THE PRENTISS CALENDAR AND TIME SYSTEM.

The accompanying illustration represents some recent improvements in calendar clocks introduced by the Prentiss Calendar and Time Company, of No. 49 Dey Street, New York City. A device is employed, called the equalizer, which enables the clock to keep the finest regulated time, and renders it practically a mechanical self-winder.

The equalizer is a very simple device for equalizing the power supplied to the train, insuring the most favorable conditions for maintaining a constant rate, and almost entirely eliminating the friction, the Prentiss clock having a Graham escapement, without the increase or decrease of friction to counterbalance the more or less large power of the main spring. On the shaft of the escapement wheel is an eccentric which actuates a pallet to permit a hair spring to take from the main spring, at each unlocking of the release mechanism, sufficient force to keep the pendulum in constant equal motion. This little device is shown in the small figure, and by its means the larger or smaller motive power of the main spring at different periods of its uncoiling is permanently reduced to the same quantity of force adopted by the hair spring. By this means also a low-priced movement may be combined with high grade timekeeping qualities. These clocks are not offered for sale, but are introduced under a rental system, the lessor taking the entire charge of the clocks, attending to the putting in of the system and the setting and regulating of the clocks.

The Prentiss calendar shows full sized printed cards exhibited directly behind sight openings in the case. It is illustrated in one of the views, as well as the manner of its connection with the clock works. It is entirely automatic, continuing after once being set to make all the necessary changes, even to the 29th day of February in leap years, without any adjustment or alteration whatever. It is operated by an independent spring motor, and is wound once a year, the only office of the clock being to release the calendar train once each twenty-four hours.

THE PRENTISS CALENDAR AND TIME SYSTEM.

AN AUTOMATIC TIME DATER.

A device in use at the main offices of the principal railways and in some of the largest business establishments of New York City, to date the time and receipt of telegrams, correspondence, etc., is shown in the accompanying illustration. It is manufactured by the Automatic Time Dater Company, of 220 Fulton Street, Brooklyn, N. Y., and requires but the attention of an eight day clock, or winding once a week. It has a first class clock movement with a continuously revolving minute dial, giving a clear imprint of the passing minute as shown by the clock dial. The clock movement is wholly disconnected from the dater mechanism,

except the connection of the two parts by a single center shaft, and thus the blows on the stamp in no way affect the time-keeping qualities of the clock. Any six words desired may also be given in the imprint, as "received," "paid,", etc., the dater, as thus used, making one of the most perfect of legal records. For keeping the time of employes, as a watchman's clock, or for a variety of purposes almost without number, its practical usefulness has been attested.

Triple Screws.

In 1892 the German deck-protected cruiser, Kaiserin Augusta, was launched, and as this vessel is the only large triple screw steamer whose trials had been completed before the United States cruiser Columbia, such particulars as are available will be of interest. The vessel is 393 feet in length, 49 feet 3 inches in breadth, and has a draught of water of 23 feet and a displacement of 6,050 tons. According to the "Warships of the World," the engines indicate 12,000 horse power, and the vessel's speed is 22 knots. Brassey's "Naval Annual" shows that the speed is 20 knots, and that the engines indicate 10,000 horse power, but in a foot note it is stated that the speed was said to be 22 knots on trial. According to other information, the displacement on trial was 5,000 tons, and with 12,616 I. H. P. a speed of 20·86 knots was obtained. The following data regarding the screw propellers appear to be reliable and to have influenced the designers of the United States cruisers Columbia and Minneapolis. The three propellers of the Kaiserin Augusta had all the same diameter, about 14 feet 9 inches, the pitch of the outer screws being 22 feet 4 inches, while that of the center screw is 21 feet 4 inches. The projection of the screws on a thwartship plane shows their axes to lie on the same horizontal plane, the disk circle of the center propeller slightly overlapping those of the outer ones. The center screw is 18 feet abaft the wing screws. Previous to the vessel's trial trip, it had been expected that the center screw would revolve more rapidly than the wing propellers under a specified power, but this was the reverse of what happened. The central screw made five or six revolutions per minute fewer than the side screws, indicating that it had considerably more resistance to overcome.

The United States deck-protected cruiser Columbia was designed in the year 1890, and the Minneapolis is practically a sister vessel so far as the design of the hull is concerned, although, in external appearance, there is a considerable difference, the former vessel having four funnels and two polemasts, while the latter has but two funnels. These vessels are about 412 feet in length, 58 feet beam, and in sea-going trim have a draught of 24 feet and a load displacement somewhat exceeding 8,000 tons. The official trials of the Columbia took place in November, 1893, and the mean speed is officially stated to be 22·8 knots, the mean draught being 22 feet 5 inches, and displacement 7,350 tons, a result showing a propulsion efficiency of 11·9 per cent in excess of that of the twin screw cruiser New York, and actually 21 per cent in excess of that of the Olympia. Before passing on to consider the Minneapolis it may be pointed out that it was not with any idea of obtaining improved speed efficiency that Mr. George W. Melville, Chief Engineer of the United States Navy, adopted triple screw propellers in these vessels. What really led to the consideration of their adoption was the large power that the desired speed required the engines to develop, viz., 21,000 I. H. P. If the vessel had only two propellers, the shafting would have to transmit 10,500 horse power, and it was doubtful whether reliable propeller shafts of that capability could be manufactured with existing appliances in the United States. No doubt other considerations were involved. The results stated to have been obtained have exceeded the most sanguine expectations. This has been most marked in the case of the Minneapolis, which, we are told, has attained a mean speed of 23·073 knots with 20,862 I. H. P.

This unexpected success has been explained to be due to the propellers being of good design and suitably placed. The propellers are of the modified Griffith design, true screw, three bladed, with adjustable pitch ranging from 19 feet 6 inches to 22 feet, all three being adjusted at the Columbia trials to 21 feet 6 inches. The center and starboard screws are right hand and the port screw is left hand. The center screw is 14 feet in diameter, while the wing ones are 15 feet, the helicoidal area is, however, kept about equal by widening the blades of the former. The pitch of the center screw of the Minneapolis on her trial was 21 feet 6 inches and the pitch of wing propellers 22 feet. This difference was made because on the trial of the Columbia the wing engines ran considerably faster than the center engines. Even with the center engines indicating 700 more horse power, only one more revolution per minute was obtained. These results appear to confirm the conclusion drawn from the case of the Kaiserin Augusta that the center screw meets with a greater resistance. Whether that resistance is produced by the effort to drive the vessel forward or by the interference of the wing screws is a matter much more difficult to determine, and is one which must always be considered when comparing the relative efficiency of one, two, and three screws.—Nautical Magazine.

New American Torpedo Boats.

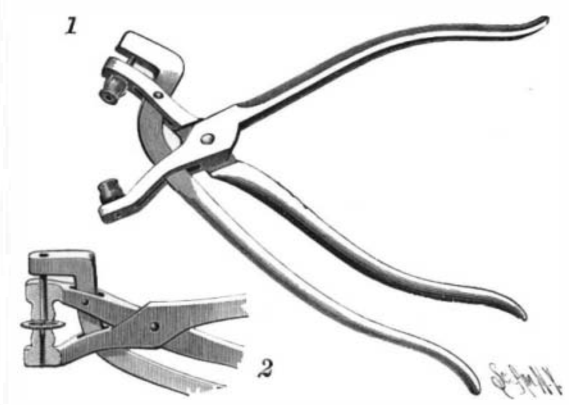
It is reported that Secretary Herbert has awarded the contract for building all three of the seagoing torpedo boats to the Columbian Iron Works, of Baltimore, awarding none to San Francisco, as was at first intended. The boats will be of about 138 tons displacement and will have a speed of about 24 knots. The vessels, exclusive of armament, will cost $97,500 apiece. The Columbian Works were the lowest bidders. Boats of similar dimensions and faster speed are stated to be supplied to the British navy for $72,400 each.

The secretary also has decided that the torpedo boats authorized by the last naval appropriation bill shall be larger and faster than those contracted for. With this end in view, he directed Chief Constructor Hichborn to prepare plans for vessels of 180 tons displacement, to have a speed of 27 knots. The latest English boats of about this class have made 29 knots.

It would be more satisfactory to the public if the American boats were made equal to anything afloat.

A WATCHMAKER'S STAKING PLIERS.

The illustration represents a simple and inexpensive tool for staking or securing staffs or pinions to watches. It has been patented by Mr. Charles C. Branson, of Granite Canon, Wyoming. It consists of a pair of pliers whose jaw members are apertured, the upper one being adapted to receive the stake, while a third or supplemental plier lever has a push portion adapted to engage the stake or punch. All the ejecting parts are connected, and the use of a hammer is entirely dispensed with, the bosses on the jaws being arranged to hold the wheel true and prevent it from being bent. Fig. 2 shows the jaws and the ejecting lever in position for pushing out the staff of a wheel. The tool can also



BRANSON'S WATCHMAKER'S TOOL.

be used to straighten bent wheels or as wheel truing pliers for all the wheels of a watch, to press on hair springs and roller tables, and for putting in arbors and pinions in the wheels.

Effect of Weight on Soldiers while Marching.

An interesting report of experiments ordered by the German War Office to determine the effect of weight on soldiers in full marching order is given in the German Army Medical Magazine, by the two officers who conducted them. The five students who volunteered as subjects marched a distance of fifteen miles and eighty-two yards. The weight in three categories was 48 lb., 59 lb., and 65 lb., and fractions. With the first weight it was found that a man at a moderate temperature could cover the distance with ease; in hot and close weather slight inconvenience was experienced, which disappeared when the march was over, so that the men could begin next day as well as ever. The weight of 59 lb. did no harm in moderate weather, but proved fatiguing when it was hot, and effects were felt next day; and with the third weight of 65 lb. the ill effects were naturally much more decided.