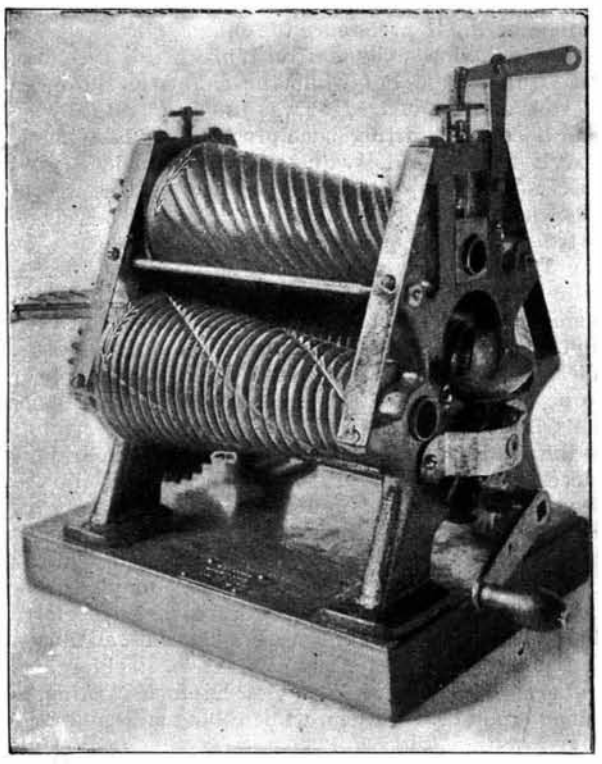
### SUCKOW'S MACHINE FOR SQUEEZING PUDDLERS' BALLS AND THE MANNESMANN SEAMLESS TUBE MACHINE.

*To the Editor of the Scientific American:*

Strange it is but nevertheless true that humble original inventors in about *one* instance out of a hundredreceive any credit or just compensation for years of their unproductive toil while alive, although they may witness in their declining years, with reduced strength and infirmities, the very invention at first sneered at brought forward and imitated successfully by



SUCKOW'S METAL SQUEEZING MACHINE.

other parties, of course under another name or names, without any redress, further than possible eulogy after their death. Numerous instances have appeared in your publications and elsewhere from time to time verifying this assertion, among them J. Crompton, the Englishman, originator of the spinning jenny; B. Thimonnier, the Frenchman, originator of the sewing machine; J. Ressel, originator of the screw propeller, etc., all of whom died poor and neglected. I inclose a photograph of the original working model of a machine of my invention, and one of which was purloined from me in 1882 on pretense of introduction after explaining further scope of the invention. I called it a "squeezer," and the invention with process you published with drawings and specifications complete, excepting the eleven claims, in the SCIENTIFIC AMERICAN SUPPLEMENT, June 30, 1877. In your issue of September 27, 1890, you also published and illustrated the so-called Mannesmann process for making seamless tubes from solid blocks of metal, with the portraits of the so-called inventors, as copied from *Uber Land und Meer*. Please compare my specification with the Mannesmann process. As an American, I feel anxious to know if this technical wonder, as some papers call it, and which now plays such an important part in the iron and steel industries, is in practical operation here, and if not, why not? And why do the Mannesmanns entirely ignore a civil communication in their own native language, forwarded to them a year ago? Further comment I don't deem necessary. ED. SUCKOW.

Jamestown, N. Y., October 10, 1893.

[A comparison of the Suckow with the Mannesmann machine certainly seems to indicate that the earlier American inventor came very near to the result by which fame and fortune were subsequently realized by the German inventors. Although the earlier patent was primarily for different purposes, and the machine was incapable without change of making the Mannesmann products, the earlier Suckow machine so strongly suggests the principal idea of the Mannesmann as in itself to afford a most probable answer to the question of our correspondent. Inventors who have become practically and financially successful do not look around for others who possibly anticipated them in their ideas but neglected or failed to improve their opportunities.—ED.]

FOR sticking glass labels on drawers, the best cement to use is a thick solution of shellac in benzole, in which gutta percha in the proportion of 1 in 12 has been dissolved.

### Microbes on Post Cards.

The latest scare in microbes has been started by Professor Uffelman, of Rostock, who infected a letter with cholera bacilli and put it into a post bag. When the letter was taken out, 23½ hours later, the bacilli were still alive. Bacilli were also found living on post cards twenty hours after infection. The micro-organisms were found to die rapidly when placed upon coins. A fly charged with cholera bacilli was afterward placed on some beef. A little later the meat was found to be swarming with bacteria. A finger was infected with cholera bacilli and dried. One hour later the finger was rubbed on some roast meat, and numerous bacilli developed subsequently. The moral of all these experiments is obvious.

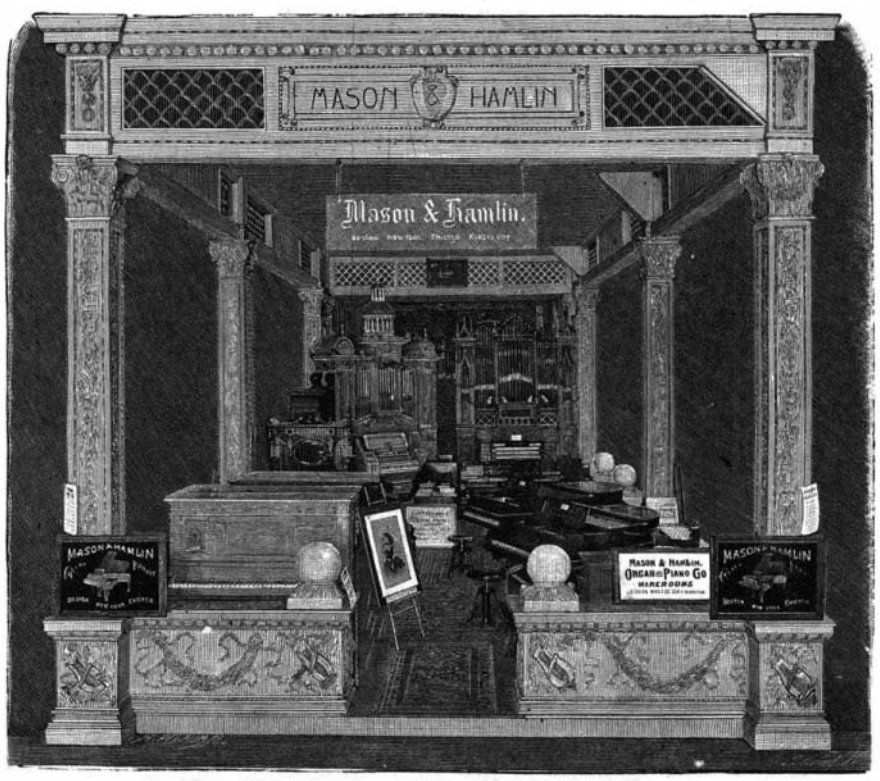
### PIANOS AND ORGANS AT THE FAIR.

Among the many exhibits of pianos and organs in the Manufactures and Liberal Arts building at the World's Fair, Chicago, there is none perhaps which at once attracts attention and holds the same more than that of the Mason & Hamlin Organ and Piano Company. The exhibit occupies a fine position just at the right of the main entrance to the musical section of the Liberal Arts building on the south side, and includes about twenty instruments in all. Here may be seen grand and upright pianos, the celebrated Liszt organs, and many styles of smaller organs. The *piece de resistance* is a two manual pedal base Liszt organ, with a highly decorated pipe top. This instrument is sold largely for churches, convents and lodges throughout the country. Although a reed organ, it is built on the plan of a pipe organ, the stops running throughout the registers. There is a full set of foot pedals, and altogether it is a most complete instrument. There is one of these instruments, also, in the Art Palace at Chicago. An interesting organ also is the India model, which is inclosed in a case of cedar, and in which there is no glue, the parts being riveted, so as to withstand the effects of the great heat and of dry climates.

Perhaps the most interesting feature of the exhibit is the piano plate, showing the now celebrated improved method of piano stringing invented and patented by Mason & Hamlin in 1882, and used exclusively by that company ever since. The strings of the piano by this system are held much more securely than in the piano as ordinarily constructed, and as a result the piano remains in tune much longer and is far more durable than in pianos in general. Among the upright pianos is one in dark mahogany, with Ionic upper pillars and the base in colonial style; another is in white and gold, with finely handpainted panels, finished by what is called the Daws enamel process, in Louis XIV. style. One of the handsomest uprights is the one in mahogany, with delicate handpainted satin wood panels. This is in marquetry style. There is a parlor grand in mahogany and the usual concert grand in its finest style. The parlor grand has hand carvings on antes and legs.

The little baby organ, which sells for $27, stands in the front, and as one man expresses it, is "perfectly able to speak for itself." The workmanship throughout the entire Mason & Hamlin exhibit is of the first grade.

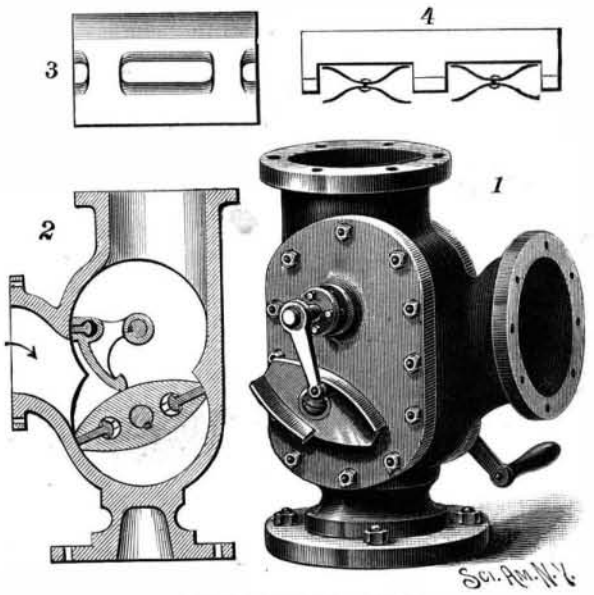
Mason & Hamlin have received highest awards at the Exposition on both pianos and organs; their patented and improved method of stringing received especial mention, it being declared by the judges that by virtue of their device the Mason & Hamlin pianos remain in tune much longer than other pianos.




THE WORLD'S COLUMBIAN EXPOSITION—EXHIBIT OF THE MASON & HAMLIN COMPANY.

### A DURABLE AND EFFICIENT PUMP.

The pump shown in the illustration is of comparatively inexpensive construction, and is designed to pump rapidly and work easily. It has been patented by Mr. Luigi Nasi, of No. 317 Bush Street, San Francisco, Cal. Fig. 1 represents a perspective view and Fig. 2 a vertical section, Fig. 3 a plan of the pump valve, and Fig. 4 one of the packing slides in the piston and valve. The inlet is at the side and the outlet at the top of the casing, and the driving shaft extends centrally through the lower of its two cylindrical chambers, the shaft having a hand driving crank, or a pulley for connection with other source of power. The piston is preferably ellipsoidal, as shown, although other forms may be employed, and at its ends are longitudinal slots which receive the packing slides. Centrally in the upper chamber is a shaft carrying a valve which extends forward toward the inlet, a curved wing of the valve, with thickened lower end, riding upon the piston. The main end portion of the valve is slotted and bored in the same way as the piston ends, to carry a similar packing slide. On the outer end of the shaft carrying the valve a crank with a handle may be used to start the pump when the water is first introduced; or the shaft may have at one end a crank carrying at its free end an inwardly extending stud to engage flanges on opposite sides and ends of




NASI'S ROTARY PUMP.

an ellipsoidal cam, shaped like the piston, and rigidly secured upon the piston shaft. In the latter case, when the piston strikes the valve wing and raises the valve, the flanges of the cam engage the stud of the crank and continue the movement of the valve. After the pump is started the crank may be removed and reliance placed on the back water pressure to hold the valve down in close contact with the piston, as after the pump is once filled it will work continuously without the valve-actuating mechanism.

### Whistling Fireworks.

One of the features at the Crystal Palace (London) fireworks display recently was whistling pieces, which in burning give a wild, screaming noise. There is some mystery about how this noise is produced. Messrs. Brock themselves are unable to say, and do not know anybody who can tell them. The firework consists of a stout paper tube 2½ inches in length, and with a bore of about ⅜ inch. About 2 inches of this little tube are stuffed with picrate of potash, leaving ½ inch or so empty. When lighted by means of a fuse it does not explode, but burns away with great violence, and with the uncanny shriek which gives the thing its interest. Pyrotechnists have tried many other compositions and many other kinds and forms of tubes, but picrate of potash is the only thing that will give anything but the faintest trace of a whistle.

### Pure Iron.

Professor Arnold, of the Sheffield Technical School, recently produced, with the aid of aluminum, a sound ingot and bar containing 99·81 per cent of pure iron. So far, no absolutely carbonless iron has been obtained commercially. An analysis of Professor Arnold's bar by Mr. R. A. Hadfield showed the following composition: Carbon, 0·07 per cent; silicon, 0·04 per cent; sulphur, 0·03 per cent; phosphorus, 0·015 per cent; iron, 99·81 per cent; total, 100·035 per cent. Its specific gravity was 7·863; limit of elasticity, 18 tons per square inch; breaking load, 23 tons per square inch; elongation, measured on 2 inches, 49·25 per cent; reduction of area, 69·60 per cent; fracture, silky

### Cold Forged Screws at the World's Fair.

The American Screw Company, of Providence, R. I., has three interesting exhibits at the World's Fair—in Machinery Hall annex, in Manufactures building, and in the Government building. The exhibit in Machinery Hall illustrates the new cold forging process employed in the manufacture of wood screws, drive screws, tire bolts, and any other kind of circular screw. This process was described and partially illustrated in the SCIENTIFIC AMERICAN, September 17, 1892. Two machines are shown in operation in this exhibit, the three-blow header and the threader, these being the only machines needed in this process. The wire used by this company is drawn with unusual accuracy, to the thousandth of an inch, even for large sized screws. The cold forged screw wastes no metal, except a very small quantity which is cut off the point of the screw blank. Wire is used three sizes smaller than the gauge of the finished screw. The three-blow header tapers the shank, forms the head, forges the slot in the head, points the blank, and cuts it off. The blanks are then taken to the threader, poured in the hopper, where, by an ingenious arrangement, they are placed in a row heads up, in an inclined runway leading between two dies, which shape the threads. These dies move horizontally in reverse action to each other and form the screw, raising the thread higher than the shank. One forward motion of the dies completes the screw, and the dies return idle. The screw is not cut at any stage and is much stronger than the ordinary cut screw, while by this process they are made much more rapidly. In a show case are exhibited four large screws, showing the form of the product at different stages of the development of the screw industry during the past fifty years, the cold forged screw easily carrying off the honors in the comparison by reason of its fine and very symmetrical appearance.

The exhibit in the Government building consists of nineteen models of screw machinery, from the oldest to the newest designs, covering cutting, heading, slotting, threading and cold forging. These models were loaned to the government by the American Screw Company. The history of the machines of which these models are shown is very interesting. The first inventor of prominence in the production of automatic screw machinery was Gen. Thomas W. Harvey, who devised a machine for shaping the heads of screw blanks. Gen. Harvey was followed by Cullen Whipple, Thomas J. Sloan, Charles D. Rogers, and others, and examples of their inventions may be found in this exhibit, also the machinery invented by the last named for cold forging. The screw machinery used in Enrope has been mainly of the Harvey and Sloan cutting type, cold forging machinery not being extensively employed there. The American Screw Company was formed by the union of the Eagle Screw Company and the New England Screw Company, both of Providence, R. I., in 1860, the Eagle Company having commenced operations in 1838, under the management of the late William G. Angell. In this country, at the present time, fifteen concerns manufacture wood screws and nearly one hundred different firms have undertaken this business since 1810.

The exhibit in the Manufactures building consists of two large upright cases, one of which contains a specimen of every kind of screw made by the company's cutting process and the other specimens of the cold forged product. Among the cold forged screws are the company's new fluted tire bolt and Rogers drive screws. The tire bolt has flutings on the shank, which hold it in place in the wood, and thus prevent it from slipping or working round and becoming loose. The flutings being straight, the bolt is easily driven out. The head of the bolt is materially strengthened by having the fluting terminate some distance from the head, leaving a plain shank. The Rogers drive screw has a thread with wide spirals, so that it can be easily driven with a hammer all the way, and the slot in the head does not extend entirely across the head, but has a shoulder on each side, so that it is not weakened by the hammer, while the slot is left perfect for the use of a screw-driver in withdrawing the screw.

Samples of these and other cold forged products are distributed by the company, as well as an illustrated circular, showing the different productions of the company. These samples will be forwarded on application, and all interested should address the company at Providence, R. I.

### The New India Rubber Tree in Madagascar.

The *Journal des Mines* states that the trade of the island of Madagascar in 1892 received a decided stimulus by the discovery of a new India rubber tree. The principal centers where this new product is treated are Farafangana, Vaugaindrano, Manaimbondro, Fort Dauphin, Andrahomby, and Cape St. Mary.

At first the new product realized from 3 to 6 piastres per 100 lb.; aided by competition, the purchase price very soon amounted to 10 and then to 15 piastres. More than 20 piastres per 100 lb. is now paid at Fort Dauphin.

The discovery of the new India rubber tree has come very fortunately to relieve the Madagascar market, which was at such a low ebb that the Tamatave houses were closing their agencies on the northeast coast and the Americans suppressed their Majunga houses.

This discovery is of very great importance; it almost constitutes a commercial revolution. The trade formerly carried on between Farafangana and Fort Dauphin was confined to a few products which were obtained only in small quantities. Merchants were almost completely disheartened and had abandoned the market to small traders.

Several of the latter possessed but a few hundred piastres at the end of from 15 to 20 years of hard work. At the present day they are all relatively rich, and it has only taken them a year to gain their thousands of piastres. At the time of the India rubber fever new houses were immediately established at Farafangana, Yangaindra, Manaimbondro, Andrahomby, Fort Dauphin, and also at Cape St. Mary, bringing goods and money.

The natives, receiving large sums in return for their products, took upon themselves to purchase imported goods to a very large extent. As long as the working of the new rubber tree lasts, this state of things will continue. The probable duration of this working is estimated at two years only.

### An English View of United States Warships and War Material.

An interesting article is given in a recent number of the *Engineer*, London, from which we make abstracts as follows:

After the close of the American war a long period might be expected to elapse before money would be voted freely for any purpose of war. Hence it followed that for about a quarter of a century the United States very properly rested, to an extent that would have been dangerous for any other nation, except, perhaps, Russia. At length came the time of awakening, which resulted in the masterly steps that have been taken during the last few years, both in the matter of ships and ordnance.

To begin with ships. Accepting the conclusions that had been arrived at by those powers who had been forced to push on continually, the United States authorities at once adopted types possessing the general features of such vessels as were most approved; for example, our Royal Sovereign class—that is, the 1889 design. Profiting by drawings giving all the necessary details, and even employing men who had been engaged in England in working out the designs, it was found feasible to spring, without a single false step or disappointment, to the very front, and to work forward so as to rival those who had offices and dockyards full of all that hardly-bought experience had furnished. We say it was feasible, but we do not say that it was by any means easy to command success in the striking way in which it has been achieved. The United States authorities are, then, to be congratulated—first, on the judgment that chose the line to be taken; and next, on the constructive ability and energy that was displayed exactly in the most profitable way. It naturally follows from what we have said, that any one would search in vain in the American fleet for such types as were developed in the twenty years following the close of the war in 1865. No mastless Thunderer or Dreadnought, no Inflexible or Italia, no masted Monarch or Duperre is to be found in the United States navy. In one tremendous stride, the United States constructors pass with hardly an intermediate step from the small coast defense Manhattan, with her 2,100 tons displacement and 19 ton smooth bore guns, to the modern ship with the powerful quick-fire armament and steel armor.

Any one taking up, say "Brassey's Annual" or "Lloyd's Register," will be struck, perhaps even considerably perplexed, by the fact that for a given displacement, America appears to have secured startling advantages compared with the European navies.

We will give a comparison between two cruisers. The English Blake of 9,000 tons was launched in 1890, and may be compared with the United States New York of 8,150 tons, launched in 1891, apparently to the great disadvantage of the former. The Blake has no side armor, being only "protected;" the New York has a 4 inch steel belt and 10 inches of armor on her turrets. The Blake carries two 22 ton 9·2 inch guns and ten 5 ton 6 inch guns; the New York, six 8 inch guns. The Blake has sixteen 3 pounder quick-fire guns, as compared with twelve 4 inch, eight 6 pounder, and four 1 pounder quick-fire guns as the secondary armament of the New York. Here, then, the superiority in the primary armament of the Blake is more than overbalanced by the New York's tremendous power quick-fire, as compared with the 3 pounder quick-fire guns of the Blake. Then, the Blake's speed is only given as 19·12 knots, while that of the New York is 20 knots. The Blake, it is true, is shown as having greater coal capacity, enabling her to steam at 10 knots for 15,000 miles, against the 13,500 shown for the New York. Nevertheless, to all appearances the American ship beats the English one hollow.

The character of the American warships may be briefly described as follows: They have been based on the best and most advanced models, they have been skillfully adapted to possess enormous powers of both attack and defense.

To the subjects of armor and guns, we find the same principles applied and with the same ability. The policy recommended by the board of officers who visited Europe in order to arrive at the system best suited to the conditions of the United States has been consistently carried out. That is to say, the manufacture of all war *materiel* has been taken in hand in the States on those European patterns and methods that appeared to be best. Solid steel armor was copied from Schneider, and in the case in which most notable success has been achieved, it has been made on his plan of hammering in preference to rolling. Gun steel was made in hollow cylinders on Whitworth's system of fluid compression, but while the aid of the European establishments referred to was invoked and fully acknowledged in starting, such progress has been made that it may be seriously questioned if Schneider could successfully compete with Bethlehem at the present moment. Certainly we know of no plate that has resisted successfully an attack equal to that defeated by the Bethlehem-Harveyed plate exhibited at Chicago, although Krupp exhibits a plate that has defeated a single blow of greater severity than those which fell on the Bethlehem plate. In our own country, Messrs. Vickers have, no doubt, produed plates which appear to be of the same excellence as those of Bethlehem. This, however, in no way invalidates our statement as to the lead taken by Bethlehem, for the remarkable success referred to was first achieved with the Harvey process at Bethlehem, and Europe has followed suit. To Schneider belongs the credit of introducing nickel into steel, but so well has this been carried out in the United States that at the present time it may be questioned if their examples of successful nickel-steel plates do not fully rival those of Europe. The most advanced and powerful plant for manufacture of steel forgings and armor, including the heaviest hammer existing, is to be found at Bethlehem, while rolling mills and still more extensive, though in some respect less powerful means of manufacture exist at Carnegie's works, near Pittsburg. The ability to which we refer has not been limited to success in processes of manufacture; it is seen in the system of control established by the government. It was decided from the first that private firms should be encouraged to develop resources on which the country could depend for the supply of elements or component parts of guns, while the government establishments should confine themselves strictly to the work of a gun factory—that is, to finishing and building up the elements supplied into finished guns. This has been successfully done so far as we are aware. We have heard of no accidents, no disappointments.

The 12 inch gun, shown as estimated for in the "Annual" of 1887, has a muzzle velocity of 2,100 feet per second, and an energy of 25,984 foot tons. The actual 12 inch gun given in the "Annual" for 1893 has the same, except that incidentally one foot ton more energy is shown. For armor a system of examination and testing has been organized, which we believe to be more thorough than any carried out elsewhere. As yet, probably all nations stand in somewhat the same position. Supplies of thin plates have been well tested, while thicker ones have been found more difficult to deal with. In the United States the delivery of plates of 17 inches is only commencing, but it is commencing under a very searching and complete system of examination and tests. There may, doubtless, be faults and weak points in connection with the supply of guns and armor, but we have not discovered them. There certainly is much to commend; nor is it to be wondered at. The conditions are singularly favorable. The United States is a great power, with unlimited resources. She is free from the pressure of the haste which is engendered by the danger of delay. She has men of notable inventive powers, coupled with the discernment to seize and apply anything good that already exists, with access to the results of experience acquired by other nations, and she has as much money as may be wished for. It is difficult to conceive circumstances more promising. Surely, if success does not follow, it could only be owing to gross corruption, or flagrant neglect or perversity. Corruption has, we know, been often found in America, as elsewhere; but we think that our readers will bear us out in the statement that the history of the United States national expenditure for defense has been remarkably free from records of its influence.

### Horse Power of a Whale.

An interesting study of the horse power of the whale has been made by the eminent anatomist, Sir William Turner, of the University of Edinburgh, Scotland, in conjunction with Mr. John Henderson, the equally eminent Glasgow shipbuilder. The size and dimensions of a great whale stranded several years ago on the shore at Longriddy furnished the necessary data for a computation of the power necessary to propel it at the rate of 12 miles an hour. This whale measured 80 feet in length, 20 feet across the flanges of the tail, and weighed 74 tons. It was calculated that 145 horse power was necessary to attain the speed mentioned.