

A NEW TRENCH EXCAVATING MACHINE.

Among the recent developments in excavating machinery is its application to sewer trenches, the excavation of which by hand often requires the removal of much more material than is actually needed for the trench, owing to the necessity of having the trench wide enough for the men to handle their tools. In deep trenches, also, the work by hand labor is often increased by the necessity of working in stages, the material being handled two or three times before it reaches the surface. The accompanying cuts represent a new trench excavating machine which does the work cheaper and quicker than by hand, and which has already been used on contract work with success in different kinds of soil.

The machine consists of a frame built up mainly of steel I-beams and mounted on four broad-tired wheels. Over the front axle is a shaft to which is pivoted a frame about 20 ft. long com-

lowering the free end of the cutter frame. The cutters travel up along the working breast, loosening material which is carried up by the blades or scrapers. At the head of the machine this material is dumped upon two horizontal belt conveyors, at right angles to the trench, which discharge the excavated material either into wagons for removal or upon the ground alongside the trench ready for the backfilling. The machine hauls itself along by means of a wire cable anchored about 300 ft. ahead. This cable is wound upon a drum which has at one end a ratchet driving wheel. The pawl of this wheel is operated by a rod from an eccentric on the main shaft of the machine, and the throw is adjustable, so as to allow of regulating the speed of advance or feed according to the depth of cut and the character of the material.

Power is derived from a 25-HP. traction engine coupled ahead of the machine. The main shaft of the engine carries a sprocket wheel connected

machine at work in front and the pipe laid ready for the backfilling.

The machines have been used at Chicago, Flossmoor, Harvey and Glencoe, Ill. At the latter place about 6,000 ft. of trench have been excavated, the width being 2 ft. and the depth from 9 to 15 ft. The material there was very hard stiff clay, which stands well, as may be seen in Fig. 2, requiring sheeting boards only at intervals of about 18 ins. The sheeting is supported by iron screw-jack trench braces. The 2-ft. trench would be too narrow for excavation by hand, but just allows room for the pipelayers to work, the pipe being kept up to within about 15 ft. of the machine. Behind the pipelaying the backfilling is done by a horse and drag scraper, with two men; the scraper working across the trench and scraping the excavated material from the ridges into the trench. In this hard material the excavator advanced about 50 ft. an hour, but in good earth, free from boulders, the progress may be as much

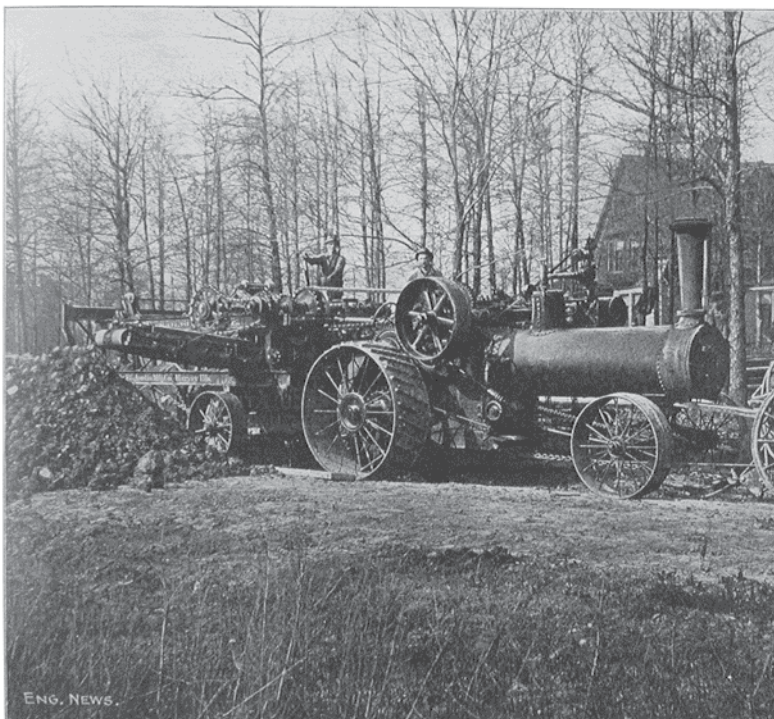


FIG. 1. TRENCH EXCAVATING MACHINE AT GLENCOE, ILL.

Municipal Engineering & Contracting Co., Harvey, Ill., Owners.

F. C. Austin Mfg. Co., Harvey, Ill., Builders.

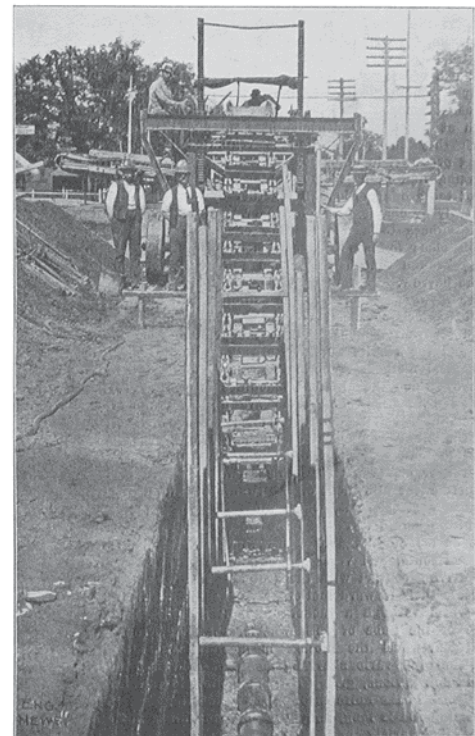


FIG. 2. REAR VIEW OF TRENCH AND EXCAVATOR.

posed of two steel channels connected by cross pieces. The shaft at the head of the machine, to which this frame is pivoted, and another shaft at the outer end of the frame are each fitted with two hexagonal sprocket wheels carrying a pair of endless link-belt chains, built up of steel drop forged links connected by cross bars and flat blades or scrapers. Each cross bar is fitted with two or three cutters of drop forged steel, the cutters on the several bars being staggered so that the entire series of cutters will cover the whole width of the excavation. Alternate bars are also fitted with side cutters or reamers for trimming the sides of the trench so as to give a clearance for the cutter frame. The blades behind the cutters form scoops to carry up the material removed by the cutters.

At the rear end of the machine are two vertical sliding bars, the lower ends of which are attached to the end of the cutter frame. The bars are fitted with racks, gearing with pinions on a transverse shaft above the rear axle. This shaft is driven by gearing and the arrangement constitutes a "crowding" device for forcing the cutter frame against the bottom of the trench, so that the greater part of the weight of the machine is carried by the breast of the cut.

The depth of the cut is regulated by raising or

lowering the free end of the cutter frame. The cutters travel up along the working breast, loosening material which is carried up by the blades or scrapers. At the head of the machine this material is dumped upon two horizontal belt conveyors, at right angles to the trench, which discharge the excavated material either into wagons for removal or upon the ground alongside the trench ready for the backfilling. The machine hauls itself along by means of a wire cable anchored about 300 ft. ahead. This cable is wound upon a drum which has at one end a ratchet driving wheel. The pawl of this wheel is operated by a rod from an eccentric on the main shaft of the machine, and the throw is adjustable, so as to allow of regulating the speed of advance or feed according to the depth of cut and the character of the material.

Fig. 1 is a general view, showing the machine at work on a sewer contract at Glencoe, Ill. The machine itself is behind the Case traction engine. To the left of the engine pulley will be seen the link-belt transmitting power to the main shaft of the excavator. On this shaft are the large sprocket wheel for the driving chain or belt and also three smaller sprocket wheels. The small wheel at the end of the shaft carries the horizontal chain which drives the shaft at the head of the cutter frame by the large sprocket wheel shown above the conveyor. The other two wheels carry the chains for driving the conveyors. Near the end of the frame will be seen one of the inclined bars of the crowding device already described. Fig. 2 is a view of the trench, with the

as 100 ft. an hour. At Glencoe, 590 ft. of trench 13 to 15 ft. deep were excavated in a working day of ten hours.

Small boulders can be handled, the cutters loosening the material around them until they fall out and are carried up by the blades. For large boulders, the cutter frame can be raised and the stone removed by picks. The machine will work in any place where there are not too many rocks and large stones which the machine cannot handle. It will cut trenches 24 to 48 ins. wide, and as deep as 20 ft.

These trench excavating machines were designed by the F. C. Austin Mfg. Co., of Harvey, Ill., and are built by that company for the Municipal Engineering & Contracting Co., of Harvey, Ill., which has acquired the sole right for their use. The latter company, therefore, makes a specialty of taking sub-contracts for the trench excavation on sewer or water-works contracts and similar work.