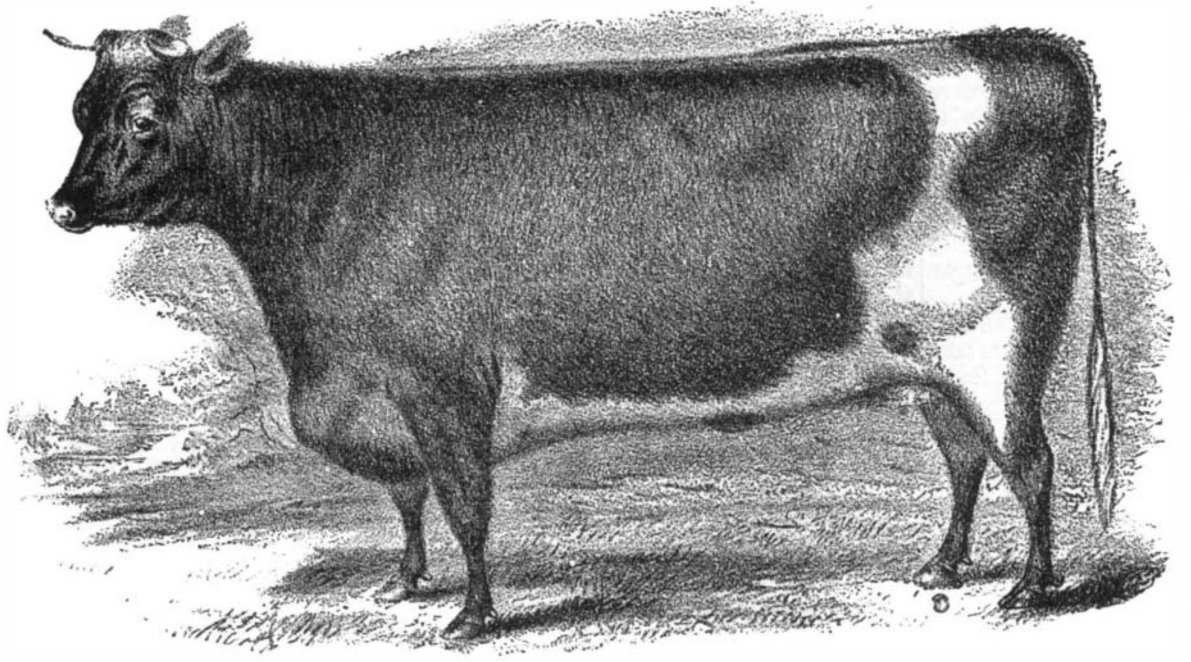
A FORTY THOUSAND DOLLAR COW.

We doubt if more extravagant sums have ever been paid for fancy cattle than those lavished during a recent sale of the herd of the Hon. Samuel Campbell, at New York Mills, near Utica, N. Y., as reported on page 201 of our current volume. Representatives of the most prominent short horn breeders in the world were present, including a large delegation of English cattle stock buyers, consisting of lords and other titled persons.

The breeds which brought the largest sums were Duchesses and Oxfords; and the first animal sold, known as the 2d Duke of Oneida, a three year old bull, brought $12,000. The cow represented in our engraving, known as 1st Duchess of Oneida, was next offered, and, after an extraordinarily exciting contest, was knocked down to Lord Skelmersdale, of England, for $30,600. Subsequently other cattle of the same strain followed at $19,000 and $35,000, and the interest culminated with the sale of the 8th Duchess of Geneva, the dam of the animal in our engraving, which was bought by Mr. R. Pavin Davis, of Gloucestershire, England, for the unprecedented sum of $40,600.



THE CELEBRATED COW, FIRST DUCHESS OF ONEIDA.

The *Live Stock, Farm, and Fireside Journal*, to which we are indebted for our illustration, says that there were, in all, one hundred and eleven animals presented, and that the amount realized was $380,890. The Duchess herd was originally from England, imported in 1853, and has been since kept in perfect purity in Duchess county, N. Y.

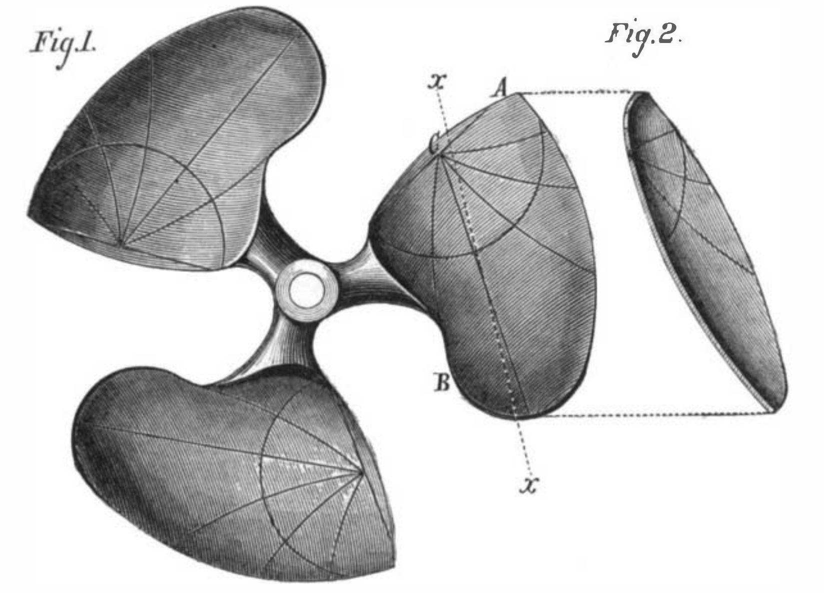
HELICOIDAL CONCAVO-CONVEX PROPELLER.

The primary object sought in the construction of the propeller to which our engraving refers is so to form the blades as to impart to the water in which they turn a longitudinal motion in a direction coincident or parallel with the axis of the screw, while, at the same time, avoiding all lateral or tangential motion. To this end the blades are constructed of concavo-convex form, to give them greater efficiency, and are combined with a helicoidal curvature, thus obtaining, in addition to advantages otherwise gained, the propelling power and easy rotation of the helicoidal bladed screw.

Fig. 1 is an elevation of the working face of the propeller, and Fig. 2 a section of one of the blades on the line, *x x*. A is the front or cutting edge of the blade, and B the back edge, considered in respect to its forward rotation.

Located near the cutting edge, at C, is the center of concavity, or point from which the surface has a curvature of equal pitch or radius in each direction, inward, outward, or rearward, as indicated by the radial lines shown. It is claimed that, by thus placing the point, C, pressure is prevented from being produced at the back of the blade either by the rotary movement of the screw or by the forward motion of the vessel through the water. The blades are perfectly connected to the hub by short arms, as represented, and may be two, three, or four in number, and cast in as many pieces as desired.

Fig. 1. Fig. 2.



HELICOIDAL CONCAVO-CONVEX PROPELLER, OR EAGLE WING.

The inventor informs us that his theory, claimed as true, has been fully demonstrated by practice. A 30 inch wheel was recently constructed at the United States navy yard, Washington, D. C., and tried on a steam launch; the usual, and best formed, helicoidal four bladed wheel used on the launch was of the same diameter, 30 inches. The pitch of the Eagle Wing was made as nearly as possible the same as the helicoidal, namely, 54°. The Eagle Wing had but three blades. Several experimental trial runs were made, placing the two wheels alternately on the same shaft, and, as nearly as possible, regulating the steam pressure so as to be alike for each trip. The fairest specimen of the trials was a pair of trips from the navy yard ship house to Fort Washington and back. A low pressure of 60 lbs. of steam, as nearly as possible, was carried.

The following are the data of the trial: Helicoidal: Average steam 60·35 lbs.; number of revolutions, 41,920; time occupied, 2h. 54½m. Eagle Wing (or helicoidal concavo-convex): Average steam, 59·7 lbs; number of revolutions, 32,660; time occupied, 2h. 46m. Differences in favor of Eagle Wing: Revolutions, 9,260; time, 8½ minutes.

A trial run from the same starting point to Alexandria lighthouse and back (something over half the former distance), at a pressure of 80 lbs. of steam, resulted as follows:

Helicoidal: Revolutions, 25,130; time, 1h. 30m. Eagle Wing: Revolutions, 21,200; time, 1h. 23½m. Difference in favor of Eagle Wing: Revolutions, 3,930; time, 6½ minutes.

A higher pressure of steam revealed a gain in difference of time in favor of the Eagle Wing, but a proportionate loss in difference of revolutions. This, it is thought, proves the fact that, for rapid revolutions of wheel, the concavo-convexity of the Eagle Wing should be reduced and, possibly, its pitch of blade lessened.

A form and pitch of blade proper for, say, 200 revolutions per minute, if revolved 250 or 300 per minute, instead of throwing the water back coincidently with the line of the vessel's motion goes further, and throws it across the line.

In the trial tests referred to, it was especially noted that a quick and increased power was exerted by the rudder under the force of the Eagle Wing, the compacted water being thrown directly on the rudder.

In summing up results under the trials made, from 22 to 27 per cent of superior efficiency is claimed for the Eagle Wing, and advantage thereof may be taken either in a speed equal to the best average with much less fuel; or, if the usual amount of fuel be used, a highly increased speed of vessel may be obtained.

The mechanical principles involved in the device are embraced by two patents, respectively dated January 21 and August 26, 1873. Further particulars may be obtained by addressing the inventor, Mr. N. A. Patterson, Cleveland, Bradley county, Tenn.; or for the next ten days he may be consulted personally at the Astor House, New York. We understand that a prominent firm in this city is now making arrangements for a complete practical trial of this propeller.

Telegraphing Maps and Plans.

A very ingenious invention has recently been exhibited by M. Dupuy de Lome, at the French Academy of Sciences. It consists in a mode of sending a plan or topographical sketch by telegraph, without necessitating a special drawing for the purpose. Over the map already made is laid a semicircular plate of glass, the circumference of which is graduated. At the center is an alidade, also graduated, which carries, on a slide, a piece of mica marked with a blade point. The latter, by its own movement along the alidade, and also by that of the alidade itself, can be brought over every point in the glass semicircle. Just before the plate is a fixed eye piece. Looking through this, the black dot is carried successively over all the points of the plan to be reproduced and the polar coördinates of each noted. The numbers thus obtained are transmitted by telegraph. The receiving device is analogous to that just described, but a simple point is substituted for the mica dot, and by it the designated positions on the glass are successively marked.

The Siemens Steel Furnace as Described by the Inventor.

In the course of a recent lecture at Bradford, Eng., by Dr. C. W. Siemens, he gave the following description of his celebrated furnace for melting steel:

Taking the specific heat of iron at ·114, and the welding heat at 2,700°, Fah., it would require ·114 × 2700 = 307 heat units to heat 1 lb. of iron. A pound of pure carbon develops 14,500 heat units, a pound of common coal 12,000, and therefore 1 tun of coal should bring 39 tuns of iron up to the welding point. In an ordinary reheating furnace a tun of coal heats only 1⅔ tuns of iron, and therefore produces only one twenty-third part of the maximum theoretical effect. In melting 1 tun of steel in pots 2½ tuns of coke are consumed, and taking the melting point of steel at 3,600° Fah., the specific heat at ·119, it takes ·119 by 3,600 = 428 heat units to melt a pound of steel; and taking the heat producing power of common coke also at 12,000 units, 1 tun of coke ought to be able to melt 28 tuns of steel. The Sheffield pot steel melting furnace therefore only utilizes one seventieth part of the theoretical heat developed in the combustion. Here, therefore, is a very wide margin for improvement, to which I have specially devoted my attention for many years and not without the attainment of useful results.

Without troubling you with an account of the gradual improvements, I will describe to you shortly the furnace which I now employ for melting steel. This consists of a furnace bed made of very refractory material, such as pure silica sand and silica or Dinas brick, under which four regenerators or chambers filled with checkerwork of brick are arranged in such a manner that a current of combustible gas passes upward through one of these regenerators while a current of air passes upward through the adjoining regenerator, in order to meet in combustion at the entrance into the furnace chamber. The products of combustion, instead of passing directly to the chimney as in an ordinary furnace, are directed downwards through the two other regenerators on their way towards the chimney, where they part with their heat to the checkerwork in such a manner that the highest degree of heat is imparted to the upper layers, and that the gaseous products reach the chimney comparatively cool (about 300° Fah.). After going on in this way for half an hour, the currents are reversed by means of suitable reversing valves, and the cold air and combustible gas now enter the furnace chamber, after having taken up heat from the regenerator in the reverse order in which it was deposited, reaching the furnace therefore nearly at the temperature at which the gases of combustion left the same. A great reversion of temperature within the regenerative chambers is the result, and the two first mentioned regenerators are heated to a higher degree than the latter. It is easy to conceive that in this way heat may be accumulated within the chamber to an apparently unlimited extent, and with a minimum of chimney draft. Practically the limit is reached at the point where the materials composing the chamber begin to melt, whereas a theoretical limit also exists in the fact that combustion ceases at a point which has been laid down by St. Clair Deville at 4,500° Fah., and which has been called by him the point of dissociation. At this point hydrogen might be mixed with oxygen, and yet the two would not combine, showing that combustion really only takes place between the limits of temperature of about 600° and 4,500° Fah. To return to our regenerative gas furnace. It is evident that there must be economy where, within ordinary limits, any degree of heat can be obtained, while the products of combustion pass in the chimney only 300° hot. Practically a tun of steel is melted in this furnace with 12 cwt. of small coal consumed in the gas producer, which latter may be placed at any reasonable distance from the furnace, and consists of a brick chamber containing several tuns of fuel in a state of slow disintegration. In large works a considerable number of these gas producers are connected by tubes or flues with a number of furnaces.

The Devil Fish.

T. L. P. writes to say that the Italian fishermen of San Francisco, who travel about the Farallon Islands and down the coast, not infrequently take devil fish from eight to ten feet across, and he has heard of one being taken of which the extended arms measured twelve feet. "Some months ago, I saw one (hanging at a door) which measured at least nine feet from tip to tip of the tentacles. I believe that the Italians here eat parts of these repulsive looking creatures, and call them quite good."