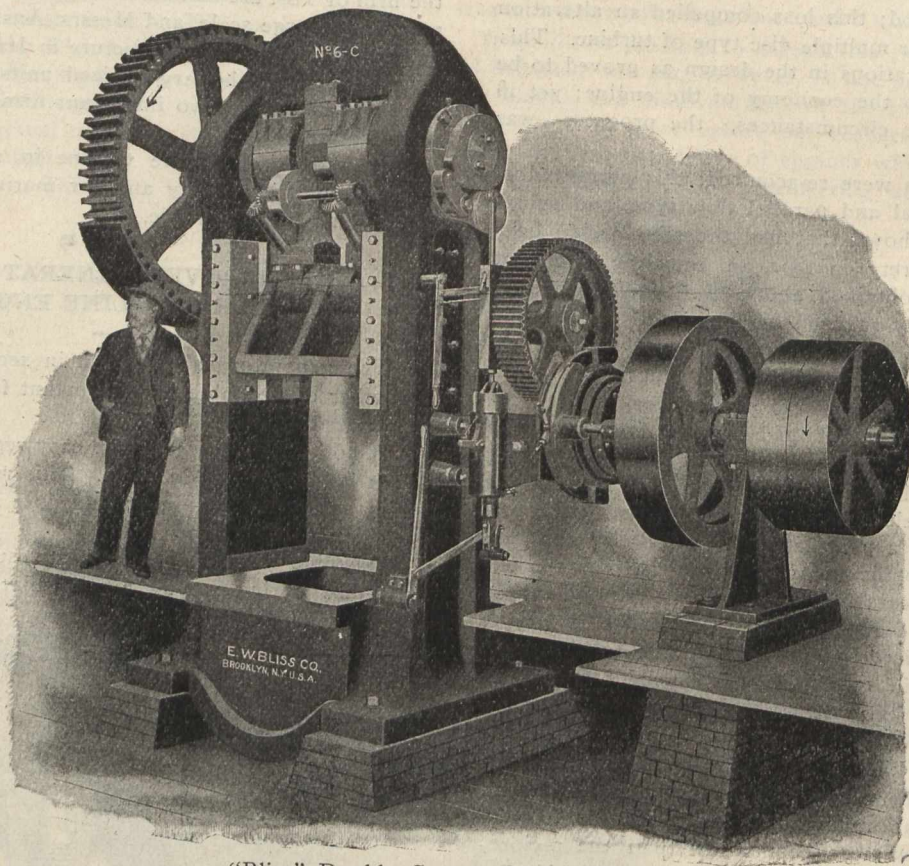


A "BLISS" PRESS OF GREAT POWER

The art of rolling sheet metal has been so perfected that sheet steel, brass, copper, aluminum, silver and gold can be rolled into any required gauge, and the alloying of these metals is so thoroughly understood by experts that sheets for any purpose can now be prepared. The perfection of this industry has naturally led to another art—that of the manufacture of machinery and tools for making these sheets into such articles as buttons from the smallest to the largest, jewelry, pins, needles, clocks, lamps, all kinds of kitchen utensils, hardware of all shapes and sizes, such as skates, hinges, cutlery, mower sections, bicycle parts and fittings, rakes, wagon hardware, and many other different kinds of articles for all purposes; details of which are very numerous. Many of these articles are made on the smaller and entirely automatic presses, while the larger articles, as steel

the stopping and starting can be done by hand, or by an automatic device, either of which can be almost instantly used. While setting the tools the machine can be operated with the hand arrangement, giving the operator full control of the slide movement. After he has set up the dies properly and then tried them with his hand trip and finds everything all right the automatic lever can be thrown in and the press operated in the usual manner, making one stroke at each depression and stopping at the top centre. Every convenience has been embodied in this machine for the rapid production of the work for which it has been built. The back shaft is fitted with an outboard bearing of large diameter and does not extend across the back of the press, as the back must be as accessible as the front below the slide face. All gears and pinions are cut from the solid, even the



"Bliss" Double Geared Power Press.

barrels, washtubs, foot tubs, steel sinks, steel pulleys and many similar articles, call for specially large power presses, which must be quick in their action and perfect in their movement carrying a cutting die as accurately as the most delicate machine made for watch work.

This has been accomplished in the large double geared power press shown in the accompanying cut. This press is probably the largest and heaviest one-piece frame machine of its class ever made—the frame casting alone weighing nearly 16 tons. The other details are all in proper proportion, the eccentric being $15\frac{1}{2}$ inches in diameter, giving the main shaft a stroke of 6 inches. The main journals are bushed, so that no wear will come on the frame. The slide has very long guides, and is finely fitted with adjustable gibs for taking up wear. The finest watch hand cutting dies could be worked in this press, so far as accuracy goes. The guides are 3 feet long, and the slide is supported its whole length in them, while the press is doing its work. The slide has an adjustment of 2 inches in the connection. The distance between the columns is only 48 inches, as in this machine great strength is required, rather than a large bed area. The bed surface is nearly square. The distance from the bed to face of the slide when up is 42 inches. This gives room for the various special and intricate dies which are to be used.

The machine can be handled as easily as a smaller one, as

large main gear. All parts are well balanced and carefully fitted. The total weight of the machine is about 80,000 lbs. It has been designed and built by the E. W. Bliss Company, 21 Adams Street Brooklyn, U.S.A.



UNIVERSAL MILLING MACHINES.

The need of a milling machine in machine shops, no matter how small, is becoming more marked from day to day. We illustrate herewith the Brown & Sharpe No. 2 Universal Milling Machine, with hand or automatic vertical feed. This machine embodies many features that make it even more accurate, trustworthy, and efficient than earlier machines of equal capacity. In designing this machine careful attention has been given to the arrangement of the various parts to insure ease of manipulation, compactness and simplicity. The parts are easy of access, a feature much appreciated in all machine tools, as it allows them to be properly cared for without unnecessary expenditure of time. The wearing surfaces and spindle bearings are amply proportioned to insure rigidity and to withstand the most severe service to which machines of this size and capacity should be subjected. The flat bearings are scraped to surface plates, kept true with master plates, not for a finished surface, but as a mechanical necessity to insure correct alignments. The cylindrical bearings are ground and fitted to standards; the