IMPROVED "NOBLE" WOOL COMBER.

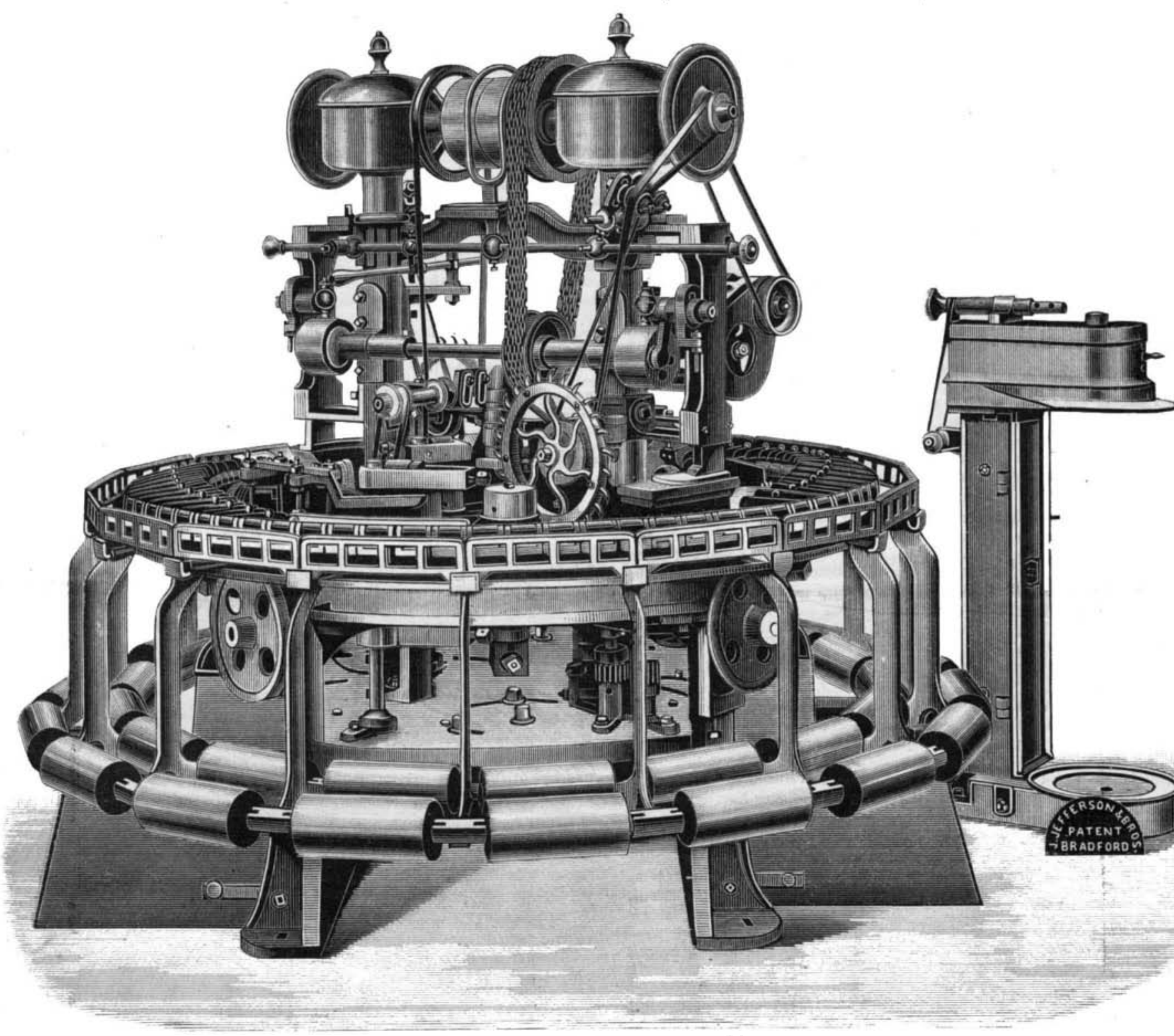
Wool combing may fairly lay claim to being an ancient industry. Centuries ago it had attained such a degree of importance that those engaged therein thought themselves entitled to the patronage of the saints, and therefore placed themselves under the protection of St. Blaise. History does not inform us whether much benefit accrued from this step to those who followed the occupation, but undoubtedly with the growth of wealth and the increase of population the numbers engaged in it grew in proportion to the requirements of the worsted trade. The simple implements of combing—the combs, fire pan, and the small etceteras—however, continued to be used until within quite recent times, when, owing to the stimulus given to other industries by the introduction of machinery, ideas began to be entertained that it would be beneficial to bring similar appliances into the worsted trade. For several reasons, combing was one of the first branches deemed suitable for the experiment. In 1790 Cartwright succeeded in constructing a practical machine for the combing of wool, but it was deficient in many respects.

Hawksley, of Nottingham, made a considerable advance upon Cartwright's machine, and this was followed at an interval of 35 years by the more successful attempts of Platt and Collier, as these were again distanced in 1842 and 1844 by the further advances accomplished by Donisthorpe. It is, however, to Josue Heilmann, the inventor of the celebrated combing machine known by his name, that the trade is most indebted for the success made in mechanical wool combing. The principle of this machine which has been further developed and improved upon by Messrs. Lister and Donisthorpe and others, rendered mechanical combing such a success that the old system rapidly disappeared before it, and the hand comber in the worsted industry has now become as nearly extinct as the hand loom weaver in the cotton trade. Subsequent inventors have continued the labors of their predecessors in the efforts to perfect this important machine. Among these one of the most successful was the comber of the "Noble" combing machine, which is deservedly the favorite in the trade today. Still even this was not perfect, as improvements continue to be devised to obviate the defects or imperfections that constant use has a tendency to reveal.

Among those who have been engaged in this task are Messrs. Joseph Jefferson & Bros., of Bradford, who have been making the "Noble" comb for seventeen years, and whose efforts have been rewarded with considerable success. They have embodied these in their improved "Noble" combing machine, which is illustrated herewith, and the points of which we proceed to describe.

The effects of the older form of the machine seem to have been that through the teeth of the comb being hot there was a tendency of the wool to rise upon or over them when the machine was stopped for a short time, so that when the machine was started, owing to the action of the dabbing brushes being somewhat behind the movement of the comb, the wool or sliver was drawn over the top of the pins, by which a quantity of noil was mixed into the top and spread out into the thread or yarn to an unknown length. The dividers were also late in their action as compared with the combs, which resulted in making slubs in the sliver. Another serious defect was the liability of the dabbing brushes to act simultaneously instead of alternately in their stroke, the result being that when this occurs the machine is severely shaken while this concert of action lasted, causing an excessive amount of wear and tear. In cases where there are a considerable number of machines in a room, and it occurs, that all the dabbing brushes are making their stroke at one time, a severe vibration of the building often ensues. This defect arises from the fact that usually the dabbing brushes are independently driven by separate straps, so that a slight difference in the tightness of these leads to the concurrence of stroke often complained of.

Messrs. Joseph Jefferson & Bros. have obviated these several defects in the following ways: 1. By the introduction of a new motion for driving the dabbing brushes (as shown in the illustration), from which both dabbing brushes are driven by one strap, alternate action being secured by the cranks being set at half centers. This perfectly effects the end in view so far as that point is concerned. But another advantage is also gained by the dabbing brushes starting to operate at full speed before the comb circles are on the move, which never allows the sliver or fiber to pass the center where the two combs come together before it is properly dabbed into the pins of the two circular combs, the result being that the size of the brushes can be reduced so as to cost not much more than half of their former price; and as they descend upon and are lifted from the teeth of the revolving combs more quickly, they are much less exposed to wear from the action of the revolving combs than formerly. This will be obvious to our practical readers. The bad work resulting from the comb commencing its revolution before the dabbing brushes could be got to work, as explained above, has been remedied by an arrangement whereby the dabbing brushes are set to work and acquire full speed before the combs begin to revolve. The same arrangement, or a corresponding one, includes the "dividers," so that all chances of the fibers of the top being doubled back upon themselves are carefully provided against, and slubby work prevented. It will be clear from these statements that, if thought desirable, the speed of the comb can be accelerated and a greater production secured. But, without insisting upon this point, it will be clear that the improvements introduced into the machine have considerably enhanced its value in the matter of producing better work, diminishing wear and tear, and effecting great economy by lessening the quantity of dabbing brushes required.—*Textile Manufacturer.*



IMPROVED "NOBLE" WOOL COMBER.

GRINDSTONES are made from natural sandstone, the stones being cut into shape and afterward turned.

Wood Screw Heads.

It may be questioned whether the present proportion of bevel, or angle, to the heads of wood screws is the best, and the proportion of diameter between head and shank is the best. A wood screw has a head that is twice the diameter of the shank, and its underside bevel presents a face that is two-thirds the diameter of the shank, or the original wire; thus: diameter of shank, $\frac{3}{16}$ inch; head diameter, $\frac{6}{16}$ inch; bevel of head, $\frac{2}{16}$ inch. Thus the head is very flat or broad in comparison with the shank, or size of the original wire from which the shank is formed.

Nails, which are driven into the wood and hold only by longitudinal friction, have very small heads—in finishing nails, hardly enough to redeem the nail's form from that of an elongated wedge. Screws hold by transverse projections—the thread—and certainly do not need any larger proportional head than do nails. All the heads of screws are "upset" in a heading machine; in some instances, as of short screws, the upset head absorbing one-third of the length of wire cut for the screw. This great spreading of course weakens the tenacity of the metal and tends to "broom" it out. To this weakness, inherent in the unfinished blank, is to be added the slotting of the head for the bit or blade of the screw driver. This cut, always of a generous width, extends in depth almost to the bottom of the beveled head (more than half way, making the head weaker as it goes downward because of the decreasing diameter of the head), in effect nearly splitting the head in two. There are faults in the present construction of wood screws that are apparent on consideration.

Suppose that the proportions of the screw were changed, so that the diameter of the head should be less and its bevel more. For instance, take the foregoing size of screw: shank, $\frac{3}{16}$ inch; diameter of head, $\frac{4}{16}$ inch; bevel of head, $\frac{4}{16}$ inch. This would make a head smaller in extreme diameter but twice as deep as the present style, while the head would be stronger because it was less upset from the original wire size, but the screw driver cut need not be any deeper. The long slant of the bevel of the head would obviate the necessity of a countersink except in very hard woods.

Experiments with Sorghum.

The experiments in the application of diffusion and carbonitation to sorghum cane made at Ottawa, Kan., by the Commissioner of Agriculture have recently been completed. Prof. Wiley, who was in charge of these experiments, says in his preliminary report that the yield of sugar from the cane was more than 99 per cent, only 0·12 of one per cent being left in the waste waters and exhausted chips. The yield of crude sugar, that is, as it comes from the vacuum pan, went as high as 280 pounds per ton, or, at 12 pounds per gallon, 23·3 gallons per ton, a result fully double that obtained by the ordinary methods. The process of carbonitation, the adding of a large excess of lime to the juice, and then precipitating it with carbonic acid, was completely successful. The product obtained was lighter in color and more palatable than that of the usual method hitherto practiced, while the saving in scums is estimated to be at least ten per cent. The difficulties encountered were entirely of a mechanical nature, and easily overcome.