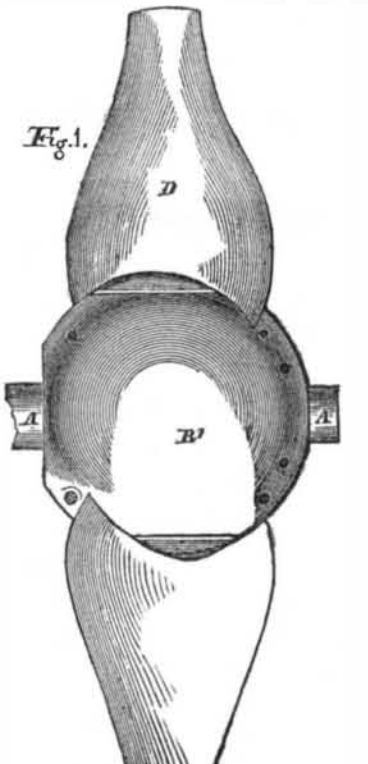
Science and Art.

Adjustable Screw Propeller.

The proper proportions of a screw to serve in propelling a vessel through the water, has long been a subject of investigation, and one which is yet not fully settled. There are so many variable circumstances involved, that it is almost impossible to determine beforehand, precisely the best form for any given vessel. Some of the earliest experimenters in propulsion employed screws of considerable length, so that the threads made one or more complete revolutions. Curious inventions are now continually springing up, in which similar screws are represented; but the first careful experiments on the subject sufficed to show that the resistance due to the friction of the water on such extended surfaces, involved a greater loss of power than could be gained from the increased length. By gradually cutting down, it has been proved that something less than one complete revolution is the best area of screw-blade, and that if this area is divided into two or more threads, and the length of the screw consequently diminished in the same proportion, the efficiency of the instrument is still more increased. Beyond this, there are numerous delicate questions involved, with regard to the exact form of the blades, a radial increasing pitch, a fore-and-aft increasing pitch, the parabolic curve, the boomerang, the utility of lips or flanges on the outer or inner edges of the wide part of the blade, the proper construction of the hub and of the arms connecting the broad blades therewith, and a host of other details, all very important, but not essential to the understanding of the invention under consideration.

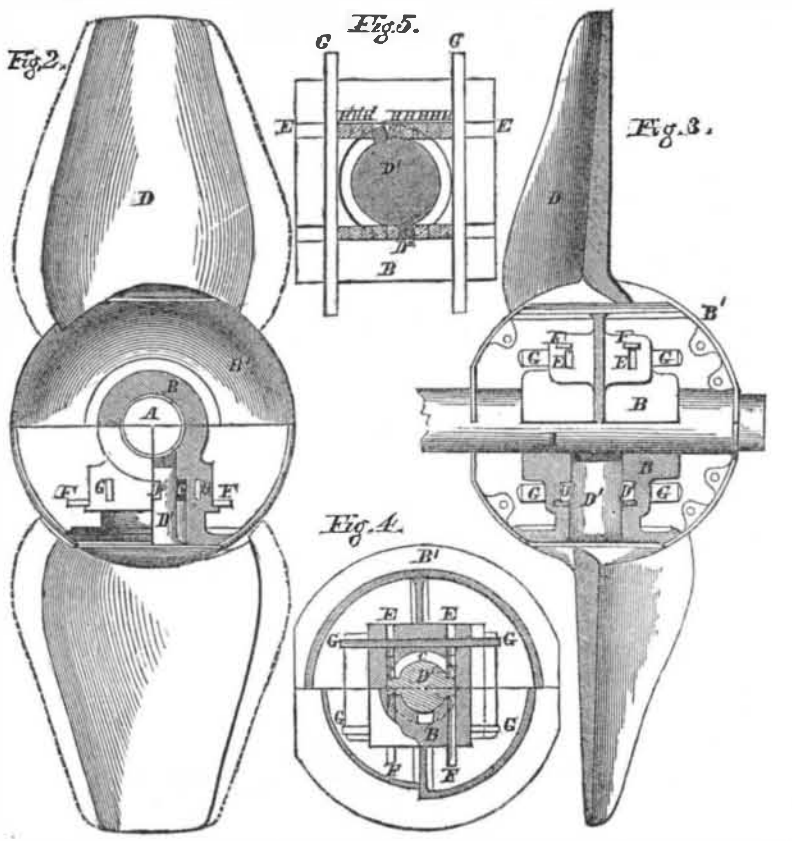
The "pitch" of a screw propeller, like the



pitch of any ordinary screw, means simply the length of screw in which a full revolution of a thread would be completed, were it sufficiently long. As intimated above, the absolutely best proportion is rarely attained except by accident, and it is consequently of great advantage to secure the means of varying the pitch of a propelling screw, at pleasure. The design of the invention under consideration is to enable the pitch to be varied at pleasure, within certain limits, and also to render easy and perfectly practicable, a substitution of a new blade in place of a broken or defective one.

The Griffith propeller is an English invention, and has been several years in use, on a number of large British vessels. It has but recently been patented in the United States, but has been applied on several of the most successful modern screw ships, among which may be instanced the screw frigates *Niagara* and *Merrimac*. The invention is generally applied in the form of a two-bladed screw but three or four blades can be applied in this manner if desired. The appearance is quite novel. Fig. 1 is a side elevation. Figs. 2, 3, 4, and 5, are views, all more or less sectional. The drawings are all on the same scale, except Fig. 5, which shows the extreme central portion on a considerably larger scale. The hub, it will be observed, is a compound construction, enclosed in a spherical casing. The blades, contrary to the general practice, are widest at their inner ends, analagous, in that respect, somewhat, to the wings of birds. A represents the main screw shafting, projecting through a tight stuffing box in the stern of the vessel. B′ represents the exterior shell of the hub, and D the adjustable blades. The inner ends of D are finished with cylindrical tenons D′, which are inserted into corresponding cavities in the interior casting B. On opposite sides of the cylindrical tenon D′, are projections D″ D″. To provide a passage for these when D′ is inserted into the hub B, two grooves are provided in the side of the cavity. It is thus easy to attach any

GRIFFITH'S ADJUSTABLE PROPELLER.



blade D to the hub by turning it into such position that the projections D″, on its cylindrical portion D′ shall correspond with the grooves in the opposite sides of the cylindrical cavity in the solid hub, into which it is to be inserted. To allow the blade to be revolved after it is fairly in its place, an annular space or ring of sufficient size is turned out. It is now easy to see that the blade can be inserted only when held in one position; but after it is fairly in its place in the hub, it can be readily turned into any position desired.

By turning the blades in the manner thus provided for, any desired inclination or pitch of the screw can be obtained. When they have been adjusted in the desired position, they are held in place by keys and small blocks of metal, arranged in the manner we will now endeavor to describe. There are two sets of keys, F, G,; the keys F pass over the lugs D″, and serve to hold them in, or rather to prevent the blade D from working or rattling radially, as it revolves. They tend to draw the blade D tightly *into* the hub B, and the blade D is therefore tightly confined, the keys F tending to urge it further in toward the shaft A, while the broad collars represented, support this pressure, and by their friction tend, without further assistance, very strongly to prevent any possible movement of D in any direction.

But as a means of insuring that the blades shall retain precisely the pitch desired, suitable channels, E, are provided, in which pitching pieces or simple blocks of metal, H H′, are inserted from each side, and caused to bear against the lugs or projections D². The keys G are then driven tightly through seats provided as represented; and these keys and pitch pieces, independent of any aid from F firmly retain the blades in the pitch desired. Thus, if the blade tends, by any violent contact with a log or lump of ice, to be twisted around in its socket in one direction, the pitch pieces H receive the pressure, and if in the other direction, the pitch pieces H′ are similarly affected; but in either case, no motion of the blade can possibly ensue.

The shell B′ is made in two parts, and secured together by bolts. Its whole objects are to protect the keys and other work in the interior from violence, and to make a smooth surface for the action of the water. It is contended, and with some reason, that the volume of the spherical mass, B′, is an advantage rather than a detriment to the efficiency of the propeller. Without discussing the question, we may observe that it is found, practically, to present little or no difficulties, and that the propeller, as a whole, is a very desirable one for large vessels. For use in sea water it is constructed of brass, as iron would probably oxydize, and the parts consequently stick fast. Constructed as represented, of suitable metals, the pitch is readily adjusted whenever the ship is docked, or when, as can be done with most of the two-bladed screws, the whole has been disconnected from the shaft, and lifted through a suitable aperture in the stern. In short, whenever, by any ordinary means, the hub of the screw becomes accessible, the shell, B,′ is readily removed, and the blades adjusted in any position desired, within the limits required in practice. In case a blade of an ordinary propeller becomes broken, the whole is rendered nearly or quite useless, and either a spare propeller must be carried, or the voyage must be completed very slowly, and at great risk of sinking the vessel from the destruction of the stuffing box due to the unequal balance of the propeller. With the Griffith screw, on the contrary, it is simply necessary first to find, by trial, exactly the pitch with which the ship can be moved the fastest, with the least expenditure of fuel, and subsequently, if a blade breaks, or otherwise fails, to remove the shell, B′ from the hub, take out the keys and pitching pieces, remove the defective blade, and insert another in the same position.

The inventor of this important auxiliary to modern screw propulsion is Robert Griffiths, of London, England. It was secured by letters patent of the United States on April 7, 1857. Further information may be obtained by addressing C. W. Copeland, Esq., No. 64 Broadway, this city.

Not an ear of indian corn grows in "Ould Ireland," and yet Wm. Watt, of Belfast—as will be found on our claim page—gives us a *hoist* in making starch from this cereal.

The Power of Wind.

The air which we breathe is so light that one hundred cubic inches only weigh thirty-one grains, yet when driven at an immense velocity, it exerts a power which sweeps large ships to the bottom of the ocean, and levels forests and strong buildings with the dust. A wonderful demonstration of its power took place in Southern Illinois, at the village of Pena, on the 14th ult. A tornado, accompanied with hail and rain, destroyed a number of buildings—dashing them to pieces. It lifted up a large frame church entire, carrying it several feet distant, and it took a up a train of freight cars from the railroad track and shivered them to pieces. Several persons were also thrown high in the air, some of whom were killed.

Some theorizing philosophers have endeavored to prove that if a comet were to strike the earth it could do but little injury, owing to the attenuated nature of its matter. But the electric fluid is so light that the most refined experiments have not yet been able to discover whether it has weight or not, and yet its destructive power is terrific. The velocities with which bodies move is an indication of their force, and comets move with fearful speed—a velocity, in comparison with which, the speed of the tornado of wind that committed such devastation in Illinois is as the cricket ball to the musket bullet.

Lead Mines in Newfoundland.

At St. John's, in the above island, quite an excitement has broken out about minerals, in consequence of the large quantity of lead being got out of a mine near Placencia Bay, belonging to the New York, Newfoundland and London Telegraph Company.