children as they intended should follow trades, as far as they were able, a good technical education, and to endeavour to create in their minds a desire for knowledge, and if the teachers of schools in the country would give more attention to this branch of education, much benefit would accrue therefrom.

When we speak of the higher intelligence of mechanics in the United States over those of Canada, and their superior technical knowledge, we do so in no spirit of detraction of the ability of our own countrymen; the advantage on the American side is from the fact that technical education has received so much particular attention by that people, that it has at last grown into a national talent, and their inventive genius is remarkable over the whole world. The wealth that has been derived from many of their self-made-men from their inventions, has been a great incentive to the study of mechanics and to superior workmanship, and has created a love of research in minds that would for ever have remained dark, had not the light been allowed to enter.

There has been a great cry for protection of late in Canada, and we are not a party that would object to a just protection to our manufacturers; but if protection is to cause them to retrograde rather than advance, because competition no longer acts as a stimulant to improvements —we do not want it. We do not want to be compelled to purchase an inferior article at a higher price than it is worth to put money in the pocket of a manufacturer who has neither the enterprise nor liberality to make an article equal in value and finish to what manufacturers make in the States and sell at a lower price. As it is, in almost every article of mechanical industry, we are far excelled by the Americans, and this excellency over our productions is not that we cannot arrive at the same degree of perfection, but because our manufacturers do not go to the expense of obtaining superior machinery and skilled labour. The work of a skilled mechanic in Canada scarcely receives any more remuneration than that of a mere bungler. If protection is to keep our mechanics in darkness and half a century behind the times, then we hope never to see it. But when the practical education of our mechanics receives more consideration in our public schools than it does at present, no doubt a higher spirit of emulation will be evinced, and there will be a greater desire to vie with our neighbours in the excellence and finish of artistic and mechanical work. Canada, with all the disadvantages of a high protective tariff against her, has so many advantages on her own side in possessing at lower rates the raw material and labour, that if she would only turn out equal workmanship with the Americans, the balance of competitive trade would still be in her favour.

CEMENT FOR IRON.—The *Iron Age* recommends the following cement;—Take four or five parts by weight of dried and finely powdered brick earth, and one part of peroxide of manganese, and mix them with two parts of fine iron filings, which must be free from rust, one half part common salt, and one half borax. Grind all fine together and mix intimately, then make into a stiff mass with water. The cement is applied as soon as made. It is first gently warmed, and then exposed to a heat little short of whiteness. It is stated to be thus converted into a slag-like material which stands boiling water and all common heats. Another recipe is: Equal parts of finely sifted peroxide of manganese and finely triturated zinc, which are rubbed up to a thickish fluid with common water-glass; this must be applied as soon as ready, and makes as hard a cement as the foregoing.

NEW METHOD OF MAKING PROPELLOR PATTERNS.

(See page 332.)

We give herewith an illustration of a new method of making patterns for propellors, so as to get a turn screw by mechanical means, without the necessity of calculation and drafts. The new method was designed by Mr. Otto Osten, a mechanic of this city. As shown in the engraving, a number of pieces of wood are planed to the same size, and placed on a piece of iron threaded on its upper end, so that a nut may clamp them together. They are then spread out to the required pitch and marked on both ends with a pair of compasses. All the wood outside the marks is then taken off. The pieces are smoothed up, clamped and glued together, and the pattern is narrowed at the hub and rounded at the tips to make it neater.

This gives all the curves true with no guess work, as is too often the case with the method in vogue. It ought to reduce the cost of propellors, as the pattern is so simply made. Propellor patterns are the most difficult jobs to do around a foundry; a true screw is difficult to make, and then they are not always sure of being correct.

Several propellors have been made as samples from this style of pattern, and can be examined at the shop of E. H. Thompson, 228 Main street. After the pattern is made, before it is glued together, the purchaser may examine and see if the pitch suits him; or he can set the pieces of wood before the pattern is made and get exactly the pitch he wants. Where it is desired to have the propellor curve inwards at the tip to prevent slip, the pieces of wood are made a little thicker at the tips so that the screw can be made accurately. We have seen several of the patterns made on this principle, by Mr. Osten, all of which were very correctly made. Any ordinary mechanic can make one, as it takes no scientific knowledge to prepare plans and drawings before the pattern makers take hold of the work.

—*Mining Scientific Press.*

A STEEL WIRE SUSPENSION BRIDGE IN CALIFORNIA.—The Pacific Bridge Company are building in Mendocina county, California, at Cottoneva, a suspension bridge which is described as follows: "The distance from centre to centre of the saddles on the towers is 270 feet. The deflection or fall of the cable is 23 feet 6 inches. The cables are built in the same manner as those of the Clifton Bridge, at Niagara. The steel wire is about No. 11 Birmingham gauge, and is protected against rust by immersing in a bath which gives it a fine coat of zinc. There are eleven wires in each strand, seven strands in each 1½ inch rope, and seven ropes in each cable. The ropes are not twisted together to form the cables, but gathered up every six feet by the suspender bands. Each rope is warranted to bear a strain of 60 tons. It is made fast to an independent anchor bar, 1 by 3 inches in diameter, and forming links 18 feet long, until connection is made with the anchors. The anchors are of cast iron, 3½ by 3 feet in surface, weigh 1000 pounds each, and are placed 14 feet below the surface of the rock. Great care was taken in securing these anchors in place by means of cross I beams which run under the rock at either side. The lower part of each pit was enlarged so as to form a hemispherical chamber, and the rock work, set in Portland cement, which is built upon the anchor, is so constructed that the upward strain is transmitted to its sides. The towers are of red wood. There are four posts 10 by 10 inches, and two 10 by 12 inches, giving an effective area of 640 square inches to withstand the strain of the cable on the tower. The wooden truss to prevent vertical vibration is 8 feet high and of the Howe truss pattern. The 270 feet of the bridge is divided into 45 panels. The longest suspenders, 44 in number, are of ⅞ inch steel wire, the 42 shorter ones are of 1⅛ inch solid iron. The estimated dead load of the bridge is 1000 pounds per linear foot; live load, one ton per linear foot; in all, one and one-half tons, or one-fifth of actual breaking load. The bridge will be completed in about thirty days, and promises to be a structure which the builders may well be proud of."—*Iron Age.*

RAW-HIDE HORSESHOES.—A Manchester mechanic has invented a horseshoe composed of cow-hide compressed into a steel mold and then subjected to a chemical preparation. Its inventor asserts that it lasts longer than the common shoe, and weighs only one-fourth as much; never splits the hoof, and has no other injurious influence on it; requires no calks even on asphalt; is so elastic that the horse's step is lighter and surer; and adheres so closely that neither dust nor water can penetrate between the shoe and the hoof.