

ELECTRIC FREIGHT CONVEYERS FOR LOADING AND UNLOADING VESSELS.

Up to within the last four years every pound of freight which was sent abroad was handled by means of slings or staging from the wharf immediately alongside of the vessel. Not only is this process necessarily slow—not many sling loads can be handled per hour, even under the most favorable conditions of weather and tide—but it is very expensive, requiring as it does a large number of men to load a ship with reasonable quickness. Moreover, in the slinging of cargo, so many packages are broken that the loss of goods is not inconsiderable.

But during the last four years the method of stowing cargoes has been greatly improved by the invention and perfection of a portable electric ship and warehouse conveyer, an apparatus which requires neither staging nor the hoisting of sack or package cargo. So rapidly does this new invention work, that a ship can now be loaded in about half the time required under the old system, with the same or less number of men employed. The system is at present

widely used on Puget Sound. The stowing of 1,000 sacks of grain or flour per hour or 600 tons per day of ten hours is considered an exceptionally good day's work in hoisting or slinging, or by staging; but the same number of men with a conveyer will handle 2,000 or 2,200 sacks per hour. Indeed, it may be stated that the conveying capacity of the machine is governed only by a ship's facilities for receiving cargo.

In large modern ships or in tramp steamers, where the crew in the hold can be increased many-fold, sack and package cargo may be handled at a rate of from 3,500 to 4,000 packages per hour.

Especially serviceable is this invention in the loading of flour, grain, and other perishable cargoes in wet weather. For, since no hoisting gear is needed, tarpaulin or canvas covering can be placed over the hatches, and stretched from the ship's rail to the warehouse door before the hatches are removed and the conveyer placed in position, thus insuring absolute protection to the cargo on the conveyer or in the hold.

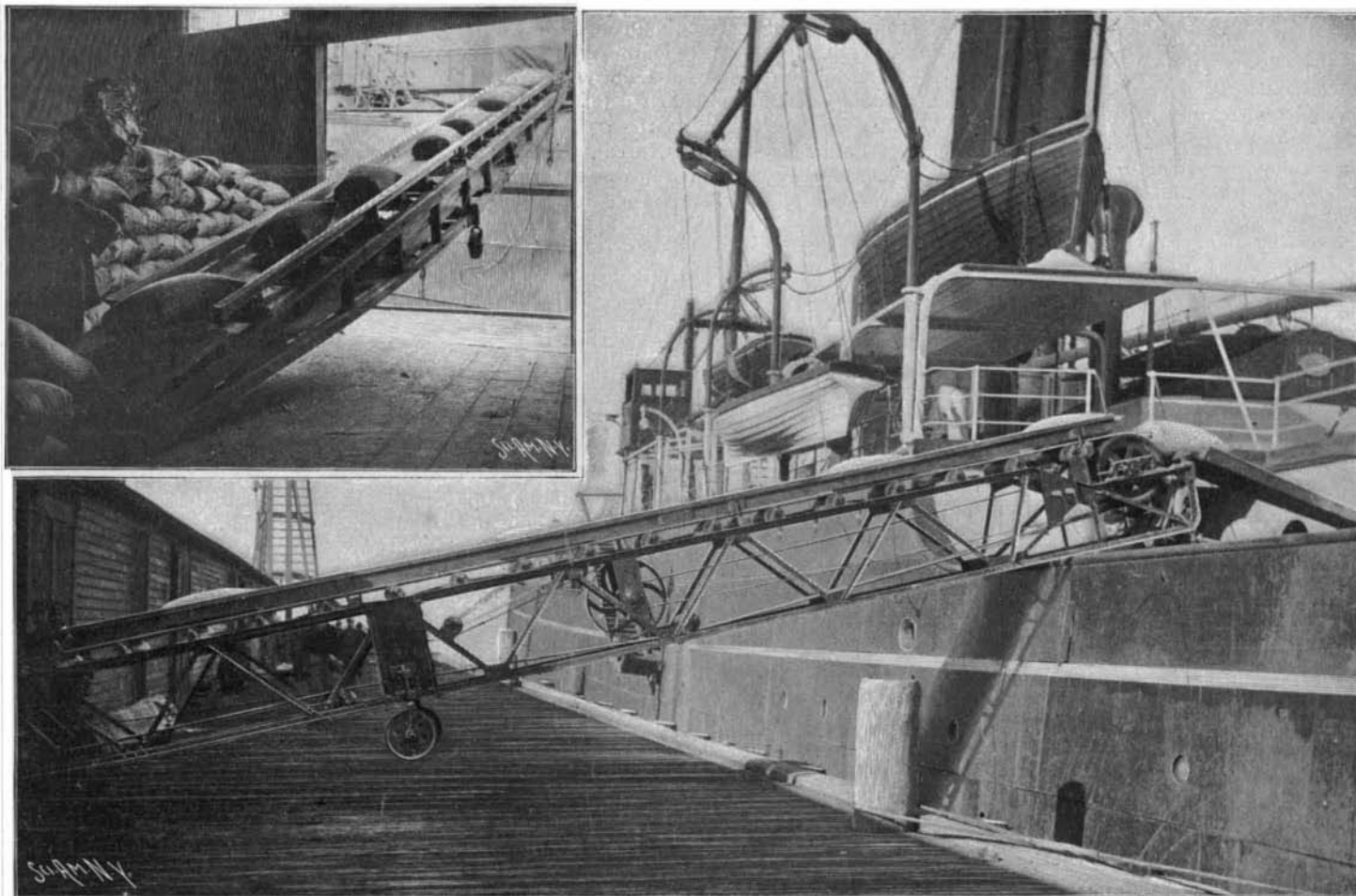
All freight which can be handled in slings can be transferred by this conveyer. The saving in claims for damaged cargo has often been noticed at the offices of the underwriters.

The machine is the invention of Captain W. L. McCabe, of the stevedoring firm of McCabe and Hamilton, Tacoma and Seattle, Wash. In the longitudinal central space formed by a strong iron or steel double truss, from 45 to 60 feet long, according to local requirements of docks

or warehouses, an endless rubber or canvas belt or apron 24 inches wide is mounted, to which belt cleats may be riveted. The belt picks up the packages on the wharf or warehouse floor, and deposits them at the ship's rail. The maximum inclination of the conveyer is about 50 degrees.

The belt is driven by an electric motor on the frame of the machine, the motor being so placed that it will be entirely cleared by the belt or working parts of the conveyer, thus insuring safety in operating.

The conveyer is mounted on a pair of swivel ball-



THE McCABE ELECTRIC CONVEYER.

bearing wheels in the center, whereby it can be easily and rapidly moved to or from any part of a dock or warehouse. Only three men are required to shift it to and fro.

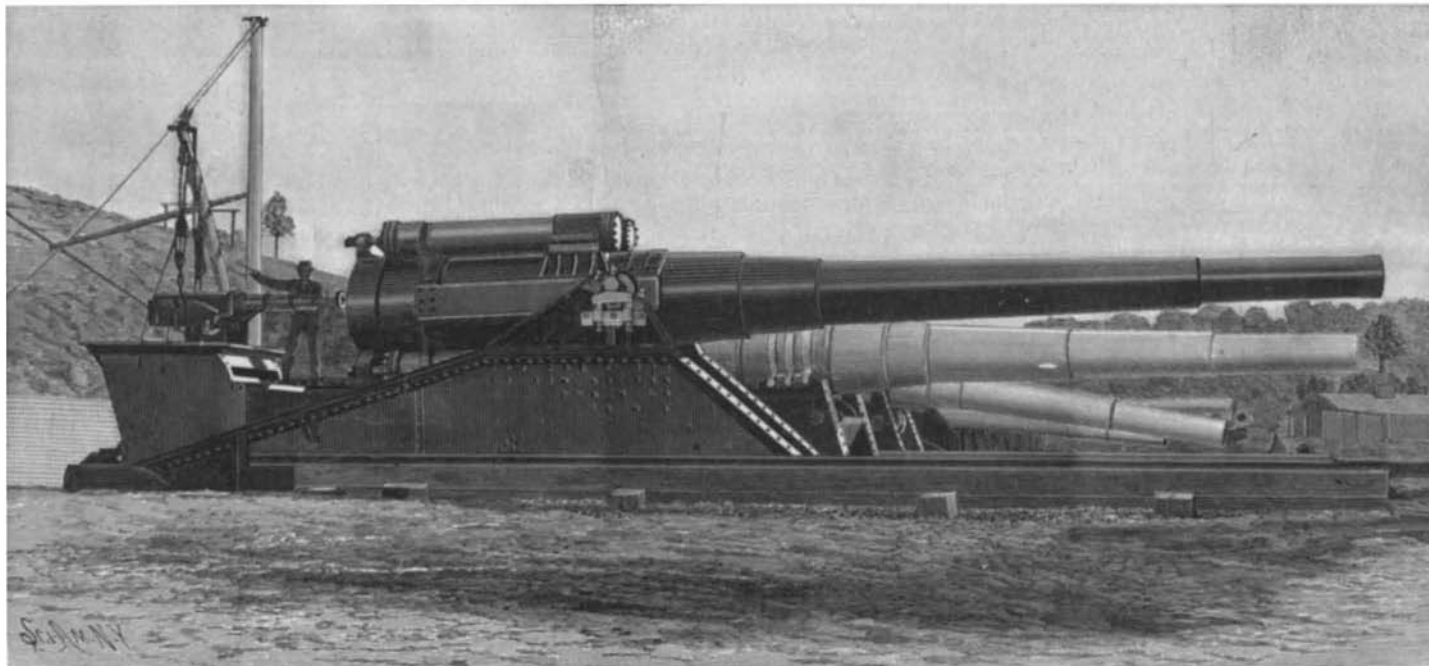
Since the machine carries its own driving mechanism, it follows that the rise and fall of the tide or the wash of passing steamers cannot hinder the rapid loading or unloading of a cargo.

The conveyer weighs about 2,500 pounds per 45 feet.

THE NEW 12-INCH NAVAL GUN.

The new 40-caliber, 12-inch gun, the first lot of which will be mounted on the new monitors and on the "Maine" class of battleships, and which will henceforth be the standard weapon of this caliber for our navy, has been completed and tested at the Naval Proving Grounds, Indian Head; about twenty rounds having thus far been fired.

By the courtesy of Rear-Admiral O'Neil, we present an illustration of this gun engraved from a photograph taken at the Proving Grounds, which shows both the gun and its mount complete.



New Navy 12-inch Gun at Indian Head—Muzzle velocity, 2,854 foot-seconds; muzzle energy, 47,994 foot-tons; foot-tons of energy per ton of gun, 893; powder pressure, 16.5 tons per square inch.

THE MOST POWERFUL 12-INCH, 40-CALIBER GUN IN EXISTENCE.

With a charge of 360 pounds of smokeless powder, and a projectile weighing 850 pounds, a muzzle velocity of 2,854 foot-seconds was obtained with a corresponding muzzle energy of 47,994 foot-tons, the chamber pressure being 16½ tons per square inch, or a half ton less than the designed working pressure of 17 tons. We are informed that the gun, its mechanism, and mount, functioned admirably in every respect. The Bureau of Ordnance is to be congratulated in having achieved such admirable results.

The fact that this gun shows 54 foot-seconds greater velocity than it was designed for, with half a ton to the square inch less pressure in the powder chamber, speaks volumes for the excellence of the multi-perforated, all-guncotton smokeless powder which has been adopted by the navy; for unlike the high nitro-glycerine powders, such as cordite, which are used by some other nations, our new navy powder achieves these splendid results without any perceptible deterioration of the inner surface of the gun.

It is interesting to compare the new weapon with the 12-inch 35-caliber guns now in service. The new gun weighs 53.7 tons and has a muzzle energy of 893 foot-tons per ton of gun. The present 12-inch gun, which weighs 45.2 tons, has a muzzle velocity with smokeless powder of 2,300 foot-seconds, and the corresponding muzzle energy of 31,170 foot-tons amounts to only 689 foot-tons per ton weight of the gun. From the above comparison it will be seen that the muzzle energy of the new 12-inch gun exceeds that of the old by 53 per cent.

If the energy developed by one round of the new gun could be applied as a constant upward thrust beneath a 12,000-ton battleship, it would be sufficient to raise it 4 feet from the ground.

The excellence of this weapon is shown by a comparison with other 40-caliber, 12-inch guns, which are being constructed by the leading gun-makers of the world. At the bottom of the list is the French gun, which, in spite of its high velocity, shows a muzzle energy of only 30,750 foot-tons, the relatively small energy being due to the very light shell, which weighs only 644 pounds. The inferiority of this gun is greater than

appears on the surface figures; for the lightness of the shell will cause the velocity of the projectile to fall away far more rapidly than that of the heavier projectiles. We should note in this connection that although the muzzle velocity of the Krupp 40-caliber gun is lower than that of the new United States gun, because of the greater weight of its shell, it will approach it in respect of its remaining energies at the