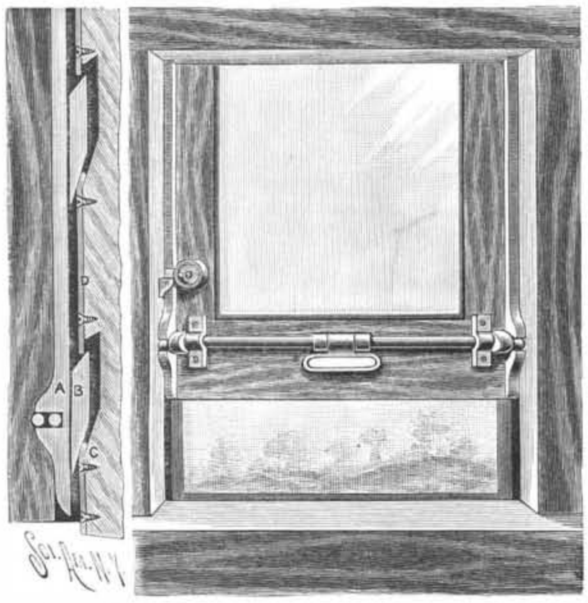
KIRBY'S WINDOW SASH IMPROVEMENTS.

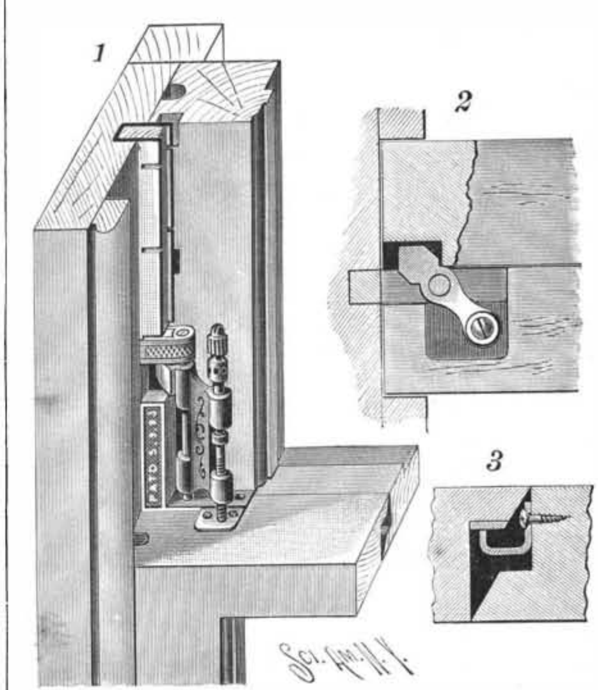
The strong, simple and inexpensive devices shown in the accompanying illustrations are applicable to window sashes of any description, especially to car windows, and are designed to allow the window to slide freely and easily when desired, or to facilitate fixing the sash firmly in such position as may best contribute to the convenience and comfort of those near the window. The improvements form the subject of four patents which have been issued to Mr. S. R. Kirby, of New Brighton, Staten Island, N. Y. By means of the lifting and locking handle provided, shown in one of the illustrations, the window may be easily raised and lowered, and the fastener made to positively and firmly lock the sash. The sash is held behind the ordinary stop beads, between which and the sash is a slight space for the movement of a pair of keeper bars, A, having upwardly projecting blunt teeth, B, the keeper bars lying opposite wear plates, D, on the sash, in which are inclined pockets, C. At the lower ends of the keeper bars are slots forming two opposite lugs, there being held in the slots short studs or cranks projecting from disks on a shaft journaled in keepers on the lower portion of the sash. Centrally on the shaft is a handle, by pressing downward on which the short studs or cranks press downward on the keeper bar, A, causing the teeth, B, to slide downward in the pockets, thus jamming the keeper against the beads and holding the sash firmly in any place at which it happens to be. When the crank is moved in the opposite direction the sash slides freely. If the sash is dropped, the handle and cranks swing downward and assist, with the weight of the keeper bars, to automatically stop the sash and prevent its striking down violently upon the sill. For large windows it is better to have a short crank shaft on one side of the window, instead of extending it entirely across the shaft.



KIRBY'S CAR WINDOW HOLDER AND MANIPULATOR.

The sash lock device, shown in one of the views, is adapted to lock the lower sash shut and lock the upper sash partially open as desired, yet holding it so it cannot be further opened from the outside. Fig. 1 represents the device in perspective, and Fig. 2 shows it in section. In the parting bead, just above the top of the lower sash, is secured a hanger, supporting the vertical pintle of a swinging bracket which has near its top a flange projected inward to form a bolt adapted to swing into either one of a vertical series of notches in the sill of the upper sash.

The bracket has on its outer face lugs in which is held a vertical screw, bearing upon a wear plate on the rail of the lower sash, the swinging of the bracket throwing the bolt into one of the recesses of the upper sash. The screw is adjustable to make it bear firmly and securely hold the lower sash. Fig. 3 is a sectional view of a securely closing hook-like attachment on the parting rail between the upper and lower sashes. Vertical metal packing leaves are also provided, by which compensation is provided for shrinking or swelling of the wood.



KIRBY'S SASH LOCK AND METALLIC ADJUSTING BEADS.

Always Room for Discovery.

We hear so much about the material progress of the age, our wonderful inventions and the great discoveries that are destined to be of untold benefit to man, that it is well sometimes to take a look through the big end of the field glass and see how little really has been accomplished in comparison with what remains to be done. For in truth we have but scratched the surface of the globe to a very small extent. The north temperate zone alone has begun to be developed, and it is only a beginning—the wastes of Siberia still lying practically uncultivated—while the south temperate zone and the tropics are scarcely touched, with their untold wealth of animal and vegetable products, besides the undoubted mineral resources which they contain.

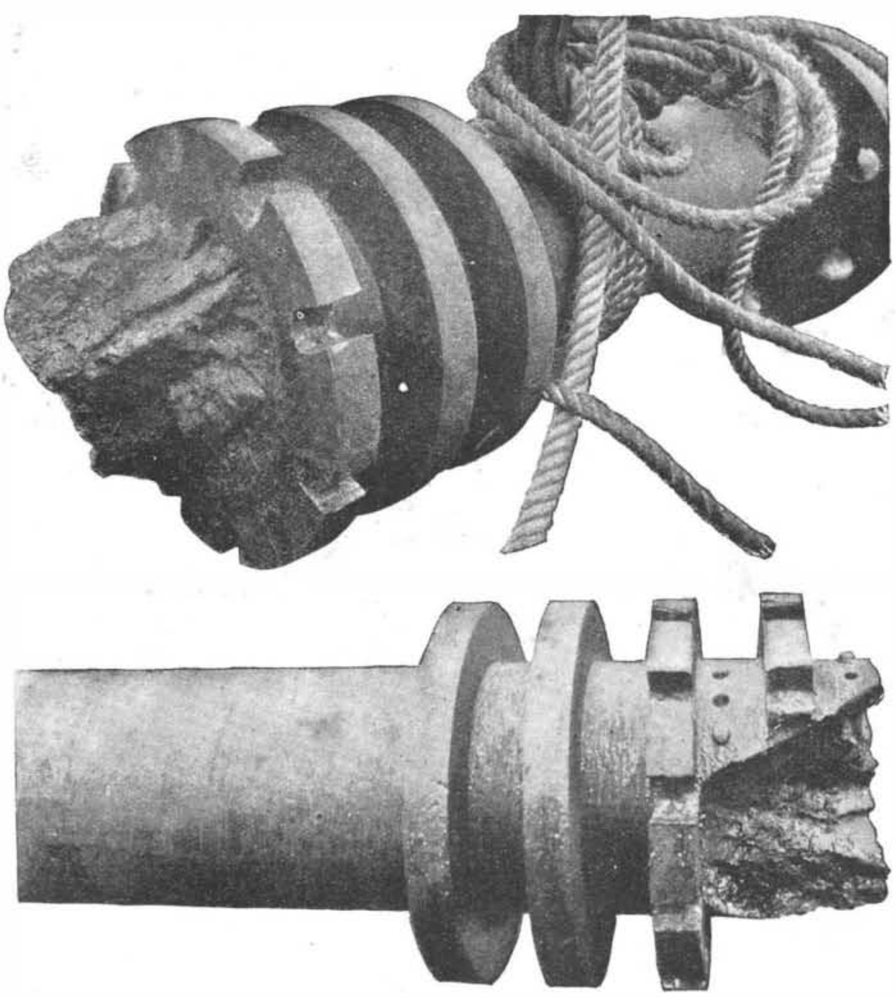
The new process of cheapening aluminum, one of the largest components of the earth's crust, brings into the field of industrial activities a substance which is destined to work a revolution in mechanics and the applied sciences. Who knows what other uses may be found for the commonest materials lying at our feet? The lesson of it all is that there is always room for discovery and that we are nowhere near the exhaustion point of the earth's resources.—*N. Y. Herald.*

BREAK OF THRUST SHAFT OF STEAMSHIP HECLA.

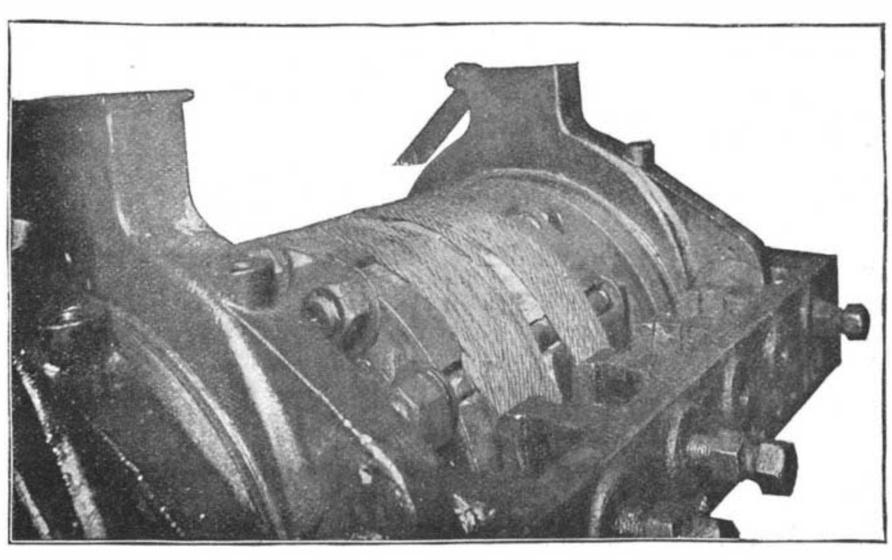
The steamship Hecla, Capt. Thomsen, arrived at New York April 8, being twelve days overdue. The delay was caused by an accident to her thrust shaft, very similar to that of the Umbria, with the exception that it extended through and between two collars, instead of one, as in the case of the Umbria. The shaft of the Hecla broke twice; the first accident occurred on March 24. The shaft then cracked between the collars, about eleven inches long, but not entirely through. Chief Engineer K. Rafin mended this by bolting belts of ½ inch steel between the collars and also on the sides of the collars; ⅝ inch wire cable was then wrapped around this.

The ship steamed 400 miles with the shaft in this condition, when the weather became severe and the shaft broke a second time—this time completely through. The belts put on the first time were then taken off, and eleven three-inch bolts put through three collars parallel with the shaft. These were screwed up with nuts as tightly as the limited space would allow. Zinc bodies were then cast and put in between the bolts to keep them solid. The wire cable was again wrapped tightly around this flush with the bearings. The ship in the meantime was taken in tow by the National line steamer America and brought to Sandy Hook; from there she steamed under her own power to her dock at Hoboken.

Thomas Duff, of the Dumbarton Iron Works, who surveyed the broken shaft, said the work of repair had been well done and praised Engineer K. Rafin for his work.



THE BROKEN SHAFT OF THE HECLA.



THE HECLA'S SHAFT AS REPAIRED AT SEA.

Solid Air.

Professor Dewar communicated to the Royal Society at its meeting on Thursday, March 9, a most interesting development of his experiments upon air at very low temperatures. Our readers are already familiar with the fact that he has liquefied air at ordinary atmospheric pressure. He has now succeeded in freezing it into a clear, transparent solid. The precise nature of this solid is at present doubtful, and can be settled only by further research. It may be a jelly of solid nitrogen containing liquid oxygen, much as calves' foot jelly contains water diffused in solid gelatin. Or it may be a true ice of liquid air, in which both oxygen and nitrogen exist in the solid form. The doubt arises from the fact that Professor Dewar has not been able by his utmost efforts to solidify pure oxygen, which, unlike other gases, resists the cold produced by its own evaporation under the air pump. Nitrogen, on the other hand, can be frozen with comparative ease. It has already been proved that in the evaporation of liquid air nitrogen boils off first. Consequently the liquid is continually becoming richer in that constituent which has hitherto resisted solidification. It thus becomes a question whether the cold produced is sufficiently great to solidify oxygen, or whether its mixture with oxygen raises its freezing point, or whether it is not really frozen at all, but merely entangled among the particles of solid nitrogen, like the rose water in cold cream. The result, whatever may be its precise nature, has been attained by use of the most powerful appliances at command—a double set of the vacuum screens already described in our columns, combined with two powerful air pumps. Upon either view of its constitution, the new solid is in the highest degree interesting and hopeful.—*London Times.*

THE coast survey of the United States was begun in 1817.