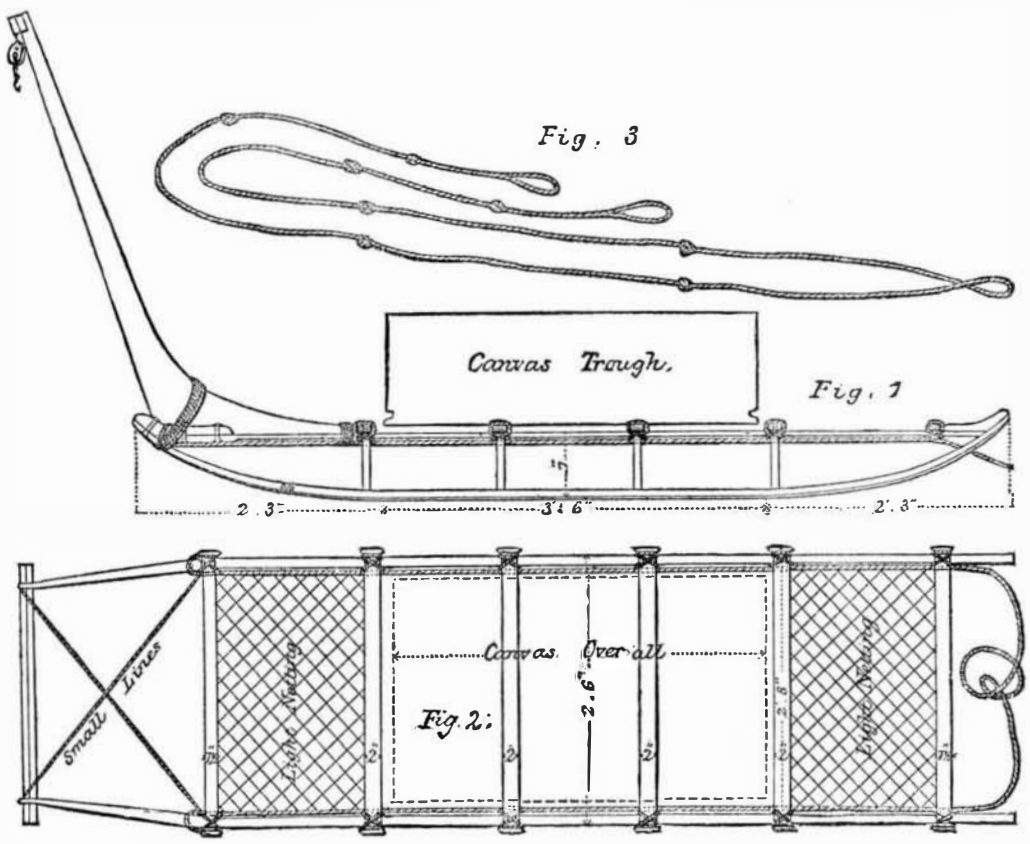
THE NEW ARCTIC SLEDGE.

Among the many elaborate arrangements for securing success to the British Arctic expedition, a new form of sleigh (or sledge, as the English call it) is to be employed, and *Engineering* gives the following account of the vehicle and its use:

After passing through Davis' Strait and up Baffin's Bay, the vessels will push on at once northward through Smith Sound, which has of late years been explored by the Americans as far as the 82d parallel. One of the advantages of this route is that, it having been determined that Smith Sound, as far as it had yet been explored, is bounded by a continuous line of coast, stations could be fixed all along it, where provisions might be left, so that in case of any accident happening to the ships so as to necessitate their abandonment, there would be a safe journey back to Baffin's Bay insured, on the banks of which, at Upernavik and other places, Danish settlements exist. There is a hope, too, that this coast line stretches still further northward, and this route thus affords additional advantages to the sledge exploring parties, as they would not be tied so much to time their return home before the breaking up of the ice as would otherwise be the case. This return home, when it has to be accomplished over the frozen sea, is sometimes a matter of considerable danger; and as it would be impossible for a single sledge to go by itself further away from the ships than the distance which could be traversed while half its provisions lasted, the following system of combined movement is adopted. A number of sledges start together, each with its proper complement of men under an officer, and all provided with sufficient provisions to last for fifty days. After traveling together for six days one sledge is dropped with only six days' provisions to take it back to the ships, the remainder of its provisions being divided up among the other sledges. The dropped sledge immediately returns to the ships, reprovisions, and proceeds to the original point where it was dropped, where it forms a depot. The remaining sledges, in the mean time proceeding onwards, continue to drop a sledge at the end of every six days, making up their fifty days' store of provisions from each one before leaving it. Each sledge as it is dropped forms a depot, and returns to reprovision from the one already established behind it. In this way a constant communication can be kept up with the ships as a base of operations, and the last sledge allowed to proceed forward fully provisioned for a journey of 50 days. The sledges which have been provided for the expedition are of three sorts, namely, 5, 7, and 12 man sledges respectively.



SLEDGE FOR THE ARCTIC EXPEDITION.

The accompanying engravings show a 5 man sledge, which consist of two runners made of English ash, straight for a length of 3 feet 6 inches amidships and turned up for a distance of 2 feet 3 inches at each end, and fitted with a steel shoe plate $\frac{1}{16}$ inch thick and two and a quarter inches broad. The bearers, on which the platform of the sledge is laid, are made either of English ash or Canadian elm, secured to the runners at each end by an elm chock, and supported by ash poppets tenoned into both the runners and bearers, and riveted through with brass rivets $\frac{1}{8}$ inch in diameter. The crosspieces, which are also of ash, are 2 feet 8 inches long, 2 inches wide, and 1 inch thick, slightly rounded on the top, and are lashed to the bearers with straps of hide which has been previously rendered soft and pliable by being soaked in warm water. When these lashings get cold, they shrink exceedingly tight and hard. The drag rope span, which is fitted after the crosspieces have been lashed, is made of 1 inch rope with an eye at each end to fit over the horns of the rear end of the sledge. It passes through two small grummets on each of the cross bars, and a hide strap which is formed round the forepart of the runners. The bight is about 3 feet in front of the sledge and is provided with an eye and thumb toggle to fasten the drag ropes to. The latter (Fig. 3) are made of 1 inch rope middled, and have their bight toggled to the span on the sledge. Three Turk's heads are made on each leg of the drag rope at equal distances apart to fasten the drag belts to. These drag belts are made of light horse girth 3 inches wide and 5 feet long, with an eyelet hole worked in each end, into which a piece of 1 inch rope 12 inches long is spliced, having at its other end a copper toggle $\frac{1}{8}$ inch thick and $\frac{1}{2}$ inch in diameter. This is attached to the drag ropes below a Turk's head with a Blackwall hitch, so that in case of necessity it can be instantaneously detached by loosening the strain upon it.

To assist the crosspieces in forming a platform on which to fix the sledge bottom, two fore and aft lines are clove-hitched round the end crosspieces and stretched as taut as possible, being placed about 9 inches apart, and 9 inches from the side of the sledge.

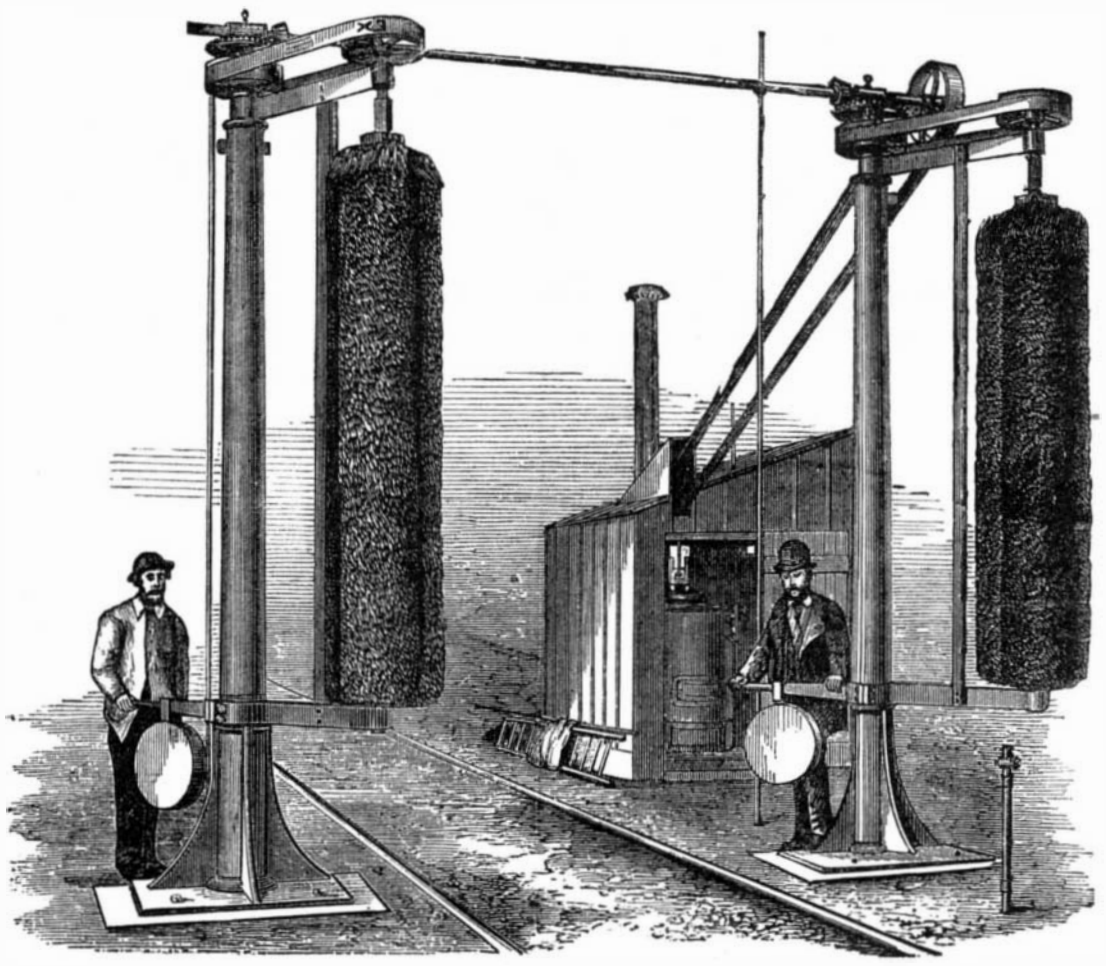
The sledge bottom itself is formed of stout canvas, stretched down to the bottom of the sledge and laced to the two end crosspieces, and is intended to aid the sledge trough in supporting the load and to keep it from being chafed by the working of the sledge. The trough is also made of canvas, and has a tatling worked round its bottom edge (not, however, projecting beyond it), into which are let eyelet holes 6 inches apart, by which it is laced to the bearers and end cross pieces in order to keep it in its place. To its ends and sides, flaps of unbleached linen are sewn, in order to cover the lading and to keep out the snowdrift and cold. At each end a network is stretched to take the cooking utensils, which are the last things put on and the first taken off. The lashings for fastening down the lading on the sledge consist of 12 fathoms of 1 inch untarred hemp or manilla rope. The sledge back forms no unimportant item in the construction, as on it can be hoisted a sail, which, in case of a fair wind, is of great assistance in relieving the men from dragging. This back is shown fitted in the diagram, and is attached to the sledge by hide lashings.

IMPROVED RAILWAY CAR-WASHING MACHINE.

We publish herewith an engraving of an apparatus for washing the sides of railway cars, recently invented by the Earl of Caithness. It consists essentially of two large vertical brushes driven by a steam engine; a number of dirty carriages, making up a train of any length, is passed slowly between these revolving brushes; water is thrown upon the side of each railway carriage, 2 feet in advance of the brush, from a vertical iron pipe pierced with small holes, placed at an average distance of 8 inches from each other. A second water pipe, pierced with similar holes, directs another series of small jets of water directly upon the brushes. The whole arrangement is not very dissimilar in principle to that of hair brushing by machinery.

This invention was made and patented towards the end of last year. Lord Caithness recently visited this country, and, says *The Engineer*, "a week or two since returned, bringing with him an exceedingly efficient and well made stationary engine of 4 horse power, manufactured by the Baxter Steam Engine Company, at Colt's firearms manufactory. This little engine, which is very popular in America, is used to drive the brushes at King's Cross station, London, where the apparatus is in use.

In a recent experiment a train of twelve dirty carriages, of different sizes, was passed between the brushes. The time occupied in so doing was $4\frac{1}{4}$ minutes, and, although this was the first experiment tried with the completed apparatus, the results were gratifying. During these four minutes it became evident to the observers that three conditions at least affected the results. The chief of these was the velocity with which each carriage was drawn between the brushes by the locomotive, those which were passed most rapidly being less perfectly cleansed than those drawn more slowly. Another condition was the amount of pressure of the brushes against the sides of the carriage, which pressure was completely under the control of the man who used the apparatus. A third condition was the distance between the holes in the vertical pipes, which projected the water upon the sides of the carriages. The motion of the train, as the small jets of water played upon it, caused the jets to describe parallel lines upon the sides of the carriages; and when the motion was too swift, and the brushes themselves not quite saturated with water, small portions of the carriages were liable to pass without being wetted. These and other little points were noted before the train had passed half way through the brushes on its first trial; the speed of the train and the pressure of the brushes were then so regulated that the last half of the train passed as perfectly washed as could be desired. Before the train passed between the brushes it was palpably dirty, and after it came out it was palpably well cleaned, windows and all.



THE EARL OF CAITHNESS' CAR-WASHING MACHINE.

In using apparatus of this kind in practice, the trains will probably have to be pushed backwards and forwards on sidings, so that they will run between the brushes once in one direction and once in the other; but in order to brush them on each of these occasions, it will be necessary to use reversing gear to drive the brushes, so that they can be turned in one direction while the train is entering the siding, and in the other direction while it is leaving. The brushes are made of horsehair.

THE repeated applications, to copper or brass, of alternate washes of dilute acetic acid and exposure to the fumes of ammonia will give a very antique-looking green bronze; but a quick mode of producing a similar appearance is often desirable. To this end the articles may be immersed in a solution of 1 part perchloride of iron in 2 parts water. The tone assumed darkens with the length of immersion. Or the articles may be boiled in a strong solution of nitrate of copper. Or, lastly, they may be immersed in a solution of 2 ozs. nitrate of iron and 2 ozs. hyposulphite of soda in 1 pint water. Washing, drying, and burnishing complete the process.