

## IMPROVEMENTS IN SHAPERS.

Among notable exhibits at the World's Columbian Exposition at Chicago there was an improved shaper, which attracted attention in consequence of the enormous chips of metal which it cut from iron and steel. To the casual observer the machine does not appear to be different from the ordinary shaper, but to the mechanic who is used to tools of this kind it is a matter of surprise to see a shaper remove from a solid block of iron such chips as are shown in Fig. 1. This engraving is a truthful representation of the machine doing actual work; and Figs. 2 and 3 show respectively a very wide but comparatively thin chip and a narrower and much thicker chip, the first being one-sixteenth of an inch thick and one and three-fourths inch wide, the other being one-eighth of an inch thick and one inch wide.

The explanation lies in the fact that the tool does its work with a drawing cut. This insures great steadiness in the moving bar of the cutter, and as the tool holder is arranged, it also secures great rigidity and firmness in the holding of the tool without the necessity of heavy clamping devices, as the tool practically clamps itself as it is drawn forward. The up and down and cross feeds are not materially different from those of other shapers, and the cutting bar is moved by reversible gearing, with a quick outward movement and a slow return. By making use of the drawing cut instead of pushing the tool, less pressure is required in clamping the work and all chatter of the tool is avoided.

This machine is made by the Morton Manufacturing Company, of Muskegon Heights, Michigan, who also make other machines on the same principle.

## The Loss of H. M. S. Victoria.

The vessels upon which we now rely for bearing the brunt of the fighting in a future naval war, which are styled by the imposing title of battleships, may, it appears—at least some of them—be sunk almost in a moment by a blow which is much less heavy than an enemy might be expected to give in action. Enormous sums are spent in providing armor to protect them against gun-fire, but the structure upon which this costly armor is placed is apparently so frail that a mere touch suffices to send the whole mass to the bottom.

We have always understood that the division of a warship into separate watertight compartments was so minute and complete that she would be safe against sinking, even if many of these were damaged. The Victoria could, however, hardly have been sunk quicker if there had been no division at all into what are called watertight compartments. Sir E. J. Reed, whose knowledge and capability of judging cannot be seriously questioned, named twelve other battleships in the House of Commons that he asserted would have the same fate under similar circumstances. We know of nothing which gives reasonable ground for supposing that Sir Edward Reed is wrong; but, whether he be right or wrong, it is not only the duty, but the interest, of the Admiralty to have this grave question inquired into by an independent and impartial committee of qualified judges. We would like to know why the numerous watertight compartments of the Victoria failed so completely to serve the purpose for which they were devised, *i. e.*, to keep the ship from sinking when injured below water. Was it because, as has been often stated, her stability is so small that the filling of one or two of these compartments is sufficient to overcome the floating power of the remainder? Or was it a question of watertight doors being left open, or not acting when attempts were made to close them? Captain Bourke's evidence before the court-martial shows that all was tight in the engine room and boiler rooms, and the water was all confined to the fore side of the boiler room bulkhead. It appears, therefore, that the watertight doors were very soon closed, although they may have been open before the fatal blow was given.

Lord Armstrong stated in his recent speech at Elswick that the loss of such a ship "calls for very grave reflection as to the policy of devoting so large a proportion of our naval expenditure to the construction of those mighty vessels called battleships." We agree with Lord Armstrong upon this point, if it be the fact that our battleships are in reality so frail and unreliable as the sinking of the Victoria would indicate. It would be absurd to glory in their "might" if it rested upon such an insecure basis as that. There is little, however, at present upon which to form a definite

of 2,099 ft. It is estimated that the projectile reached an altitude of 21,456 ft., and its flight occupied 70.2 seconds. The Krupps have had a drawing made showing the flight of the projectile relatively to Mont Blanc, from which it is evident that it would be possible for the gun to fire over the mountain from Pre St.-Didier.

## Tuberculosis and its Prevention.

Dr. Anderson, the medical officer of health of Dundee, delivered an interesting address recently, so says the *Lancet*, with the view of quickening public interest on this important topic. After referring to the history of our knowledge of the specific germ and of the manner of its propagation, he mentioned the fact that tuberculosis had been calculated to cause one-seventh of the total mortality of the human race. It was remarkable that, notwithstanding this important fact, little practical interest had been taken in the matter by the state, local authorities, or individuals. An assumed theory of its unavoidable nature seemed to lie at the root of this baneful fatalism. Dr. Anderson maintained that all tubercle bacilli were derived from predecessors of the same character, and pointed out the facility with which this bacillus adhered to moist surfaces and propagated itself under insanitary conditions such as prevailed in the overcrowded houses of the poor. He also mentioned the opinion, held by bacteriologists, that the expired breath of those suffering from the disease was comparatively innocuous, while their sputum swarmed with bacilli, and on evaporation and desiccation was apt to become a fruitful source of infection. Hence the paramount necessity for a system

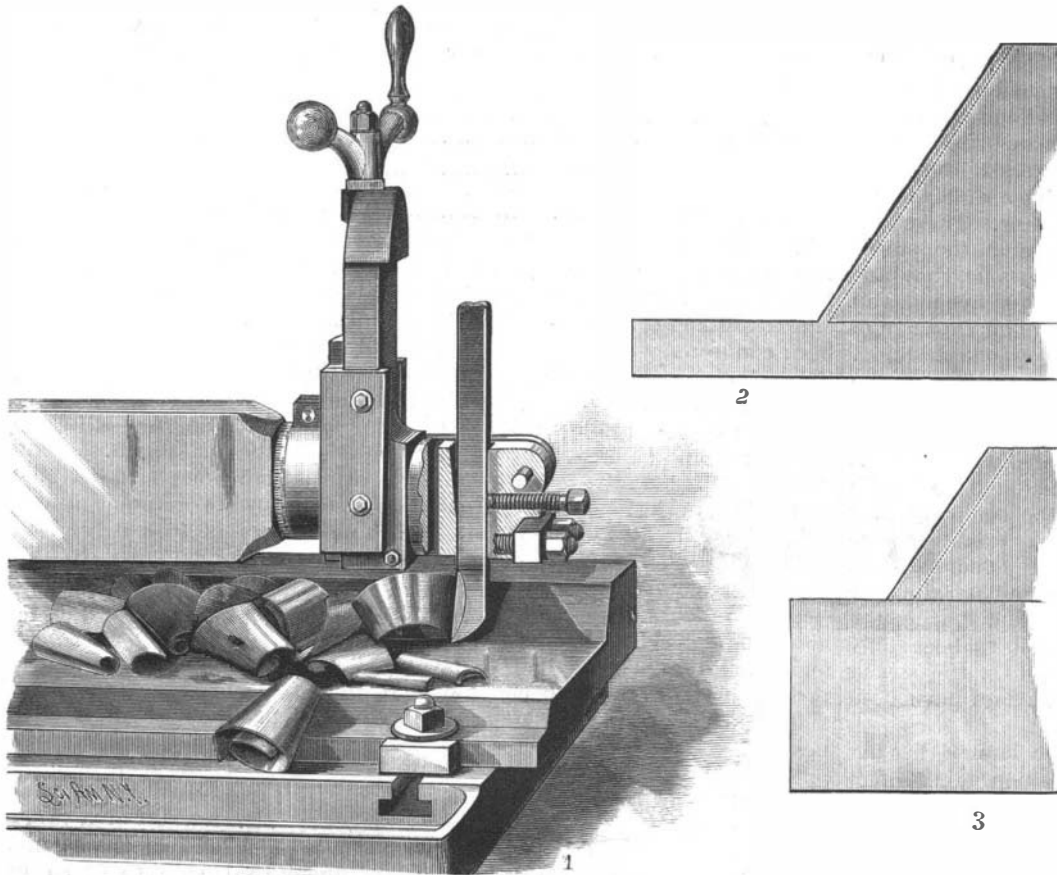
of destruction of the sputum, disinfection of apartments occupied by those suffering from tuberculosis and disinfection or destruction of articles of clothing likely to retain the germ. Referring to the large mortality from tuberculous disease, Dr. Anderson mentioned, as an instance of public apathy in the matter of its prevention, the fact that very few people applied for disinfection of material after death from this cause, in comparison with the numbers of those who took such precautions in the case of the various fevers. Passing to the subject of the disease in cattle, he pointed out the large mortality among these animals from this cause and also the relation of milk supply to infant mortality from tuberculosis. The proportion of deaths from this cause in children under five years of age in Dundee was found to be 1 in 11. All these facts pointed to the necessity for the householder to safeguard his own interests. Dr. Anderson concluded his instructive address by mentioning in detail the preventive and disinfectant measures necessary to secure the highest possible immunity from the scourge.

## Our Birds are Leaving Us.

In *Harper's* Susan Fenimore Cooper sings a gentle dirge over the departure of the birds from our forests and hedgerows. Selecting a typical region in the Northern Alleghanies, she shows how the birds have gradually become silent, first the great white pelican on the mountain lake, then the beautiful wild swan, and finally even the myriads of wild pigeons. This last bird is one of the most curious examples of the sudden destructive blows to whole species that man's presence can give. Seemingly one of the most numerous and prolific of birds—flocks estimated to be 240 miles long have been seen in this century—it is now practically a thing of the past.

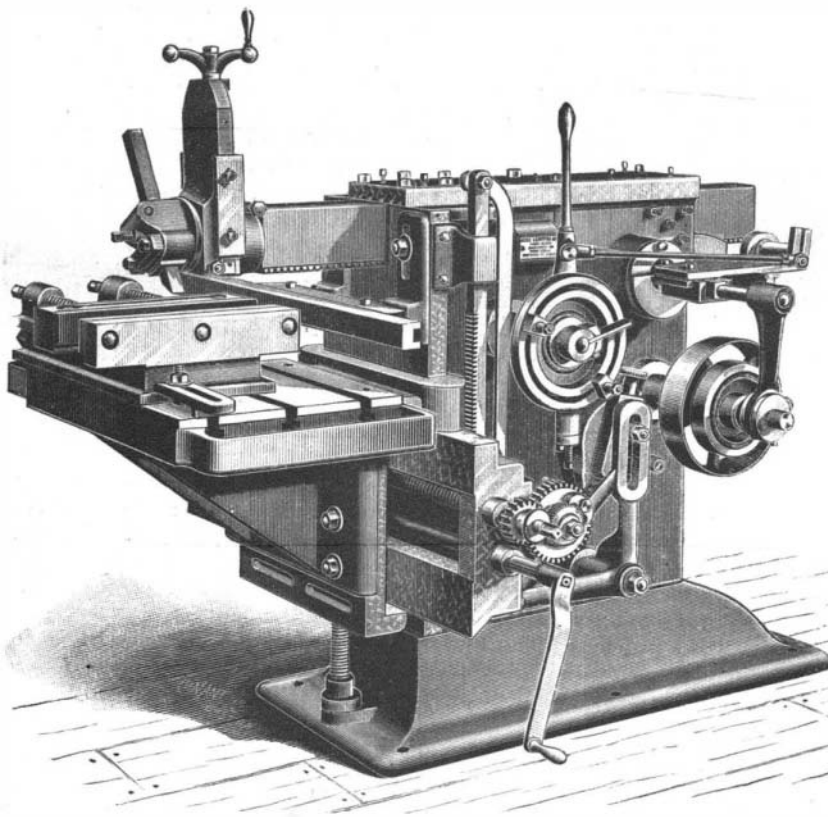
And as for the songsters, and the smaller feathered tribe:

"The friendly red-breasted robins, the beautiful blue-birds, the gay, musical goldfinches, those charming song birds the wrens, the gorgeous orioles, the purple finches, the dainty greenlets, the pretty cedar birds, the merry gold crests, and their cousins the ruby-crowns, those dainty sprites the humming birds—these and other bird families never failed in past years to bring joy with them to our lawns and meadows. Many of them are now rare visitors. The sturdy robins are much less numerous than they were formerly."



HEAD OF THE MORTON SHAPER SHOWING HEAVY CUT.

opinion upon the question, and no sign of the necessary information being furnished. We desire to know whether it be not practicable to build a battleship in watertight compartments so that no single blow would send her to the bottom; whether the Victoria was not believed to be so constructed, and whether she was so constructed in fact; whether other of our principal battleships are in the same case with the Victoria; whether the watertight doors were thoroughly efficient, and were capable of being readily closed from a safe position above water; and what is the best to be done in



THE MORTON DRAWING CUT SHAPER.

order to make existing ships satisfactory in these respects, if they be not satisfactory now, and would be in danger of meeting the fate of the Victoria under like circumstances.—*Engineering.*

A COAST gun built by Krupp, when being tested at the Meppen proving grounds recently, threw the projectile 65,616 ft., or nearly 13 miles, the gun having an elevation of 44 deg. The projectile weighed 474 lb.; the charge of powder 253 lb.; giving an initial velocity