

SADLIER'S NEW METHOD OF RAISING AND LOWERING SCREW PROPELLERS.

Captain J. W. Sadlier, of the State Line steamship "State of Indiana," has recently invented a new mode of raising and lowering propellers while the same are on the shaft, the object being to adjust the screw to such a depth as may, under different circumstances, be necessary to prevent its being affected by the pitching or draught of the ship. The racing of the screw during stormy weather, or when the vessel is lightly loaded, is one of the inherent evils of screw propulsion, and one to the remedying of which more attention might profitably be bestowed. It can readily be apprehended that the alternate lifting and immersion of the screw while in motion throw sudden strains, often of severe character, upon the engine, while racking the vessel herself; and that constant care and watchfulness are necessary to prevent injury to the machinery. Captain Sadlier's invention affords a means of placing the screw at any depth desired, and instead of having a rudder post supported only from above and located in rear of the screw, as otherwise would be necessary, he abolishes rudder post altogether, and hinges two rudders, B, one on each side of the dead-wood just forward of the stern post. It may be said, however, that, according to this plan, there is really no dead-wood, as all that region abaft the bulkhead, A, is occupied by an iron frame, through openings in the keel extension of which the water is free to enter and emerge at the after side apertures, as indicated by the arrows in the vertical sectional and plan views herewith given. Water pressure on both sides of the rudders is thus balanced. The rudder posts extend up to the spar deck, where they terminate in cog wheels, C, by means of which motion is imparted to them by the simple positive steering gear shown in Fig. 3. The rear portion of the screw shaft passes through a ball-and-socket water-tight joint in bulkhead, A, and is attached to the main shaft by a universal joint.

There are two iron stern posts, having a deep groove on their inner sides. In this groove moves a block, and in this block are nuts for the reception of the heavy vertical screws, D. These screws extend up on deck, and are rotated by hand gear, E, so that in this way the block is caused to travel up and down. The block receives the long bush-bearing block, F, which is pivoted therein, and through which the screw shaft passes.

When twin screws are fitted on this system, the ordinary arrangement of central rudder would be employed, and two double-cased vertical radial chambers could be fitted, one under each quarter, for the shafts of the port and starboard screws. The propellers would be in advance of the center stern post, so that the rudder could be put hard a-port or a-starboard without interfering with the action of either screw. In this case either or both of the propellers, separately or simultaneously, would be raised or lowered by similar gearing, as in the case of the single screw.

One advantage which Captain Sadlier anticipates from this invention is that it will admit of much more beam and much less draught of water than in the case of vessels constructed on the ordinary stationary propeller and single rudder plan. He also considers that steamers built with these improvements will possess greater strength, and be safer and better sea boats by reason of these superior properties; and that the carrying capacity will be increased without a corresponding increase in the cost of the construction. In case of an accident to the machinery at sea, rendering steam as a motive power impracticable, the propeller could be raised out of the water, and the vessel could proceed much more expeditiously under sail.

With these improvements it is also pointed out that all necessary repairs connected with the propeller could be made either at sea or in port, without sending the vessel into dock; that the damage which not infrequently results from hawsers fouling the propeller shaft in port or elsewhere would be avoided; and that steamers could be constructed so as to admit of their being shifted without ballast.

New Oil Discoveries.

Some excitement has been created in oil circles by the discovery at Sparta, a small city thirty miles north of Oil City, Pa., of an oil-producing sand only twelve feet below the surface. A farmer, while digging a well for water under his barn, found the sand and well immediately filled up with oil of a lubricating variety. New oil property has been discovered on the line of the Philadelphia and Erie Railroad which will add to the prosperity of that road if the discoveries are successfully worked up. Already a ten barrel pumping well has been struck at Stoneham Station, a point five miles east of Warren, and one pumping five barrels at a point five miles northeast of Wilcox. Both of these wells are in new districts, and the discovery will, no doubt, lead to further search.

ASTRONOMICAL NOTES.

BY BERLIN H. WRIGHT.

PENN YAN, N. Y., Saturday, February 23, 1878.

The following calculations are adapted to the latitude of New York city, and are expressed in true or clock time, being for the date given in the caption when not otherwise stated.

PLANETS.

Mercury rises.....	H.M.	Saturn sets.....	H.M.
Venus rises.....	6 05 mo.	Uranus in meridian.....	6 56 eve.
Mars sets.....	5 56 mo.	Neptune sets.....	11 43 eve.
Jupiter rises.....	11 36 eve.		10 40 eve.
	4 57 mo.		

FIRST MAGNITUDE STARS.

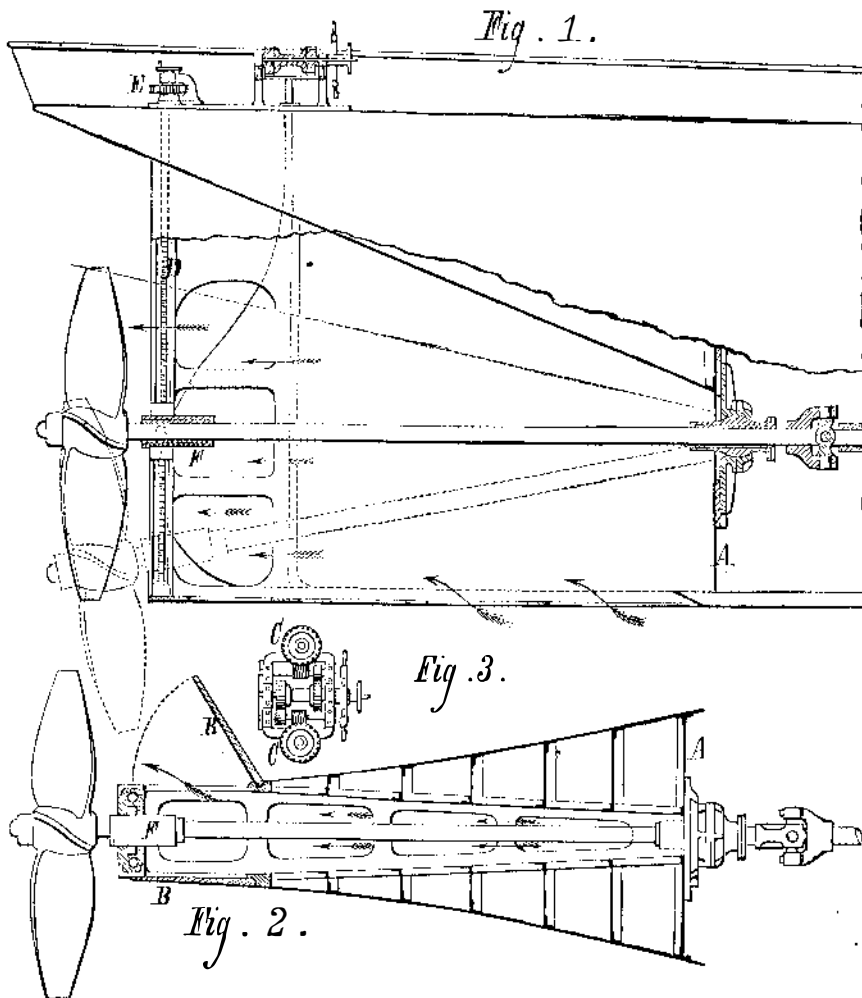
Antares rises.....	H.M.	Sirius in meridian.....	H.M.
Regulus rises.....	1 50 mo.	Procyon in meridian.....	8 25 eve.
Spica rises.....	5 03 eve.	Aldebaran in meridian.....	9 18 eve.
Arcturus rises.....	9 39 eve.	Algol(2-4th mg.var.)in mer.....	6 14 eve.
Altair rises.....	8 43 eve.	Capella in meridian.....	4 46 eve.
Vega sets.....	3 08 mo.	7 stars (cluster) in meridian.....	6 53 eve.
Alpharatz sets.....	5 12 eve.	Betelgeuse in meridian.....	5 26 eve.
Fomal autsets.....	9 38 eve.	Rigel in meridian.....	7 34 eve.
	4 36 eve.		6 54 eve.

REMARKS.

Mercury and Venus are practically invisible, the former rising only 39m. and the latter 48m. before the sun. Mercury is approaching his superior conjunction, and Venus was at her inferior conjunction February 20, and is now, therefore, morning star, remaining such until December 5, the date of her superior conjunction. Jupiter is still so near the sun that the eclipses, etc., of his moons cannot well be seen. Saturn's rings are still invisible. Uranus is bright-

Curious Telephone Experiments.

The first magnets were about the size usually now employed, 1/4 inch in diameter, and about eight times as long. Ferrotypes plates were first used, but these are by no means necessary. Removing these plates, I tried necessarily a number of substances; first, thin tin plate answered perfectly, both for sending and receiving. Sheet iron, about 1-50 inch thick, does not act so well, but all that is said is perfectly understood. While experimenting with these the plates were merely laid on the top of the instrument without being fixed in any way; the topmost wood part with the conical cavity was also discarded, as both transmitting and receiving went on equally well without it. This part of the instrument seems superfluous, as the sound, when the bare plate is pressed flat against the ear, seems louder from the greater proximity. Now, iron plates do not appear to be absolutely necessary, although iron acts better than anything; yet diamagnetic substances act very well. Desiring my assistant, who was some distance off and beyond reach by direct sound in any way, to continue counting for some time, I removed the iron plate and laid across the instrument a broad bar of iron 1/4 inch thick. Placing my ear against it I heard every number distinctly, but somewhat enfeebled. A square piece of brass, 3/8 inch, was placed in position; the sound, although distinct, was not so strong as the last. Next, thick pieces of lead, zinc, and steel were tried. The steel acted about the same as the thick iron, and as in the other cases every word spoken was feebly but distinctly heard. Now, some of these are diamagnetic metals, and yet the action goes on. Non-metallic substances were now tried—first, a piece of window glass; this acted very well indeed. With wood—a piece of matchbox—the action was feeble, but on placing other pieces of gradually increasing thickness the sound gradually increased, and with a rough piece of wood 1 1/4 inch thick the sound was perfectly distinct. I next placed an empty wood box in position; this acted very well. A square piece of cork 1/4 inch thick acted, but rather feebly. A block of Turkey stone 2 inches thick was placed upon the instrument, and with this against the ear the speaker could be followed easily. I now tried without anything at all intervening, and placed my ear close on the magnet and coil, and now, most curious of all, without any plate to vibrate I could hear feebly, and by listening attentively I could understand all that was said. This was repeated many times; mechanical transmission of sound was impossible, as many yards of wire lay coiled upon the ground, and yet without anything (but air) intervening between my ear and the end of the magnet I could understand what was said. Now, all these experiments were one way—the sounds were received. The sounds transmitted (or attempted) acted rather differently. A tuning fork, struck and placed on the thin iron plate or on the woodwork, was heard clearly; for speech, the thin iron plates acted best. With the other substances, the stone, thick wood, glass, zinc, etc., the sound of the fork was heard by it either resting on them or by holding the vibrating prong over them. These thick substances did not answer for the sound of the voice. All these substances were now put aside, and the vibrating prong held directly over the pole of the magnet; this sound was clearly heard, although nothing intervened but air between the vibrating fork and the end of the magnet. The intensity of the sound was not nearly so great by resting the fork directly on the pole as when the vibrating fork was held over the end of the magnet. I next tried if my voice could be heard with this arrangement. The result was rather doubtful, but I think some action must have taken place, for the fork was heard by merely vibrating in the vicinity of the pole, and the effect produced by the voice must have differed only in degree, and was too feeble to be heard at the other end. I have repeated and made quite sure of these results, and have succeeded in transmitting sound very distinctly without a plate over the pole, and have in return distinctly heard all that was said by placing my ear against the instrument—also without any plate whatever. It would seem that to affect the magnet so as to produce induced currents something in the first instance must vibrate in some way, possessed of more *vis viva* than a gas, and it does not seem necessary that the substance be paramagnetic, for diamagnetic bodies act very well.—B. W. Warwick, in *English Mechanic*.



RAISING AND LOWERING SCREWS.

est February 16, and as this number reaches its readers before that date, it may be well to state that at that time Uranus may be seen 3m. west and 34m. north of Regulus, passing the meridian 2m. 20s. before the star. His position varies but little from that for this date also. To-morrow morning (February 24) the star Scorpii (3.5 mag.), situated about 2° southeast of Antares, is occulted by the moon, the star apparently passing behind the moon's southern limb. The event will be visible between the parallels of 28° and 62° north latitude. The immersion takes place at 5h. 43m. morning; emersion, 6h. 30m. morning, Washington mean time; duration 47m.

Sound Waves made Visible.

Mr. Sedly Taylor communicates to the Physical Society a process for making sound waves visible to the eye. A hole cut in a piece of cardboard is filled with a film of soap in glycerin, just thick enough to produce bands of color. This card is fastened to a tuning fork, which is thrown into vibration by a violin bow, when the colored film is immediately thrown into vibration, and vortex rings and square bands of color are produced on the screen.

To Kill Lice on Cattle.

A correspondent advises the same method for killing lice on cattle that is employed by florists for exterminating bugs that infect plants, to wit: Cover the animal with a blanket pinned close round the nose, and smoke thoroughly with tobacco. It will destroy the lice, without the bad effects following the wetting with decoctions or the use of grease; a second smoking is seldom necessary.

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Electrostriction.—A Curious Effect produced upon the Thermometer.

Professor Young proposes to the Royal Society to give the name of "Electrostriction" to a peculiar action of the mercury of a thermometer. If the bulk be chemically coated with silver, and then by the electrotype process covered with the same metal, the mercury will traverse some portions of the scale, and finally take up a definite position independently of temperature. Copper, silver, iron, and nickel constrict the bulk, while zinc and cadmium distend it.