A NOVEL USE FOR A STEAM ENGINE.

Mr. W. L. McLaren of Ottawa sends in the following interesting description of an impromptu method which he applied to cutting irregular holes and spaces in some thin pieces of metal. Finding that drilling and filing these holes by hand promised to occupy a considerable time he devised a method of using a small upright steam engine which he had made several years ago for experimental purposes. The stroke and bore of the engine were each about I inch in dimension.

After removing the piston rod and head, a hole was drilled the size of the former in the centre of the cylinder head, and the shank of the saw, being of the same cross-sec-



tional area as the piston, was run entirely through and connected with the cross head in the same position is the piston. To reduce the number of moving parts, the eccentric and eccentric strap were removed, and the fly wheel of the engine was then belted to the countershaft on his bench lathe.

A table was improvised, using an ordinary clamp and a couple of pieces of flat iron as shown in the accompanying photoe photograph, the pieces being bolted so as to allow of small adjust. adjustments. The outfit could be readily taken down or set up in a few minutes' time.

The question arises why the shank of the saw was not ne question arises why the snank of the apparatus nerely connected directly to the piston and the apparatus hun by steam. This was not feasible as steam was not available, and because the engine was of such a small size that it would a would hardly generate sufficient power to do the work; where-as, wh as, when the outfit is operated by belt it transmits sufficient power to changing of the power and allows a variation of speed by the changing of the speed of the countershaft.

By plugging the hole in the centre of the cylinder head the steam engine may again be used for its original purposes.

The Dominion Engineering and Inspection Company, of ¹he Dominion Engineering and Inspection on the Montreal and Toronto, have been appointed to inspect the fabrication of the centre in word for placing the centre fabrication of the travelers to be used for placing the centre ban of the Quebec bridge. These travelers will be manufact tred by the Structural Steel Co., Limited, for the St. Lawrence Bridge Company.

SOME FEATURES OF THE MACHINERY EXHIBIT AT THE PANAMA PACIFIC-INTERNATIONAL **EXPOSITION.**

Such great advances have been made during the last decade in the perfecting of methods of shaping metals, that many of the machines for this work are of extreme interest. Also, the improvement in the processes of producing purer metals has contributed its part toward making many of these methods possible and practicable. Every visitor to an oldtime machine shop, and such a shop existed up to a very few years ago, recalls the long lines of shafting, pulleys and belts overhead for transmitting power from the engine that drove the shop to the machine that did the work. All, or nearly all, of this arrangement has now given way to the system of driving each machine by electric motor. The steam engine in the shop no longer drives a long line of shafting, pulleys and belts, but drives, instead, a generator, supplying power to the motor mounted on each machine, and, in this way, any one machine may be operated while the remainder of the shop is silent.

The rapidity of work always counts if quality is not sacrificed, and the use to-day of special steel alloys for making cutting tools has rendered possible high speeds of cutting thought impossible a decade ago. Some of these high speed steels are so hard and tough that they can cut an enormous chip from a piece of metal, making both chip and tool point red hot, yet not wearing away unduly the point of the tool.

These machine tools include lathes, planers, shapers, drills; boring, milling and slotting machines, besides tools for special kinds of work. In fact, a milling machine might be called a special tool, as it can do a remarkable variety of intricate work in shaping metal, and its precision is far greater than can be obtained by hand work.

Among the most interesting of the special machines that will be shown at the Panama-Pacific-International Exposition in celebration of the completion of the Panama Canal is the screw-cutting machine, which makes not only wood screws and bolts, but a great variety of articles that are cut from a revolving piece of metal, such as lock tumblers, sewing machine shuttles, hollow nipples for gas fixtures, and the like. These machines are almost human, and an intelligent boy in a shop can look after the operation of a dozen of them. After the machinist sets one of these machines with the proper tools for cutting any of the shapes required, all that need be done further is to feed a 16 ft. rod of metal into the machine and set it going. The machine automatically cuts from the end of this metal the screw or bolt or other article, moving about as if human hands were handling the piece and finally finishing it and dropping it into a box. The machine of its own accord feeds the rod further in, so that another article may be made and so on until the rod is entirely used up, and if another rod is not put in immediately the machine stops of its own accord.

Another extremely interesting and recently developed class of machines is composed of those for grinding curved or flat surfaces. These do not use steel tools, but use various wheels made up of emery or other hard grinding material, which revolve very rapidly and perform the required work. In this way, surfaces may be ground to far truer shape than by any other process yet known; for example, the smooth parts of an automobile engine crank can be cut from the rough forging in a remarkably short time.

The metal presses form still another class of special interest. There are many varieties of these for pressing such things as rifle cartridge cases, lead pencil ferrules, collar buttons, small tin boxes and many other articles. These are made from flat discs of metal, and many of them are shaped