SCIENTIFIC AMERICAN

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IMPROVED FLOATING GRAIN ELEVATOR.

The problem of how to effect a rapid transference of goods to and from ships has been very successfully solved during the past few years, especially in the case of grain, for by the aid of elevators and conveyers it is now removed with great rapidity and economy. Fixed elevators, however, necessitate the berthing of a ship alongside the warehouse to which they are attached, and it has therefore during the past few years become the practice to use a portable elevator, by means of which a cargo can be unloaded and placed in any shed alongside of which a ship may be moored.

The first type of portable elevator was one which could be lifted from a barge and dropped into the hatch, motive power being derived from an engine placed upon the deck of the ship, and obtaining steam by means of a flexible tube from a boiler carried by the barge. The use of elevators of this description has enormously increased, as is evidenced by the fact that in 1881 81,951 tons of grain were unloaded by their use, while in 1887 745,090 tons were so discharged in the two ports of Glasgow and Liverpool. These elevators are arranged to have two legs, so that they are practically duplex, and lift the grain from each side of the ship simultaneously, thus keeping it in even trim. By stopping the operation of one leg, a ship which has a list can be brought upright. It is not, however, with the portable type that we have so much to deal as with a development of that idea which is embodied in a floating elevator. A machine of this class is here illustrated.

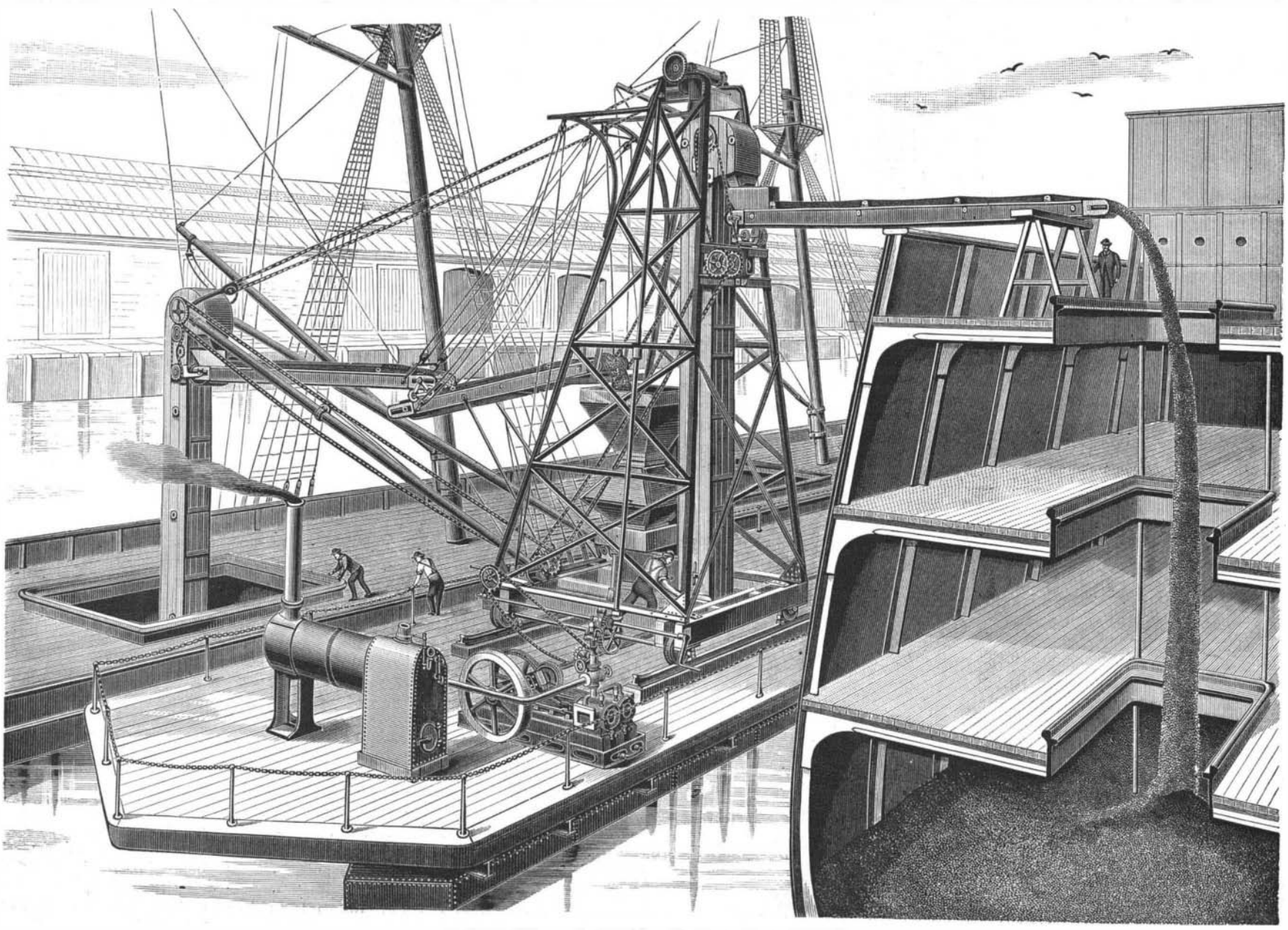
It will be seen that the elevator is carried by a barge or pontoon moored alongside the vessel to be unloaded, and which also contains a steam boiler to supply the necessary power. The upright column is a double one —internal and external—the inner one being fixed to the lower base plate or foundation, and the outer to the upper plate. Between the two plates a set of rollers are placed, so that by means of a hand winch the case and bridge can be revolved, as is sometimes necessary in order to suit the position of a vessel and to house the elevator. At the upper end of the pillar two H-section girders are attached, which form a bridge or jib for carrying the elevator trunk. In addition to having freedom of circular movement, the bridge can be raised or lowered at the point or nose, as desired, by means of the wire stays attached to the short end of each girder. This provision is made in order to allow of the elevator trunk being easily placed to suit the delivery, and also to facilitate the housing of the elevator, as will hereafter be described. The requisite power is obtained by means of the winding barrel shown. The elevator trunk is carried in a light wrought iron frame, through which it can slide, the frame being in turn sustained by trunnions, which enable it to be oscillated when necessary.

In addition to the oscillatory movement there is also provision for moving the frame and trunk longitudinally on the bridge, by means of a traverse screw worked by a hand chain from the deck of the pontoon or barge. The range of longitudinal movement is, of course, limited, and is only intended to compensate for the variations existing in the beams of ships. To the head of the elevator leg or trunk is attached a wire rope, which passes over guide pulleys to a barrel, driven by gearing from a pair of engines fixed to the upper plate. By means of this the trunk can be drawn into a horizontal from the vertical position it is in when raising grain. A further lifting rope is taken from a third winding barrel, also driven by clutch gearing, and attached to a ring bolt at the lower end of the elevator case. In this way the latter can be vertically raised or lowered out of or into the hold of a ship, and can thus easily follow the height of the cargo as the latter is unloaded. Two pairs of steam engines are fixed on the revolving base plate, by which the whole of the motions are controlled, one pair driving the three winches described, and the other the elevator and conveyers.

The elevator trunk or leg is fitted internally with two endless chains, running parallel to each other over pulleys at the top and bottom, and to which are attached at short intervals steel buckets. The necessary motion is communicated to these chains by means of pitch chains of special construction, working on sprocket wheels, the chain from the engine driving a second one placed on a shaft running alongside one of the bridge girders, and so communicating motion to sprocket wheels, which drive the elevator and conveyers. This method is clearly shown in the illustration. Attached to the elevator head is a telescopic delivery pipe, by which the grain is delivered to the conveyer band. If it is necessary to have more than one length of conveyer, a sprocket wheel is placed on the spindle of the roller at the extreme end of the first length, driving a similar wheel on the first roller of the second length. The distance to which the conveyers may be extended is thus very great, the whole of the power being derived from the engines on the pontoon or barge. The sprocket wheel and chain arrangement are of special design, easily detachable, and very convenient.

We had recently an opportunity to inspect a machine of this class which is being supplied to the Limerick corporation, and we can testify to its easy and efficient working. We have referred to the housing of the elevator. This is requisite when it is out of use or when the machine is being moved from place to place, and is effected in the following manner: A cargo having been discharged, the leg or trunk is, by means of the lifting winch, drawn up clear of the ship's hatch. It is then drawn round until it lies on the bridge, which is swung round until it is fore and aft of the barge, being then allowed to fall at the nose, until the latter rests on a trestle placed on the deck of the barge, the whole being then made fast. The gearing, etc., is then closed up, and the barge is then ready for transportation without any fear of accident.

The buckets are stamped out of steel, cooper, or brass



IMPROVED FLOATING GRAIN ELEVATOR.

sheets in one piece, and even in the largest sizes are without a joint. A special plant has been laid down by the makers for this purpose, and they now make a large number of various sized and shaped buckets. The arrangement of these on the elevator chains is such that the maximum duty is obtained, as no space is lost in any way. Each machine is arranged to raise 50 tons per hour, but can, if necessary, raise 60 tons. The whole arrangement is most complete, and the machine we inspected worked well and was well constructed.

Our illustration represents a machine constructed for the transference of grain cargoes from large barges to ocean-going ships, weighing it in the process. This machine was made for use at Odessa, the grain arriving at that port by large sailing barges. As will be seen, one elevator leg is sustained at the end of the jibs or derricks, and raises the grain from the barge and delivers it to a conveyer. The latter empties it into a weighing machine placed on the pontoon carrying the elevator, which automatically weighs it, and delivers the grain so that it can be raised to the second elevator, which is carried by the upright frames shown. The second elevator delivers the grain to a conveyer, by which it is dropped into the ship.

The makers are Messrs. S. S. Stott & Co., of Haslingden, near Manchester.—*Industries.*

The Fastest Railroad Train in the World.

Competition between two of the great English lines of railroad has recently taken the form of cutting down the running time. The London and North-Western and the Great Northern, striving against each other for the traffic between London and Edinburgh, have reduced the running time between these points to eight hours. By the first named road the distance is 401 miles, by the other it is 397. For the entire distance the schedule is slightly exceeded by the short B. & O. run between Baltimore and Washington, 40 miles in 45 minutes. But the length of the trip removes it from the comparison. On the North-Western road one run without a halt of 158 miles in three hours is a part of the trip. This exceeds the run from Fort Wayne to Chicago by 12 miles. To realize what this speed means, it may be compared with the trip from New York to Chicago by the Pennsylvania Railroad. The same speed would reduce the time between these points to a little over eighteen and one-half hours. It has been suggested that an afternoon train should leave New York and should reach Chicago in time for business the next day. The above proves the practicability of such a project.

Clouds of Moths.

The city of Reading, Pa., had a remarkable visitation of moths on the evening of August 1. Myriads of them infested the air, resembling at a distance a snow storm. They were first noticed flying around the electric lights about 8 o'clock, and gradually increased to such numbers as to obscure the brilliancy of the lights. Passengers on the street cars, as they passed under the lamps, were covered with the insects, and handkerchiefs, hats, and fans were plied vigorously to keep them off. Fires were built under the lights and heaps of the moths were burned. Penn Street saloon men were compelled to close their front doors to keep out the pests, which were attracted to the barrooms by the bright lights. The doors and windows of dwelling houses had also to be kept closed to keep them out. Local savants pronounced them cotton moths, and they evidently came from the South. They are said to precede a hot wave, and a decided rise in the temperature is predicted.

At Easton, Pa., butterflies by the thousands flew around the sixty-four electric lights, lit on the carbons and then dropped dead in the globes. When the men who renew the carbons visited the lights, they found on an average two quarts of dead butterflies on each globe, a total of four bushels, besides the lot that had fallen on the ground during the night.

Moths Attracted by the Electric Light.

A curious and interesting spectacle is now presenting itself upon Third Avenue, New York. Myriads of moths are circulating around the electric lamps upon the corners of the street, their shadows being projected upon the sidewalks and opposite blank walls, as if upon the screen of a magic lantern. Passers-by are startled at perceiving these apparitions dart across their path, and stand gazing astonished at the novel sight. The moths are barely a half inch long, but appear projected at least two feet, with outstretched wings in proportion.

THOMAS LATHAM.

A $50,000 Horse.

A remarkable auction sale took place on July 31, at Lexington, Ky., on the occasion of the sale of the celebrated three year old stallion Bell Boy. This horse had a record at three years of 2:26, and was bought four months ago for $35,000 by Jefferson & Seaman. To close the partnership, the animal was again sold as above, and brought on the block the large sum of fifty thousand dollars, the largest price every paid for a horse in this country. The purchaser of Bell Boy was C. E. Seaman.

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(Illustrated articles are marked with an asterisk.)

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No. 659.

For the Week Ending August 18, 1888.

Price 10 cents. For sale by all newsdealers.

GEN. PHILIP HENRY SHERIDAN.

On August 5, at 10:20 P. M., Gen. Sheridan passed away. His death, following upon the demise of Gen. Grant, removes another of the great leaders of the United States army in the civil war, and acts to still further relegate the conflict to the domain of history.

Gen. Sheridan's parents were natives of Ireland, and emigrated to this country about sixty years ago. He was born March 6, 1831, in Somerset, Perry Co., Ohio, about twelve miles from the birthplace of Gen. Sherman, his companion in war and his survivor. His family were of pure Celtic blood, and many of the characteristics of the race are said to have appeared in Sheridan, especially in early life and during his West Point career. He graduated at West Point in 1853, and was sent to Texas, where he began his experience as a soldier in fighting the Apache Indians. Until 1861 he remained in the West. On the breaking out of the war he was assigned to various duties, principally clerical and in the quartermaster's department, until May 25, 1862. Then he took command of a regiment of cavalry, the Second Michigan, and at once began his brilliant record as one of the most daring commanders on the Northern side. His magnificent achievements at Winchester and elsewhere are matter of song and history.

In 1870–71 he was with the German armies, and witnessed many of the scenes of the Franco-Prussian war. He was often solicited to enter the field of politics, but persistently refused. In June, 1875, he married, and now leaves a wife and four children to mourn his loss. His quiet and retiring disposition serves only to make the memory of his actions in war the more enduring.

THE MECHANISM OF THE COUNTER ATTACK.

With the coming of quick-firing arms and more destructive engines of war, tacticians are looking with more favor upon the feasibility of the counter attack, especially where a small force is operating against a larger one, being, as one might say, upon the defensive, and in this humor, allowed by the enemy to choose its own battle ground. It will be remembered that the French, in the early days of the Franco-German war, occupying this latter position, invariably organized a counter attack and generally after the enemy's ranks had been terribly mangled by the play of the mitrailleuse. But the French, peculiarly fitted as they are for offensive rather than defensive operations, rarely followed up their advantages, and later on, the Germans, adopting the same tactics with better organization, kept a force in reserve to oppose the counter attack, which, had the French been less discouraged, would doubtless have proved tardy, if, indeed, at all availing. At least this is alleged in a recent paper of great interest by Major W. M. Smith, of the Royal Artillery. There is an extreme school of writers on the conduct of war with the new arms who insist that to occupy the "weak intervals" of the battle ground with anything beyond a mere "screen" or outpost line of infantry is a waste of strength needed elsewhere. The element in which lies the source of strength is, according to Major Smith, the extent of the fire-swept glacis in front of the position, and the intensity of the hail of iron and lead that can be poured over its surface. The enemy, he says, must be compelled to cross that zone, and to suffer the utmost penalty in doing so, and for this purpose the frontal fire of infantry must be a maximum in volume and in its lateral extent without a break or even a quaver. All military readers will recall Napoleon's famous plan for "piercing the center"—a system which now has fallen into disuse; the "pivot and interval" system rendering it abortive, though doubtless a Napoleon could still break the line with it, as Epaminondas used to shatter the strongest line with a steel-tipped wedge of warriors.

TORPEDO WARFARE IN PRACTICE AND THEORY.

Captain Greenfell, late of the Royal Navy, having large experience with and little confidence in the locomotive torpedo, recently gave his conclusions to the Royal United Service Institution, where were many with equal experience ready and able to confute his most serious charges. Captain Greenfell thinks the big gun, such as modern ships carry, far more effective than the torpedo, the former having a battering range of from three to four miles, and the torpedo an effective range of only 500 yards. As to accuracy, he says: "Captain Gallway (an authority) speaks of a torpedo as being extremely accurate which showed a mean error at 400 meters of 2·4, say 94 inches, laterally, the depth being always within a small decimal of that at which the torpedo was set to run. Any modern gun will do for comparison. I take the first which comes to hand—the 24 cm. 30 caliber long German gun. At a range of 2,000 meters (five times the other), its mean error is vertically 16 inches, horizontally 8 inches."

But Captain Greenfell admits it were impossible to train big guns on a moving torpedo boat, and with another big ship in sight, belonging to the enemy, the fight would be equal. But the torpedo boat is looked to to take a big ship at a disadvantage, and we quote his own authority. Captain Gallway says that machine guns, which are looked to to beat off torpedo