by means of the two levers shown on the front of the hood. This headstock contains an assemblage of gears oppositely disposed on the upper and lower shafts, engaged and disengaged by throwing the levers to right or left. The proper combination of the levers for any desired speed is indicated by prominently placed index plates. The range of speeds thus obtained through both the headstock and the motor

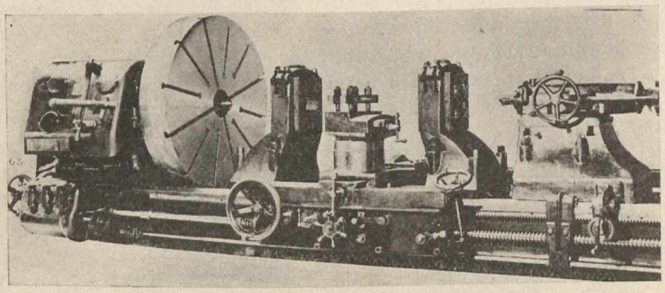

Fig. 1.

is very wide, varying by minute gradations, and far superior to the machine driven by belt through cone pulley. The levers operating the gears in the headstock are readily thrown as the operator desires by simply releasing a knob, and all danger and liability to error are eliminated—a very important consideration in the operation of these heavy lathes. The compactness and neatness of the entire arrangement of the headstock and motor driven are well shown up in Fig. 3.

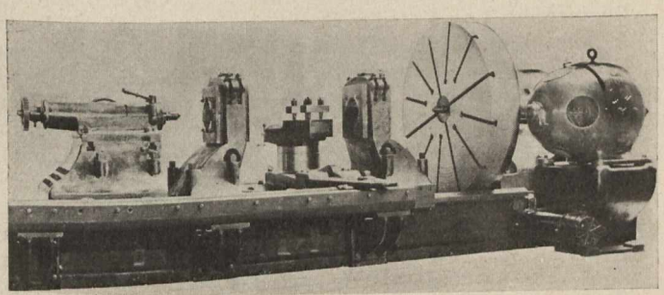

Fig. 2.

Below the all-gear headstock, on the head end of the bed, is located the geared feed changing device. Through the three levers, shown at the front of the box, seven distinct and positive feeds are obtainable without removing a single gear. The gears are mounted on two shafts, and are

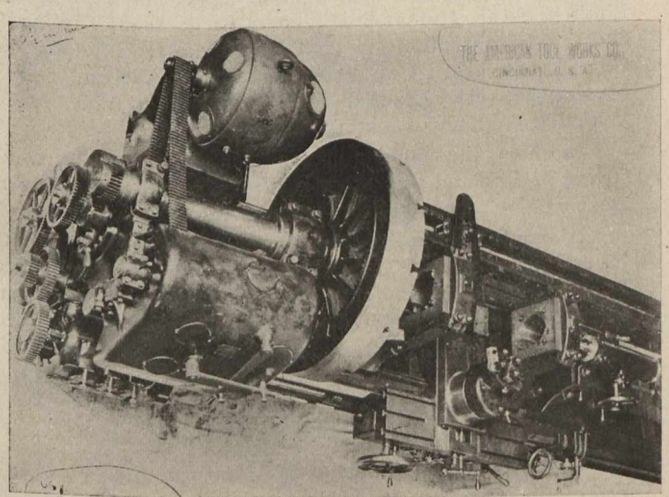

Fig. 3.

completely housed in. Simple index plates show clearly the various combinations for obtaining any desired pitch or thread.

Aside from the motor drive, the features of especial interest, on this particular lathe, are the roll-turning attachments. The heavy housings shown are for the purpose of holding heavy pipe roll castings. At the rear of the machine, mounted on the rear of the bed, is shown an interesting roll-forming attachment, well conveyed in Figs. 2 and 3; the purpose of which is to impart curved surface to long pipe straightening rolls. It operates on the principle of a taper attachment; a shoe, provided with anti-friction rollers, slides in a trough following master bars, thus generating the same curve on the rolls being turned. Straight work can be turned by simply disengaging the nut which holds the shoe and by tightening cross feed nut.

The concaving rest, shown in Fig. 3, is interchangeable with the compound rest, and is used for grooving out pipe welding rolls, with capacity for rolls for pipe from 2 to 20 inches diameter; a limiting gauge, which is provided, being of great value to the operator in getting the tool to any desired diameter. This rest operates with rotary motion, through worm and worm wheel, with either hand or power feed, the latter being derived through the feed rod and carriage with all the advantages of the regular feeds.

Otherwise the lathe contains all the features of excellence peculiar to "American" lathes, including the heavy drop V bed, making the actual swing 62 inches. All gears throughout are coarse pitch and wide face, cut from the solid.

Further information will be cheerfully furnished by the makers.

SEWAGE DISPOSAL WORKS IN GLOUCESTERSHIRE, ENG.

By W. Hollingworth, C.E., Toronto.

The Septic Tank system of sewage treatment, which has found great favor in England as the most economical solution of the problem of the disposal of all descriptions of sewage and trade wastes, is now being accepted in Canada as the most satisfactory method of dealing with the waste products of towns and cities.

The following is a description of works on this system carried out by me for the rural districts of Stroud, Gloucestershire:—The sewage is received at the outfall works direct into the grit chamber which is designed to arrest all road detritus and other non-oxidizable matter. From thence it passes into the Septic Tank through submerged openings, the outlets also are placed below water-level, this excludes all light, and to a certain extent air, and prevents any disturbance of the upper contents of the tank. The tanks are in duplicate and covered over with concrete arches having air-tight manhole covers and ventilators fitted with fine copper gauze. The solid matter contained in the sewage on entering the tank is broken up, some of which descends to the bottom, other floats to the surface according to the specific gravity. This floating matter undergoing decomposition forms a scum on the top of the sewage in the tank. During the winter this scum attains a thickness of two or three inches, forming a rough and coherent layer of considerable toughness, the surface of which becomes covered with a variety of fungoid growths; during the summer, however, this reduces to about half this thickness.

Light and air being excluded from the tank the anaërobic bacteria originally present in the sewage increases to an enormous extent, and attacks all organic substances, the more complex of which are converted into simpler compounds by their action, the ultimate result of the decomposition being the production of ammonia, carbonic acid gas, considerable quantities of hydrogen and methane; these two being highly inflammable have been used in some cases for illuminating the works at night. The sewage now in its semi-clarified state, through the action of the anaërobic bacteria, flows through a circulating chamber, which automatically precipitates any suspended matter which may find its way through the tank outlets during times of abnormal flow, into an aërating trough, flowing over the sides of which in thin sheets into the pipe leading to the alternating distributing gear, and from thence on to the filters which are open tanks 5 feet in depth, filled with crushed furnace clinker, and having collecting drains at the bottom joining main collectors and terminating in discharging wells. The filters are arranged in groups of four and are filled and