged steel ball races at top and bottom. The forks are of the finest light steel tubing, brazed into a forged steel crown, which extends through the head and is one piece. Detachable mud guards and brakes are furnished, which can be easily removed if not wanted. Ball pedals, with square rubbers, light and dust proof.

LOVELL DIAMOND CYCLE—MODEL 19.

Rat-trap plates are furnished with each pair, which can be used in place of the rubbers. Adjustable dust proof ball bearings, of first quality throughout, including wheels, crank shaft, head, and pedals. This model is geared to 64 inches and weighs 32 lb., and when stripped, 29 lb.

The saddle and sliding seat post shown is one of the new features for 1894. This enables the rider to regulate his position and brings him at proper place over the pedals, and, by turning a set nut at bottom of saddle post, the seat can be given any desired angle, either forward or back.

Among the new pieces of drop forgings made by their special machinery, we show the parts just as they come from the forging machines, and before they are finished. This enables the Lovell diamond to do away with many joints which other wheels possess, renders these cycles stronger and more durable, and shows to what perfection this branch of manufacture has been developed.

All interested in cycling should send to the John P. Lovell Arms Co., Boston, Mass., for one of their 1894 cycle catalogues.

The Manufacture of Aluminum.

In a lecture dealing with this subject lately delivered at a meeting of the Manchester Association of Engineers, Mr. W. S. Sample, of the Patricroft Magnesium and Aluminum Metal Company, said that the development of the electrolytic processes for making aluminum created a demand for pure alumina, and manufacturers had succeeded in supplying an article over 99 per cent pure, the 1 per cent being made up principally of water and silicon. Pure carbon electrodes were necessary, and these were furnished with a fraction of 1 per cent of ash. The result was that aluminum was made so that the entire product was over 99 per cent pure, which was much better than the regular results obtained by the chemical processes.

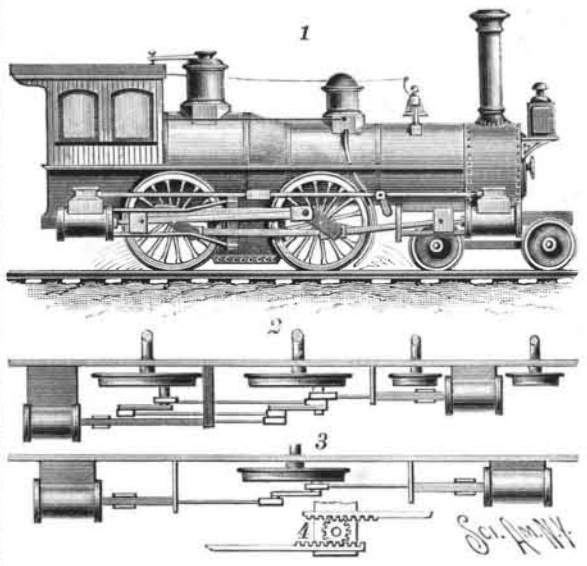
As the methods at present employed consisted of the direct reduction of the oxide of the metal, it did not seem possible to have a more simple process, and not probable that a more complicated compound could be treated in a more economical manner. It might be inferred, therefore, that further cheapening of aluminum would depend upon the greater consumption of the metal, and also upon cheaper power and materials, and the consequent decrease in the average general expenses with greater output. The present total output of pure aluminum was between 4 and 5 tons per day, which was more than the annual production up to 1886. This rapid increase in production had been due primarily to the decreased selling price, which encouraged consumers to make practical use of the metal. The present consumption might be graded into three classes, each of which took about equal parts. These were iron and steel, brass and bronze, and pure metal. The best testimonial was the continued use of the metal by both iron and steel makers, and brass and bronze founders. The properties of aluminum had been greatly exaggerated and as greatly depreciated by many writers. Notwithstanding the difficulties in perfecting a new process and in introducing a new metal, it had obtained a place among the metals of ordinary and daily use, and its position was continually being made more secure by a further appreciation of the uses to which it had been put successfully, and by new uses to which it was being applied almost daily.

Metallic Sodium on Water.

Even the amateur chemist knows that a bit of sodium dropped upon water produces an explosion. When a considerable quantity of the metal is placed in a partly closed vessel of water, a violent explosion occurs. It has been supposed that this is to be accounted for by the formation of sodium peroxide, which is at once decomposed, giving its oxygen to the hydrogen set free when the peroxide is made. Prof. Rosenfeld has been experimenting to find out whether or not this is the correct explanation of the phenomenon. He notices that the sodium is always blown to pieces from the center, and believes that the explosion is caused by the sudden separation of a hydride of sodium formed at the beginning of the reaction. He finds that a current of steam may be passed over a piece of sodium held in a bent iron tube without any explosion, and no oxygen can be detected in the resulting gas. The hydrogen is carried out of the tube before there has been time for the hydride to be formed. This experiment can best be performed with an iron crucible; the steam is blown into it through a side tube and the hydrogen escapes from a similar tube on the opposite side. When the steam is cut off, solid caustic soda, mixed with finely divided iron, is found in the crucible. This is thought to be due to the formation of an alloy of iron and sodium, which is afterward decomposed, leaving the particles of iron in the soda.

THE PATTERSON LOCOMOTIVE.

The improvement herewith represented consists in a change of method of applying power to driving wheels, and was patented by David S. Patterson, now deceased, of North Platte, Nebraska, June 6, 1893. Patents were also secured in Great Britain and Canada. Fig. 1 shows a standard American locomotive altered by application of the improved gear, and Fig. 2 is a plan view, by which it will be seen that power is applied to the same driving wheel from opposite directions, front and rear cylinders being connected by their rods to opposite ends of a double crank on the main driver. To preserve counterbalance and prevent pounding on the rear axle journals two side rods are used, the rear crank being of the same form as the main one. The engine deck forms the saddle for the rear cylinders, and has steam passages supplied through a pipe leading from the throttle pipe below the valve, the exhaust being carried under running board to rear of front saddle. In Fig. 3 the improvement is shown



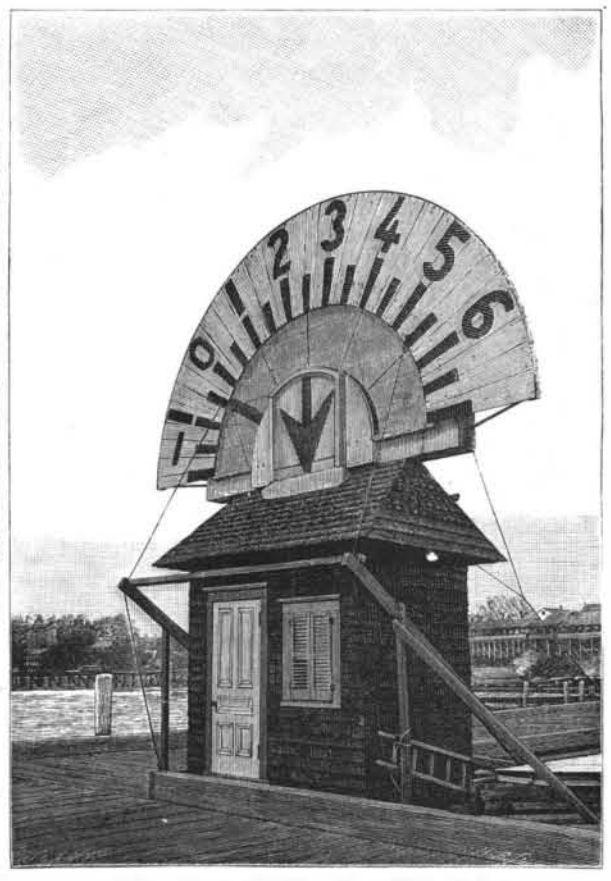
THE PATTERSON LOCOMOTIVE.

with only one driving wheel. The standard form of valve motion is used, the forward valve rod extending back to rear valves, its motion being reversed by the device shown in Fig. 4, contained in a covered box which also forms a guide for the rods. This arrangement is also adapted, without the side rods, to stationary engines, particularly those of high speed, where a heated journal would cause serious trouble, such as would be the case in an electric light or street car power engine. It is also adapted to English engines having a single pair of driving wheels. By thus applying the power from opposite directions it is designed to entirely eliminate pounding and friction in the axle journals, as well as to effect an entire freedom from the well-known "pound on the rail," for, as the rod leading to the forward cylinder will push or pound downward on the rail when its crank pin is on the lower quarter, the rod leading from the rear cylinder will be on the upper quarter, pushing upward with the same force as the forward rod has in its downward pressure. For further information relative to the improvement, address Letitia Shaw Patterson, North Platte, Neb.

TIDAL INDICATOR, NEW YORK HARBOR.

Nearly all foreign trade vessels that enter the port of New York pass through what is termed "the Narrows," which is a contraction of the channelway formed by the bluffs of Staten Island on the one hand and Long Island on the other or easterly side.

For the convenience of mariners the government has lately erected upon the pier at Fort Hamilton a tidal indicator, to show, for the benefit of vessels passing in or out of the harbor, the condition of the tide. The arrow pointing downward shows that the tide is ebbing, while the mark under the figured dial indicates that it is almost dead low water and the flood will soon begin.



NEW TIDAL INDICATOR, NEW YORK.