A NOVEL TOOL-GRINDING ATTACHMENT.

Prof. C. V. Boys, of the Royal Society of Great Britain, has designed a novel tool-grinding attachment, the object of which is to provide a means economical, handy and easily understood by a mechanic, of accurately grinding lathe and planing tools. It is not a universal grinder, and it will not grind reamers, milling cutters, and a number of things for which well-known but expensive and elaborate tools are essential. But what it does do it does easily and well, and is especially applicable in small shops where expensive grinding machinery is not required. It is true it only does what the average workman himself thinks he can do sufficiently well, but the better the workman the more he knows that he dare not, especially with cranky and awkward tools, approach so near to the proper relief angle as he should, and the more ready he is likely to be to welcome a simple and handy, but accurate guide.

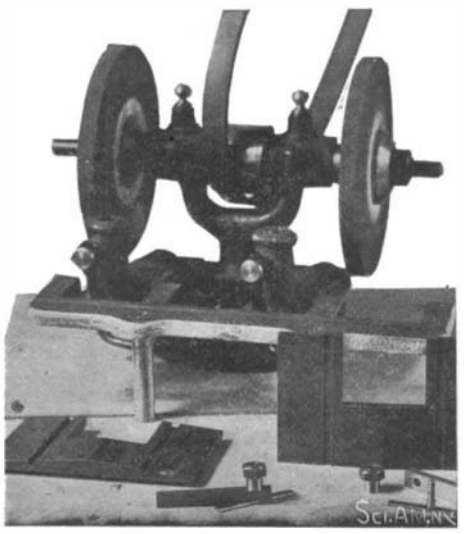


Fig. 1.—TOOL GRINDER WITH REST DETACHED.

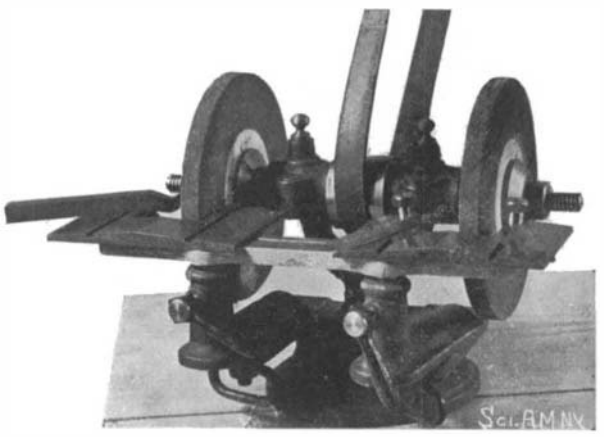


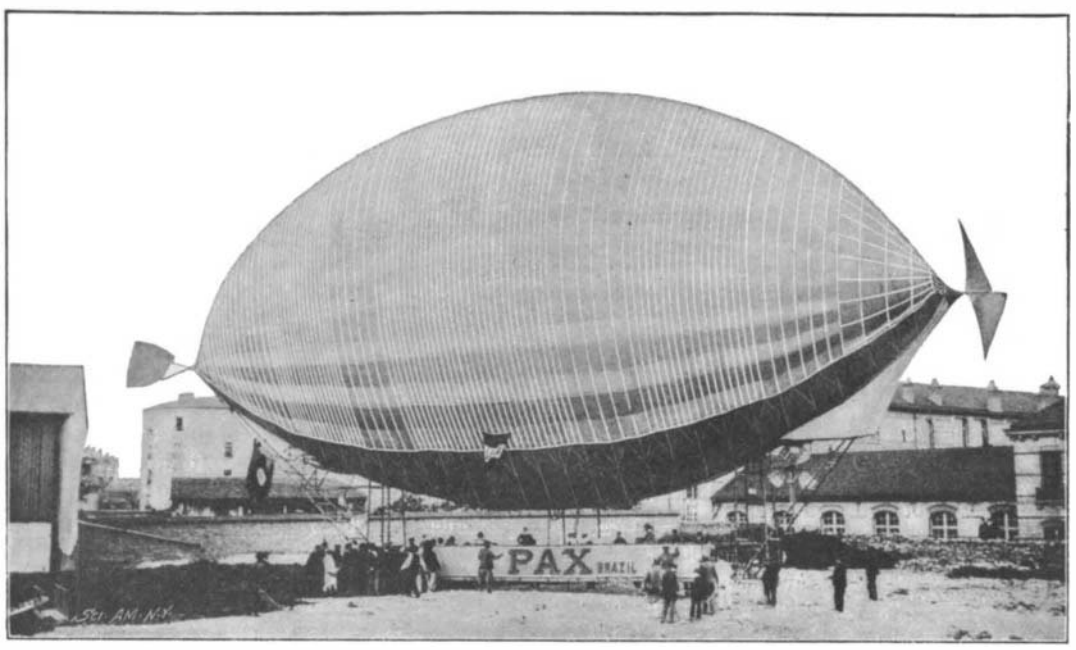
Fig. 2.—GRINDER WITH REST IN PLACE.

It is a simple device, consisting, as will be seen from the illustration, of an ordinary grinding head with a pair of wheels made to carry a platform of double U-form in plan, in which there is a longitudinal groove. In general, the platform is clamped, so that the groove is parallel with the axis of the grinding head. Upon the platform rest two double inclines, the form of which is very clearly seen in Fig. 1, while they are shown in position in Fig. 2. One of these, which is made to embrace the coarser cutting wheel, is sloped on each side to an angle of say 5 degrees, while the other, which embraces the fine cutting and finishing wheel, is sloped on each side one degree less.

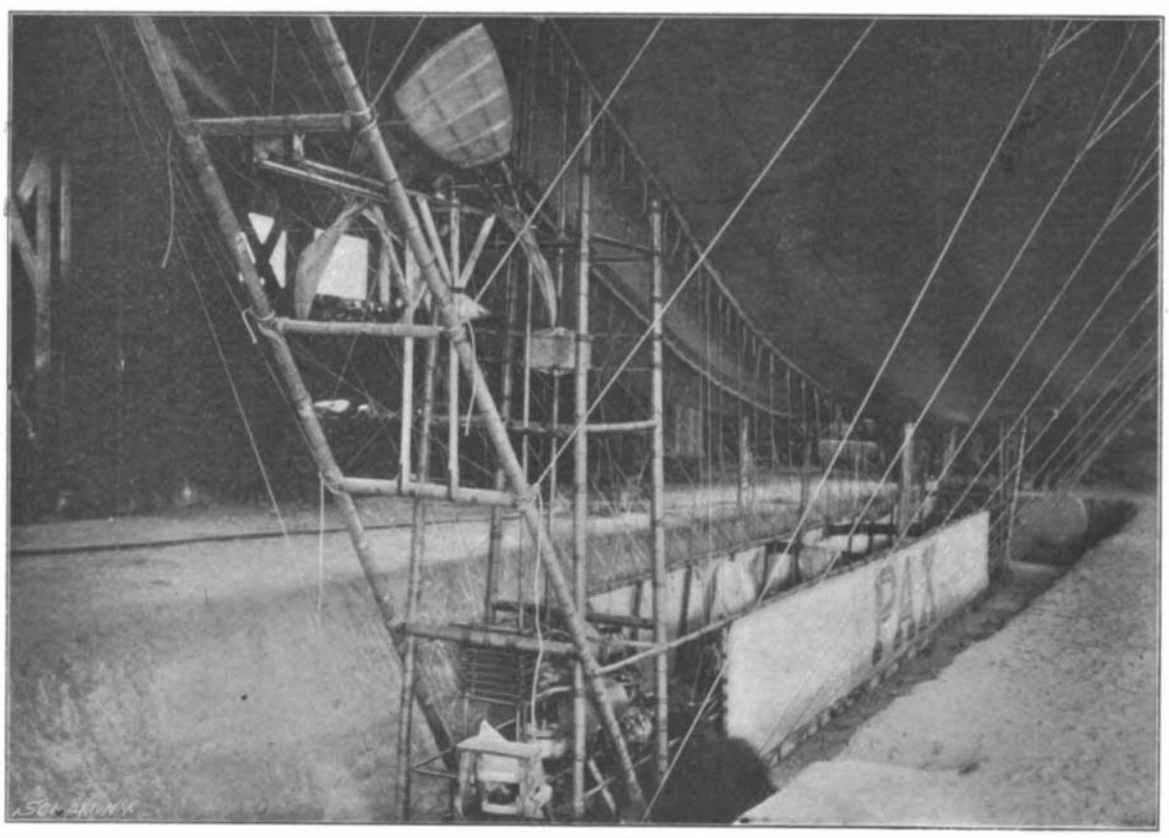
Suppose it is desired to grind a round-nose tool, in which, of course, there is no profile angle, it is laid by its shank upon the steeper double incline, and its round nose is brought to bear lightly against the flat face of the wheel, while the shank is swept over the incline. This is done on each side of the coarser wheel, and a relief angle of 5 degrees is accurately ground. It is then picked up, and with one light sweep on each side of the fine wheel, the edge only is finely ground to one degree less. If the tool is cranked below the shank level, the open mouth of the double incline gives room for the crank as shown at the left of Fig. 2, or if it is a very small tool adapted with a holder, it may be at once supported closely to the wheel. The fine grinding need not extend more than a very little way down below the edge, but with a light and rapid sweep it will reach to the bottom. Should it be arrested before this, the resulting angle of 179 deg. is seen perfectly clean and sharp, thus testifying to the precision in the work done.

Next suppose that a tool is required with definite profile angles. For this purpose the angle guides seen in Fig. 1 are set on a protractor. They are then laid in the grooves of the steeper double incline one on each side, as shown to the right of Fig. 2, and the shank of the tool is brought up against the guide, resting at the same time on the inclined face. The edge is then traversed up and down the face of the wheel, under a light pressure. As the vibration keeps the double incline almost floating, this can readily be accomplished with the greatest delicacy. As soon as the angle grinding is finished, the tool is picked up with its guide, and placed upon the less sloping double incline of the finishing wheel, and a delicate sweep taken across its face. The obtuse angle of 179 deg. will now be far more conspicuous than it was in the case of the round-nose tool. The other edge, or as many as there may be, are then ground in the same way.

A screw-cutting tool ground as exactly as described would suffer from the defect that its nose would not be inclined to the angle of the rake of the thread, and thus would cut more keenly on one side than the other. This difficulty is overcome by the simple device of tilting the whole platform to an extent, determined by a washer, stamped with a number representing the diameter divided by the pitch. The effect of this is to alter automatically all the angles, so that the relief is right on both sides, and the nose of the tool slopes at the same angle as the rake of the thread. It may be mentioned that not only is a tool ground accurately and more quickly by this simple contrivance than by hand, and when ground it need not be tested by an angle gage, but when applied it may be set in the slide rest correctly by its shank, instead of by the short cutting edges and the angle gage, which is necessary when hand grinding is resorted to. Then there is no fear of the two sides of a thread having different angles if they are desired to be alike. There is one feature of this grinder that may not be apparent at first sight, though it is obvious when pointed out. If the protractors are each set to say 30 deg., the edges of the tool will make an angle of 60 deg. with one another, symmetrically situated with respect to the shank as already explained. This will cut a screw thread in which the angle as tested in the axial plane is 60 deg., but the actual angle measured across the thread will be just under 60 deg., namely, such an angle as projected will appear as 60 deg. Now, if the tool had been ground by its edge, tested with a protractor so as to be exactly 60 deg., the form of the thread as seen in an axial section would be just over 60 deg. In most cases the change in the angle due to projection would not be enough to be of any consequence; but where such precision is essential, it is convenient to be able to set the guides to the angle, as shown in an axial section direct without having to make the calculation or allowance for the effect of projection.



First Trial of the "Pax" on May 4, 1902.



The Car, Motors, and Steering Propellers of the "Pax."

AIRSHIP "PAX," IN WHICH SEVERO LOST HIS LIFE.

TOTAL WRECK OF THE SEVERO AIRSHIP.

To the list of enthusiastic aeronauts who have sacrificed their lives in the interests of aerial navigation, the name of Augusto Severo must now be added.

At about 5 o'clock on the morning of May 12, a crowd of spectators was gathered in the airship grounds in the Rue Quintinie to witness the ascent of Severo in his airship "Pax." In the car were Señor Severo and his engineer Sachet. It is said that at starting there seemed to be some difficulty with the steering gear and the propellers. But after several stoppages the airship sailed off steadily enough in the direction of Issy, where the experiments were to be made. As the ship hovered over the Avenue Demaine, she was caught by a puff of wind and blown about in such a fashion that to the onlookers it became immediately apparent that Severo had lost all control. A bright flash of light suddenly enveloped the balloon. A loud report instantly followed. From a height of 1,500 feet the machine fell toward the earth, crashing through branches of trees, finally landing in the Avenue Demaine. Severo was hurled from the balloon as it fell, and struck the ground near the Mont Parnasse station. He was picked up a mangled corpse. He struck the ground feet first, and with such velocity that the bones of his legs were forced through the soles of his boots. Sachet, it seems, was burnt to death.

At this early date it is rather difficult to explain the cause of the accident. The men who built the balloon claim that the accident was due to the explosion of one of the reservoirs. Santos-Dumont holds that Severo's motor was located much too near the gas bag, and that as Severo rapidly arose the gas expanded and was driven out through the valve and sent against the motor. Col. Renard, of the French army's balloon di-