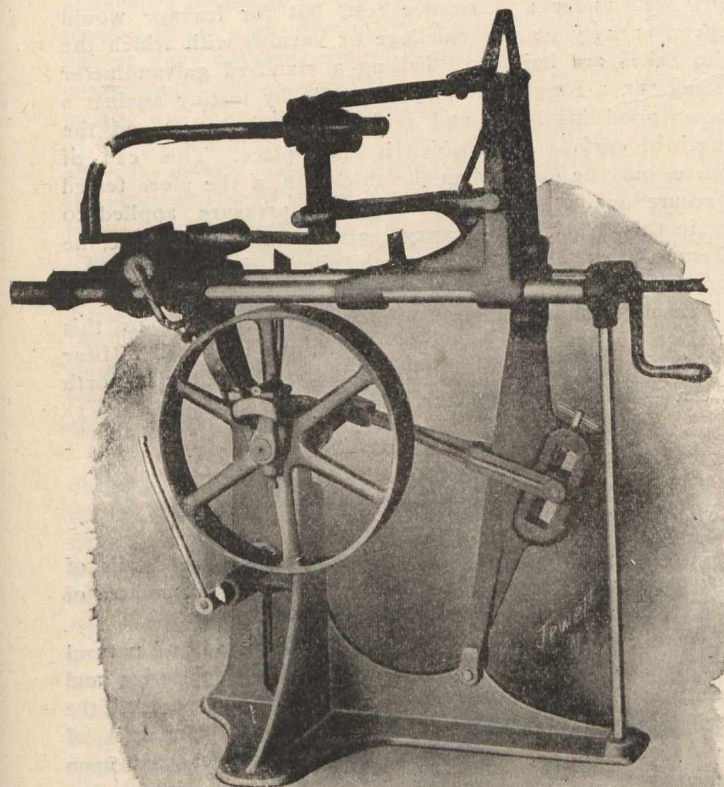


THE FAIRBANKS POWER HACK SAW.

The accompanying cut represents the Fairbanks Power Hack Saw, which is being manufactured and sold by the Fairbanks Co., throughout Canada. This saw was designed for the purpose of combining speed, accuracy, durability and economy, and the results obtained in each particular enable the makers to claim that it is superior to any machine on the market. Several of these saws have been placed in large manufacturing factories throughout Canada, and to thoroughly appreciate the value of this machine it must be seen in operation. It is of interest to the shop-owner because it is durable, saves saws, and increases the output, while its simplicity and convenience please the operator. Although it has advantages lacking in other makes of saws, the cost is about the same.

The Fairbanks Power Hack Saw has been built to satisfy the demand for a reliable and economical saw. It is constructed on correct mechanical principles, for longest wear, and to obtain the best and greatest amount of service from hack saw blades. It is a compact and self-contained machine of a high grade, using saws from 9 to 14 inches long, though especially intended for blades up to 12 inches in length. It does the cutting on the pulling stroke, with weight of saw frame and levers lifted off the blade on its forward or idle stroke. This arrangement keeps the saw blade sharp longer, and enables it to do thirty per cent. more work than machines of ordinary construc-



tion. One of its valuable features is the spring tension, which acts on the saw frame, and is much more effective and convenient than the weights with which hack saws are ordinarily equipped. The connection from the pulling end of saw blade to main lever is rigid. The steel overhanging saw arm gives a constant tension to the blade, and facilitates the quick insertion of blades or changing for different lengths. The stroke of the saw blade is readily changed while the machine is in motion, thus utilizing the full length of the blade for effective work. The stroke may be varied from $6\frac{1}{4}$ inches to 8 inches to suit the size of work being cut. It has means for adjusting the saw blade to make it cut straight or squarely through a piece of stock, even when the blade has more clearance, or is duller on one side than the other. It has a driving clutch that locks the crank to the driving pulley, without end friction on the bearings with its consequent loss of power. It is provided with an adjustable automatic stop that will always stop the machine when the cut is finished. The stop may be quickly set to stop

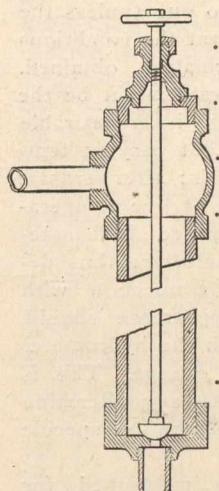
the machine when the saw has cut partly through a piece, and it will operate positively to within 1-32-inch from the point where it is desired to end the cut. The machine is so quickly and yet so easily handled that it is almost impossible for even a careless operator to pinch or jam his hand in operating it, a fault very common with many of the machines on the market. Further information will be furnished by the Fairbanks Co., Montreal, or by any of its branch houses.



A HOME-MADE STEAM TRAP.

At the recent meeting of the New England Cotton Manufacturers' Association, Thomas H. Smith described, as follows, a home-made steam trap which he had invented:

"It consists of three feet of two-inch pipe with a cap on the top, and the stem and gland of a $\frac{1}{4}$ -inch valve inserted in the top. That stem is attached to a brass rod 5-16-in inch diameter. On the bottom of the rod is a little hemispherical piece



Home-made Steam Trap.

of packing, which is sufficiently hard to resist the action of steam. If you get anything softer than this, the steam will melt away. The ratio of expansion of brass and iron is practically as three is to two; that is, you will have three points of expansion in brass to two in iron. Steam at 50 pounds' pressure contains 297 degrees of temperature. Taking 200 degrees as the difference between the inlet steam and the outlet water, a 30-inch trap gives nearly 1-32 inch in expansion, which is sufficient to drain the trap. I have noticed that this trap has one advantage—the trap is open when it is empty. That should be the case with all traps, so that when the steam is turned on the water will drain out of the pipes, and the pipes can also drain themselves after the steam is turned off. Turn the steam on, and the water will come out of the half-inch pipe and fill the pipe at a low pressure. As soon as the steam begins to come, the rod will close the valve entirely. After that it will open itself slightly and allow the water to trickle out in a hot stream. With this little valve arrangement at the top, you can set it so that more or less steam may pass."



ON INSULATION.

(Concluded from October issue.)

5. That insulators of any description should have a high insulation per mil of thickness is a very important matter, especially in generators and motors, when looked at from the "space factor" point of view. It is surprising what a large percentage of the available winding space is taken up by insulation in generators and motors, more especially in high-tension alternating-current work.

Having considered in detail the points of good insulation, it remains to consider what tests can be conveniently made with a view to securing a many good points in the insulation used, always bearing in mind that electrical tests are by far the most convenient in a manufacturing works, which is generally far from being a chemical laboratory. Particulars of tests as published by manufacturers of insulation are at times misleading, as frequently it is not stated whether the breakdown voltage was with continuous current or alternating current, and if the latter, whether the value is R.M.S. or maximum. Further, some manufacturers test between terminals shaped hemispherically and others between two flat discs. Again, some only test for an instant at the voltage named, merely bringing the voltage up and down again. It is possible, therefore, for the material to break down under a much lower voltage even if only sustained for a short time. Information of this description is of no use to the designer; that will readily be understood. Consequently some systematic way of testing all insulating materials is required. This need only be