## THE LENGTHENING OF THE GUNBOATS MACHIAS AND CASTINE.

An interesting operation has recently been performed at the Brooklyn Navy Yard. It consisted in the lengthening of two of the new navy ships, the gunboats Castine and Machias, and we illustrate in this issue the execution of the work.

These ships were built at the Bath Iron Works at Bath, Maine, their names to some extent revealing their place of construction or native state. They are sister ships, as originally built, of 1,050 tons displacement, 190 feet load water line, 32 feet breadth of beam, and 17 feet depth from main deck. As armament each ship carries eight four-inch breech loading rifles, four six-pounders and two one-pounder rapid firing guns and two Gatling guns. The ships throughout are of American build and were designed by the Navy Department.

They were found to be lacking in stability. Each ship has a high forecastle and high quarter deck, the waist being comparatively low, with high bulwarks at its sides. Should a sea be shipped and the waist filled with water, there would be great danger of the vessel capsizing and foundering before the water could escape by the scuppers. Again, in case of war or collision, the filling of any of her compartments with water would very probably bring about the same result. Various plans of increasing the stability of these ships were discussed, and finally it was decided to lengthen them, an operation which has not been carried out in the navy yard for many years.

The two ships were accordingly docked in the new timber dry dock. Sliding ways were provided for the keels of the forward half of each ship; when floated into the dock, as each ship took its keel bearings, bilge blocks were run in as usual and the emptying of the dock was completed. The ships were now shored in place; the bilge blocks on the forward halves were drawn back and sliding ways substituted therefor. Previous to their introduction into the dock a little work had been done in cutting the ships in two, but the hull and truss elements of the ships were left virtually intact. When once in the dock and exposed, a gang of men began to cut them apart. The rivet heads were cut off, on the inside of the ships for the most part, and the rivets were backed out. In this way a division was carried all the way around each ship entirely by removing the rivets, the plates not being cut at all.

Next came the operation of separating the two portions of the ship. Wedges were driven just above the sliding ways under the bilges, so as to remove part of the weight from the keel blocks and sliding way resting thereon. Hydraulic jacks were then arranged, some within the ship and some working against the ways in the most accessible positions of advantage to push the two halves apart. An accurate system of sighting was provided, a theodolite being mounted on the quarter deck with sighting points on the forward half of the ship. The jacks were now worked, and very slowly the ship separated, and the jacks were shifted and worked again until the forward half was moved 14 feet from the after portion. In case of one of the ships absolutely no departure from alignment could be detected during the movement. In the case of the other ship perhaps $\frac{3}{16}$ of an inch of departure was observable at one time.

To complete the operation the gap had to be closed. For this purpose a complete set of plates, each one 14 feet long, were provided, and by means of the new Sellers traveling crane they were lowered in position and were then riveted into place. The plates were butt jointed and riveted to inside straps. Previous to the introduction of the plates, seven new frames had to be put in to complete the framing of the ship. On Tuesday, May 15, operations began upon the Castine, and by half past seven P. M. on Thursday the ship had been divided and pushed apart. Operations on the Machias began on Friday morning and on Saturday at one P. M. she was also divided and ready for the frames and plating.

The new ships will be 204 feet long on the load water line and will have 1,220 tons displacement. The metacentric height is increased from nine inches to nineteen. This not only adds greatly to their stability, but the increase in size will enable them to carry eighty-five additional tons of coal on the same draught as before, while the bunkers are given an increase in capacity of one hundred and twenty-five tons, which at a speed of eight and one-half knots give her nine days or about seven hundred and sixty-five miles additional radius of action, burning fourteen tons of coal per day.

The improvement in stability is due to the addition of midship section. This is the broadest and most stable portion of the ship. It is easily understood that a section of bow or stern isolated from the rest might at once upset. But the broad midship section with its exaggerated stability brings up the whole to the proper amount, and an increase in its length means an increase in the sum of stabilities of the different sections. The work was in charge of naval constructor F. L. Fernald, U. S. N.

## Change of Color in Lemon and Orange Peel.

BY E. G. CLAYTON.

When orange peel is moistened with strong hydrochloric acid, its color changes from yellow to a rich dark green; lemon rind, similarly treated, retains its hue, or, at most, assumes a dingy, yellowish-brown tint. A convenient and simple chemical test, therefore, which will distinguish between small fragments of lemon and orange peel is to touch them with a glass rod previously dipped in hydrochloric acid. The diluted acid will answer the purpose, but the reaction is slower.

A few minutes exposure to hydrochloric acid gas will effect this change in the pigment of orange peel. The color of lemon rind is unaffected.

The shades of green developed by dilute hydrochloric acid are deepest in the cases of Murcia, Denia, and Florida oranges, of moderate intensity with Jaffa and "blood" oranges, and feeble with Valencia and Tangerine oranges. This statement also applies to the reactions with strong hydrochloric acid, excepting that the color of Tangerine orange peel with the strong acid is perhaps more intense than that observed with any of the other varieties of the fruit.

The peel of the lime behaves, with hydrochloric acid, like lemon rind.—*The Analyst.*

## NEW STEEL BELT FASTENER.

We illustrate an improvement in belt fastenings which has just been placed on the market by W. O. Talcott, 16 Sabin Street, Providence, R. I. In the Acme steel belt hook, the teeth, being long and sharp, pierce the belt easily, and as they stand diagonally upon the hook, they do not cut away so much of the strength of the belt as they would if they cut continuous holes or slits straight across the end of the belt.

The teeth rivet toward the center of the fastener, as

Fig. 1.

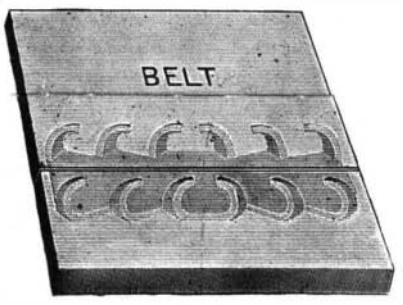


Fig. 2.

Fig. 3.

Fig. 4.

ACME STEEL BELT HOOKS.

shown in Fig. 2, giving them a very strong hold in the belt. Fig. 1 shows the hook with teeth full size, and Fig. 3 a much narrower hook, being really the center section of the hook shown in Fig. 1. The small hook can be used on a belt half an inch in width and several of them can be used for wider belts. Fig. 4 shows end view of single section hook and illustrates clearly the cant of the teeth.

These hooks are particularly valuable in belts running at high speed and do not make the rigid joint made by wire hooks, and as they do not require to have holes punched in the belts for their insertion, they do not weaken the belt, as is done by many other fasteners now in use.

## How Baltimore Banished Tramps and Helped the Idle.

E. L. Gould, writing in the *Forum*, says: Baltimore has always been a city more or less favored by that modern knight-errant, the tramp. Its climate is not too severe, and its people have for a century enjoyed the reputation of being more than ordinarily hospitable. Certain charitable eccentricities—such as soup-houses, night shelters, and depots for the free distribution of articles of subsistence, in which kind-hearted but unreflecting people indulged during the last two or three years—added greatly to its popularity as a winter resort. A Central Relief Committee [was organized last December] typifying the co-operation of business interests with philanthropy. The manifesto on winter relief which followed the organization of the Central Relief Committee set forth succinctly a programme of action.

1. Citizens were urged to contribute liberally to established charitable agencies.

2. Donations were asked to a special fund for opening a new institution to shelter the homeless, where the work test would be rigidly applied. A "Friendly Inn," capable of accommodating 150 persons nightly, was already in existence, but its housing facilities were not thought to be sufficient. Its managing board expressed the willingness to co-operate in securing a uniform work test by abolishing the system of paid meals and lodgings. The extension of facilities would enable all demands to be met, and the people were promised a diminution in the number of vagrants and tramps.

3. It was conditionally stated that, if the city would buy the stone for macadamizing roads in the annex, the Central Relief Committee would open stoneyards in order to provide work for unemployed residents with families to support.

4. A salutary warning was issued against the dangers of indiscriminate almsgiving.

Soon after the appearance of these "standards," subscriptions began to flow in, and it was decided to proceed at once with the equipment of a "Wayfarers' Lodge," to accommodate 125 persons nightly, and its rules provided for a three days' limit to consecutive shelter, unless under special circumstances. Wood sawing and splitting was offered as the only means of payment for meals and lodgings. Certain compulsory features, such as a hot bath every evening under the supervision of an attendant, with a liberal use of carbolic soap, and nightly disinfection of wearing apparel, were regularly exacted. Clean night gowns and slippers were also furnished. The Wayfarers' Lodge was opened on January 15, 1894. On the first day of January of the present year, 320 males lodged in the police stations. By January 28 there had been a decrease to 80, and on February 3 the police stations were finally closed to male lodgers. Notwithstanding this fact, there have always been unoccupied beds in the Inn and the Lodge. The record of lodgings at the Wayfarers' Lodge from January 15 to April 1 shows that the nightly average was 61. At the Friendly Inn the average for this period was 98. As a rule, the men performed the tasks they were set to accomplish. Returns from the six weeks' operation of the Wayfarers' Lodge show that less than four per cent have been ejected for refusal to work, disorderly conduct, profanity or pilfering. Of the patrons during the first twenty days of February, 59 per cent were of American nationality, 17 per cent were Irish, 9 per cent Germans, 6½ per cent English and 3¼ per cent Scotch. The nativity of the remainder included 17 foreign countries. In the matter of age, 9¼ per cent were under 21 years of age; 45¼ per cent between 20 and 30; 28 per cent between 30 and 40. More than eight-tenths of the whole number were in the flower of youth or manhood. As regards occupations, 40¾ per cent professed skilled trades; 5 per cent were [illegible] men, miners and sailors; 2¼ per cent were bookkeepers, clerks, telegraph operators, bartenders and waiters; 2 per cent were farmers, gardeners, drivers, or teamsters; and 47 per cent classed themselves as general laborers.

Comparison of the statistics of lodgings in the police stations before and after the inauguration of sound practice in dealing with the homeless poor reveals a fact of weighty significance. It shows that such methods, with the hearty backing of the police, are a sure and effective means of ridding a community in an unusual degree of tramps and vagrants. The district agencies of the Charity Organization Society, which in previous winters have been besieged for help unanimously report that the demand from this class of people has been reduced to practically nothing. The number of requests for transportation from the city was notably diminished. Finally, almost without exception, citizens testify that street begging and personal importunities at their homes have marvelously fallen off. The police assert that the class of people referred to are now scarce among Baltimore's floating population.

Dealing with the homeless poor represents simply one side of the activities of the Central Relief Committee. Furnishing work to unemployed residents is the other. [Four] stoneyards were opened. The piece system of payment was inaugurated. Fifty cents was the price fixed for a unit of work which could be accomplished by a man of ordinary strength in about four hours. The maximum sum which any man might receive was $1 a day. Work was so distributed that, as far as possible, each candidate was given two days weekly, and the more necessitous three and even four. Summarizing the results accomplished in connection with the relief of unemployed residents with families to support, we find:

1. That industrial work was provided on economic principles. The actual cost was about 33 per cent of the funds raised.

2. Market rates were observed both in the purchase of raw materials and the sale of broken stone, so that no violence was done to economic laws.

3. There could be no "sojering." Inattention and neglect were at the expense of the worker, not to the detriment of the work provider.

4. Complete harmony and co-operation existed with established charitable agencies, and the latter were able to test chronic subjects for relief by securing their admission to the stoneyards.

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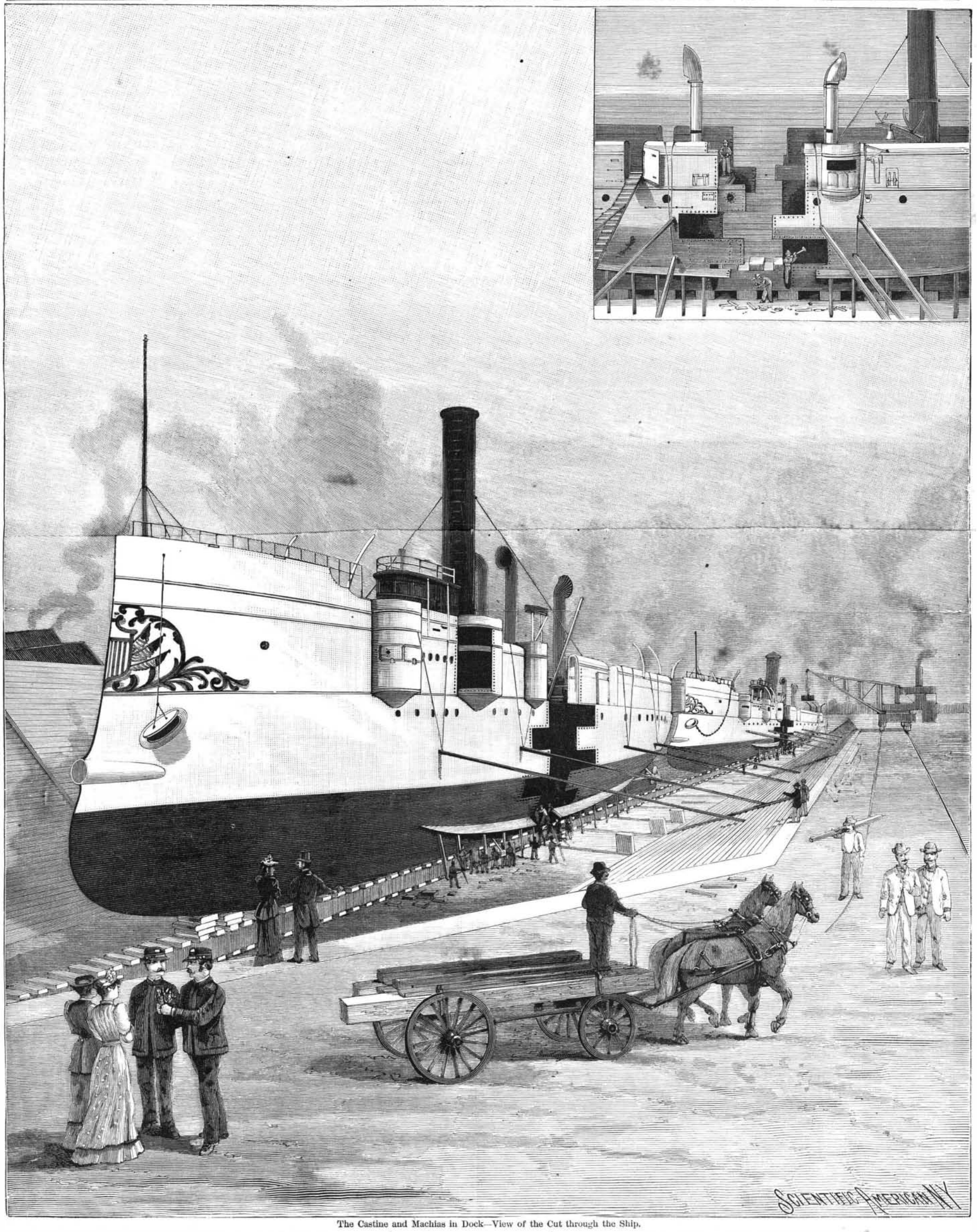


The Castine and Machias in Dock—View of the Cut through the Ship.

**LENGTHENING OF THE GUNBOATS MACHIAS AND CASTINE.**—[See page 7.]