

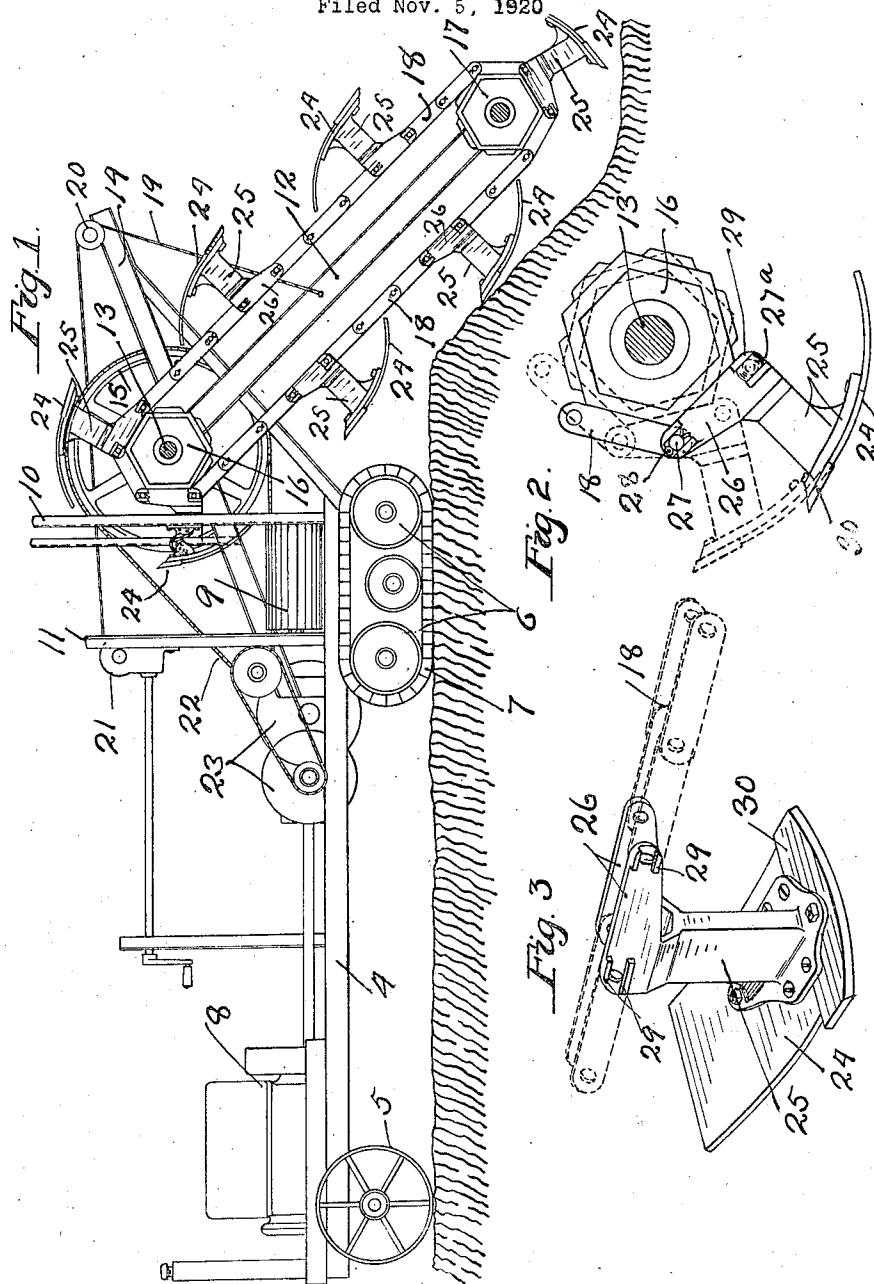
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G. H. GREIMANN

EXCAVATOR

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UNITED STATES PATENT OFFICE.

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EXCAVATOR.

Application filed November 5, 1920. Serial No. 421,898.

To all whom it may concern:

Be it known that I, GEORGE H. GREIMANN, a citizen of the United States, residing at Garner, in the county of Hancock and State of Iowa, have invented certain new and useful Improvements in Excavators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to excavators of the type that are especially adapted for digging, for example, drainage trenches or ditches in which to lay sewer, drain or other pipes, and generally stated, the invention consists of the novel construction and combinations of parts hereinafter described and defined in the claims.

In a sense, the present invention is in the nature of an improvement on the machine disclosed and claimed in my prior Patent #1,287,675, of date December 17, 1918, entitled "Excavator."

Primarily, the present invention is directed to improvements in the endless excavating mechanism and is directed particularly to an improved arrangement of excavator spades or segmental excavating plates that are carried by an endless link belt or belts arranged to run over polygonal driving and guiding wheels and whereby an important function, hereinafter described, is obtained.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a view chiefly in side elevation with some parts in diagram and with some parts sectioned, illustrating my present invention;

Fig. 2 is a fragmentary view illustrating the novel action of one of the polygonal wheels on an excavating spade that is approximately in position to drop its load; and

Fig. 3 is a perspective illustrating the manner in which the spades are connected to the chain or endless carrier.

In Fig. 1, the invention is illustrated as incorporated in a self-propelled excavator, the parts of which may be briefly noted as follows: The numeral 4 indicates a truck frame supported by front wheels 5 and by

rear wheels 6, over which tread chains 7 are arranged to run. Through suitable mechanism, not necessary here to consider, the wheels 6 are driven from an engine 8 carried by the truck 4. The numeral 9 indicates a transversely movable conveyor belt, which runs over suitable rollers driven from the engine 8 and adapted to deliver dirt at one side of the excavator in a well known manner. The numerals 10 and 11 indicate upright columns rigidly secured on and carried by the frame 4 and between which, as shown, the conveyor belt 9 is arranged to work.

The numeral 12 indicates a vertically adjustable boom, which, at its front end, is pivoted on a transverse shaft 13 journaled in suitable bearings on a trussed rearwardly projected boom-supporting frame 14 that is rigidly secured on the main frame 4. The shaft 13 carries a large sprocket or chain of the wheel 15 and a small polygonal wheel 16. A similar polygonal wheel 17 is journaled to the free rear end of the boom 12. A sprocket or link chain 18 runs over the two polygonal wheels 16 and 17. Said wheels 16 and 17, as shown, are hexagonal.

For raising and lowering the boom 12, a cable 19 is attached thereto and extended over a guide sheave 20 on the frame 14 and is attached to a suitable windlass indicated as an entirety by the numeral 21. For rotating the sprocket or chain wheel 15, a chain or belt 22 is run thereover and this chain or belt is driven from the engine through any suitable transmission mechanism indicated as an entirety by the numeral 23 and not necessary for the purposes of this case to further consider. The sprocket chain or link belt 18 carries a plurality of curved spades formed by flat sheet metal bent into segmental form. These spades are rigidly secured to the flanged outer ends of arms 25. Said arms 25, at their inner ends, are bifurcated or forked and their prongs are formed integrally with or otherwise rigidly secured to laterally spaced link-forming elements 26, which latter are incorporated as certain of the links of the chain or belt 18. The link-forming elements 26 are adapted to be readily coupled to the standard links of the chain by coupling pins 27 that are held in place by cotters 28 passed through perforations in the ends of said chains and held between guard ribs 29 on the outer surfaces of said link-

forming elements 26. The pins 27, at one end, (see particularly Fig. 2), have flattened heads 27^a that are held between the adjacent ribs 29. These ribs 29 also perform the additional function of preventing rotation or oscillation of the pins in respect to the link elements 26, and, hence, cause the wear to take place between the pins and the standard links of the chain and thus save the link elements 26 from wear. This is important because said elements 26 are a part of the cast arm 25, the replacement of which would be expensive.

A sharp edged tempered cutting blade 30 is bolted, riveted or otherwise rigidly secured to the front edge of each spade and to the flanged outer end of the spade-supporting arm. This cutting blade 30, at its ends, projects slightly beyond the sides of the spade, and the sharp front edge is cut on the line of a circle so that the central portion thereof will move in advance of the end portions in the excavating action. This is important because, in the first place, it will cause roots and the like to work off at the ends of the cutting blade and, in the second place, will cut a ditch with a slightly rounded bottom or that is lower at its central portion than at its sides. It is now important to note that each blade-supporting arm 25 projects outward from the rear ends of the link-forming elements 26 and that the spade projects rearward from said arm 25, directions being taken in respect to the direction of travel of the chain 18, in the excavating action. This forward projection of the link-forming elements 26, from the spade-carrying arm 25, affords means for attaching said link elements into the chain at a point in advance of the cutting edge of the blade 30 and gives a good leverage resistance in the chain to the reaction from the cutting force.

Another important result is this: Just before a particular spade reaches a position for dumping its load, (see Fig. 2), one of the salient or projecting angles of the wheel 16 strikes the rear portions of the link elements 26, thereby producing a sort of a rapping action and outward movement of the arm 25 and spade 24, which serves to loosen the dirt or load from the spade so that it will more readily subsequently discharge the load; and moreover, under continued upward movement, the spade and especially its rear portion will be thrown radially outward or farther away from the axis of the shaft 13 so that the discharge of the load from

the spade will be made an easier matter and the spade will more readily throw its load forward onto the transverse conveyor belt 9.

The excavating blades 26 are herein designated as "spades" because they have much the action of a spade, in that they cut the dirt loose and then scrape as well as carry the load to the point of discharge. As the so-called spades, as preferably constructed, have no side flanges, the dirt will not be packed or caused to adhere thereto to the same extent as with the excavating device of the character generally designated as buckets. The statements above made are based on actual experience in running of commercial excavators embodying the invention.

What I claim is:

1. In an excavator, the combination with a link belt of the sprocket chain type, of polygonal driving and guiding wheels over which said belt runs, outstanding arms having bifurcated inner ends formed with integral laterally spaced link-forming elements incorporated as links in said belt, and excavating spades or blades rigidly secured to the outer ends of said arms.

2. In an excavator, the combination with a link belt of the sprocket chain type, of polygonal driving and guiding wheels over which said belt runs, outstanding arms having bifurcated inner ends formed with integral laterally spaced link-forming elements incorporated as links in said belt, and excavating spades or blades rigidly secured to the outer ends of said arms, said spades being curved on lines that are approximately concentric to the axis of said wheels, in the movements of said blades around said wheels.

3. In an excavator, the combination with a link belt of the sprocket chain type, of polygonal driving and guiding wheels over which said belt runs, outstanding arms having bifurcated inner ends formed with integral laterally spaced link-forming elements incorporated as links in said belt, and excavating spades or blades rigidly secured to the outer ends of said arms, said spades being curved on lines that are approximately concentric to the axis of said wheels, in the movements of said blades around said wheels, and the front cutting edges of said spades being convexly curved and wider than the body portions thereof.

In testimony whereof I affix my signature.
GEORGE H. GREIMANN.