belt passes round two idlers and in over a pulley which operates the belt by means of a spur wheel and pinion.

From the top of the elevator leg the wheat is discharged into a large hopper above the scales. From this it is let fall by the operator into scales (Fig. 4), which weigh 160 bushels, or 9,600 pounds, at a time. This is done very expeditiously, only a brief interval being required from the time the lever, which opens the bottom valve of the hopper, is pulled to the time the scales are full. So expert are the operators that each 160 bushels is weighed with the greatest nicety. If the wheat has been previously cleaned, it is not cleaned at the stores, but is transferred at once to the bins. If it is to be cleaned, it is dropped from the weighing scales to the bottom of a short lofter or vertical elevator and carried up to the cleaning room. Here it falls upon the upper end of large inclined shaking screws, Fig. 3, where all the larger rubbish which may have become mixed with the wheat in transit is taken out. This rubbish consists of small sticks, twigs, leaves, fragments of coal, etc. The refuse passes over the screen and falls over the lower edge. The wheat falls into a vertical chute oblong in cross section, from the bottom of which it falls in a thin stream about ½ inch wide and 14 feet long. A strong current of air which is drawn across the stream of falling wheat by means of a fan serves to carry away all the dust, chaff, shriveled wheat cockles, weevils and finer rubbish which was not caught on the screens. The wheat now falls onto long belt conveyors which extend throughout the whole length of the building and are kept continually in motion. There are six lines of these belts in the gallery and six in the main store. They are made of fourply canvas and rubber and all of them are 30 inches in width. Their weight is carried on cylindrical rollers which extend the full width of the belt.

At the point where the wheat falls onto the belt the edges of the latter are turned up more acutely by a pair of rollers, one under each side. The object of this is to keep the stream of wheat from being scattered by the belt before its inertia is overcome. When the wheat reaches the long lofter by which it is to be taken to the top of the tower, it is discharged from the belt by a "tripper." This is a movable frame which runs on a track beneath the belt and carries two rollers, the upper one of which is a few feet above the level of the belt, the other being at the belt level. The belt rises with a gradual curve and passes over the upper roller and vertically down beneath the lower roller. The sudden change in direction of the belt causes the wheat to be thrown clear of the belt into a hopper, whichleadsit to the foot of a long lofter. The latter carries it to the top of the tower, where it is delivered into a hopper. From the hopper it falls by gravity to one of a number of universal distributing spouts, Fig. 5, situated just above the bins. This spout is swivel jointed and may be swung round to connect with any one of eight different spouts which lead to as many different bins, each spout carrying the number of the bin that it serves. So complete is this system that the wheat carried up by each lofter can be directed to any one of one hundred and fifty-two different stations. A part of the spouts will be noticed in the engraving, leading down from the towers through the roof of the main building.

It frequently happens that a body of grain becomes heated spontaneously, and means have to be taken to cool it to a normal temperature. It is at once drawn off from the bottom of the bin and carried by the belt conveyor to a lofter, by which it is taken up to one of the cooling rooms, which are situated in the towers above the main building. The cooler is built in units, any one of which consists of a deep and long, but narrow, box which reaches from floor to ceiling of the cooling room (Fig. 7) and is divided by two vertical partitions into three narrow compartments each 16 inches in width. The side walls and partitions consist of overlapping horizontal slats, which are arranged similarly to the slats of a Venetian blind and slope inwardly. On the outside of the slats is a wire screen. The top, bottom and ends of the cooler are closed and airtight, and the middle compartment is connected with a powerful fan. The heated grain is run into the two outer compartments, the fan is started and a strong current of cold air is drawn in through the wall of grain in each compartment until it has been cooled to normal temperature. The grain is then returned to its bin or loaded onto the steamer as desired.

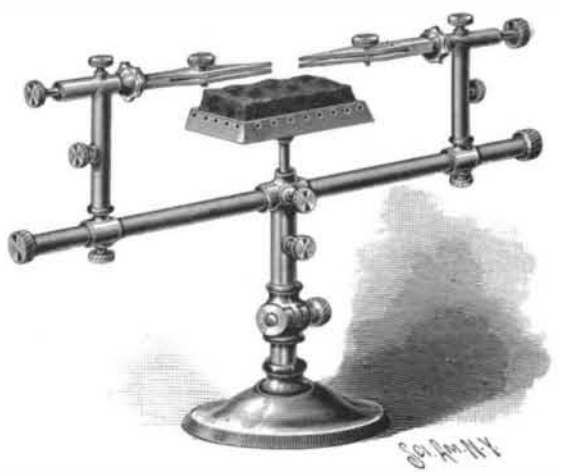
By reference to the large engraving of Dows' stores, it will be seen that at the level of the lower floor of the bridge gallery and at the middle height of the main building there is a long row of delivery spouts. There is a similar row on the other side of the building, and each of these may be used for transferring the grain to the ocean steamers. The wheat is drawn off at the bottom of the bins, carried by a short lofter to the conveyor belts, and by them transferred to the spout at which it is to be delivered. Here it is thrown off the main belt by a tripper, as already described, into a chute which delivers it to the spout leading to the hold of the steamer. When it is remembered that the building has 1,000 feet of wharfage front on each side of it, it can be seen that three or four large vessels could be loaded at once at these stores. It need scarcely be stated that such an establishment as this is capable of handling a vast amount of wheat in the year, the total having risen in some years to as high as 16,000,000 bushels.

Canadian North Pole Expedition.

Capt. Bernier, of Quebec, intends to try to make a trip to the North Pole, starting March 1, in the "Windward," which was used by the Jackson-Harmsworth expedition, from some point on the north coast of Siberia. He intends to take with him a geologist, a surgeon and five men. He expects to send the "Windward" back from Siberia after disembarking his outfit, as he intends to return to Spitzbergen, where supplies will await him. He will be provisioned for two and one-half years. He intends to travel at the rate of six miles a day, making the journey to the pole in 120 days. He expects to travel with dogs and reindeer, especially the latter, on account of their meat as well as their service. Information is not forthcoming as to how he proposes to feed his reindeer on the trip over the ice. Dogs have not been found to be extremely valuable adjuncts of a sledging journey over such ice as that which Dr. Nansen encountered. Reindeer would be far less serviceable than dogs. March seems to be a very early season for a start on an expedition of this kind, as there is little probability that Capt. Bernier could get through into the Kara Sea before early in the summer.

A UNIVERSALLY ADJUSTABLE JEWELER'S CLAMP.

To hold jewelry and similar articles while being operated upon, the clamp shown in the illustration, in connection with which is employed a charcoal pan or heating apparatus, has been invented and patented by Fred J. Thomas, of Cairo, Ill. Upon a suitable standard is pivoted a hollow pin, which may be rigidly held in any position by a set screw, and turning on the pin is a sleeve, also adjustable to desired position by a set



THOMAS' JEWELER'S CLAMP.

screw, while in the upper end of the sleeve is rigidly carried a horizontal beam, passing vertically through which and into the hollow pin is the stem of the charcoal pan, also held at the desired height by a set screw. At each end of the beam is an adjustable standard carrying an adjustable sleeve at the upper end of which is a horizontal head which receives a slidable rod with whose inner end is connected spring fingers projecting over the charcoal pan and adapted to hold the work in any desired position. The clamping portion of the device may, if desired, be removed from the standard and a horizontal arm adjusted thereon, to support a glue pot, etc., over an alcohol lamp, the device being adjustable to a great number of positions and having a great number of different uses.

Acetylene for Military Signaling.

In conjunction with Captain J. E. S. Moore, Mr. A. E. Munby has been making some experiments on the use of acetylene in signaling lamps, says The Progressive Age. They have obtained such good results with the very primitive apparatus at present employed, the light is so brilliant, and the requirements so portable that it seems well worth considering whether acetylene could not take the place of the lime light where portability is an object. From a communication by Mr. Munby we learn that the apparatus consists of a five-ounce bottle carrying a two-hole rubber cork. Water drips on to the carbide from a wide glass tube, holding some two and a half ounces, and furnished with a connection of rubber tube and a screw clamp to act as regulator. The gas escapes from a straight tube to the lamp, being trapped on the way by a wider piece of tube, into which the smaller tubes are corked at each end. This makes a sufficient condenser for any water vapor. The gas tube enters the lamp through the base, and the gas burns from an ordinary 0000 Bray. The generator, when charged, weighs one pound, and after a couple of minutes, during which time the action is a little irregular, will give a steady light for thirty or forty minutes. On more than one occasion, indeed, it has run out without the clamp being touched after first adjustment. He finds an ordinary lamp small for the heat produced, and has had to rivet the soldered parts; but increased ventilation would be easy to arrange. Of course, for permanent work, the generator would have to be arranged in metal. Even then it would probably be the lightest gas-supplying arrangement for the illumination yet produced.

Miscellaneous Notes and Receipts.

Wine from Leaves.—A French druggist has conceived the idea that the flavor of the fruits of shrubs and trees is generated in the flowers of these plants and passes from them into the fruits. The fragrance which the leaves of the black currant bush give off, especially after a little rubbing, and which is so very similar to the taste of the berry, has led the man to adopt this opinion. He goes further, and says that the pleasant taste of the apple, pear, or grape is prepared in the leaves of the respective plants, although he admits that it is hardly noticeable with these, and by far not in the same degree as with the black currant. But this does not discourage the inventor. He sees glycoside, which he proposes to decompose in sugar, or a more or less aromatic principle, as he sets forth in the Union Pharmaceutique. The respective leaves are to be crushed and a fermenting agent, such as yeast, is added to them, whereupon the odorless and tasteless glycoside decomposes and the chemical principle becomes free which is to impart to the fruit proper its aroma and pleasant taste. What was formerly sought to be accomplished with apples, pears, grapes, etc., is now done in a simpler manner with the leaves of these plants in the fermenting vat. Jacquemin, for this is the name of the inventor, places, e. g., apple tree leaves in water containing 15 per cent of sugar; then he adds the yeast. During the process of fermentation there is an odor of apples, and when the fermentation is finished and the yeast has settled, a straw yellow liquid is obtained which possesses the fine "bouquet" of the fruit of the respective trees from which the leaves were taken. With vine leaves the results are still more prolific. A beverage tasting and smelling strongly of wine is obtained, and finally brandy may be distilled from it which is similar to the best cognac!

Changing the Bed of the River Scheldt.—In Antwerp it is hoped that the plan long nourished in influential circles to connect the Rhine with the Scheldt by a canal may at last be realized. Such a new waterway would tend to increase international trade considerably. It is thought in Antwerp that a favorable moment has come to take the enterprise seriously in hand, because Kaiser Wilhelm is advocating the connection of all German rivers with the Rhine. The Belgian government and the city of Antwerp are now confronted with two projects from which to choose. One plan is to extend the harbor works and to broaden the present river bed. Another plan proposes to cut off the large angle which the Scheldt describes below Antwerp by a new bed, whereby the channel receives the proper breadth and necessary depth. This would do away with the north citadel, whose place would be taken by new harbor works.

Fixing Leather to Metal.—In order to fix leather to metal, the Maschinenbauer gives the following directions: Digest 1 part (weight) coarsely crushed gall nuts with 8 parts (weight) of distilled water about six hours and filter through linen. Then pour 1 part (weight) of cold water over 1 part (weight) glue, leave it stand for twenty-four hours and heat the whole, whereby a concentrated glue solution is obtained. Now coat the leather with the warm gall nut extract, bring the glue solution on the roughened and warmed metal, lay the leather on it, press it firmly, and allow to dry in the air. The leather will adhere so firmly to the metal that it cannot be separated without tearing it.

Manufacture of White Opaque Colors by the Use of Tungstates.—Those tungstates which are slightly soluble or insoluble in water and give no colored sulphides with hydrogen sulphide, preferably the tungstates of the earthy alkalies, are now employed in Germany as oil, size and water colors. Especially tungstate of lime and tungstate of zinc are recommended as white opaque pigments. The various tungstates of the same metal (e. g., calcium) behave alike and their quality as white opaque color is not affected by their different percentage of water. Tungstate of lime possesses the covering power of white lead, but remains white to sulphide of hydrogen and similar substances, while white lead turns brown. These tungstates can be used as size colors and water colors, another advantage over white lead.

Waterproof and Fireproof Wood.—In order to render wood waterproof and fireproof, the following "silicification" process is made use of according to the Gewerbe. The small boards are first laid into a waterglass solution of 5° to 10° Be. where they are left 10 to 12 hours, when they are taken out and allowed to drip off. After drying, they are placed in a solution (gravity 2° to 3° Bé.) of calcium chloride, magnesium chloride and ammonium chloride. In this they are left 4 to 6 hours, and after dripping off and drying again, they are ready for use.