June 5, 1956 G. W. McININCH 2,748,504

TRENCH DIGGING MACHINE

Filed March 28, 1952 2 Sheets-Sheet 1

Fig. 1

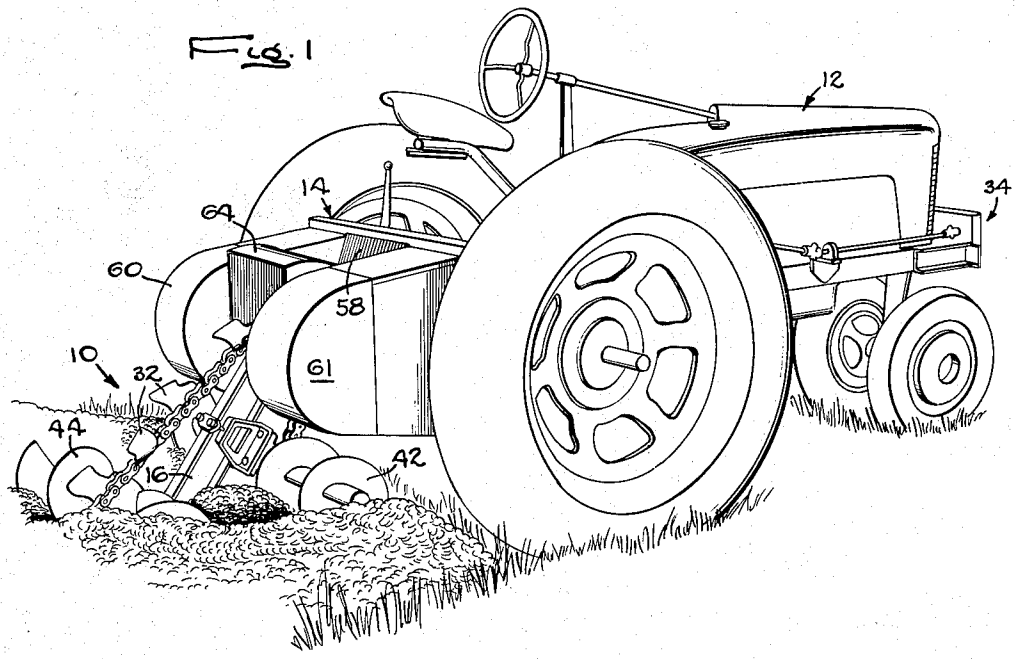
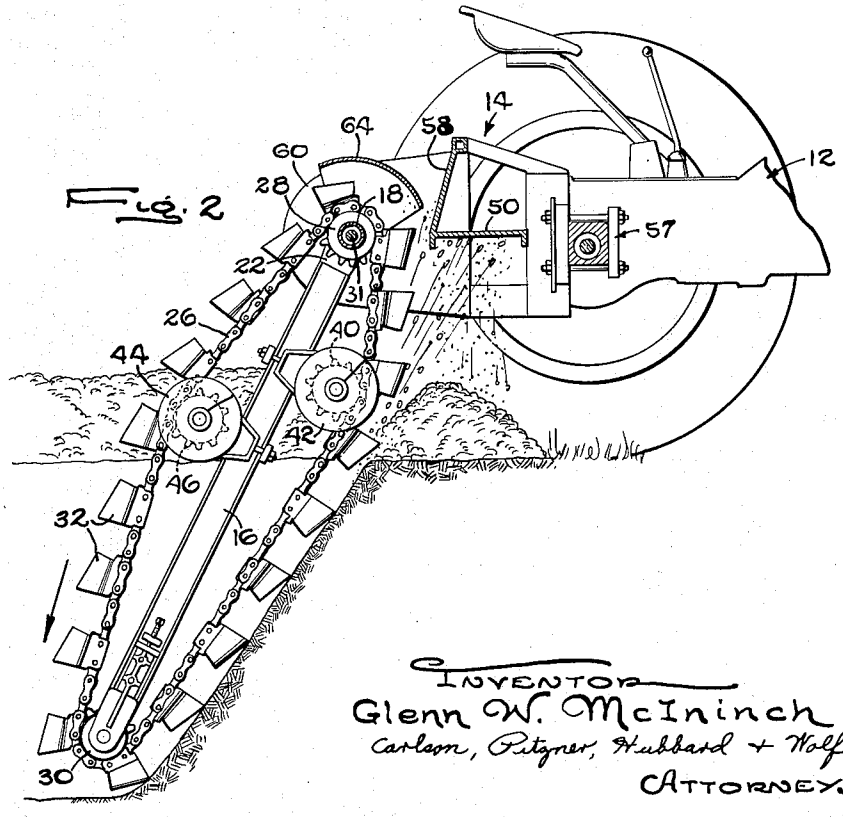


Fig. 2



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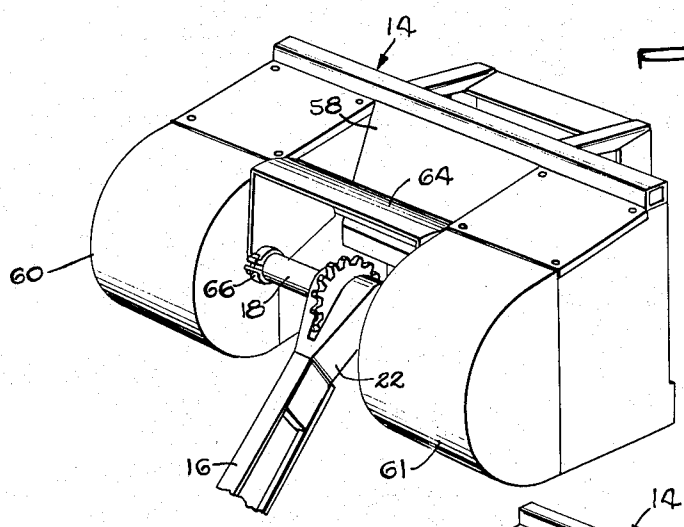


Fig. 3

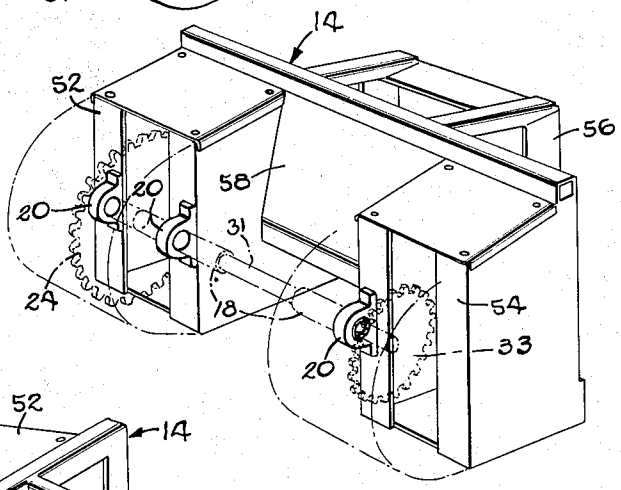


Fig. 4

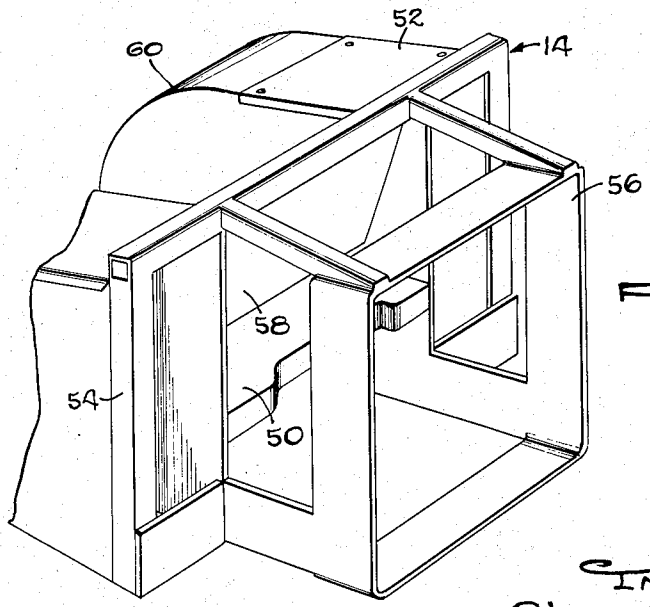


Fig. 5

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TRENCH DIGGING MACHINE

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Application March 28, 1952, Serial No. 279,015

2 Claims. (Cl. 37—86)

This invention pertains to trench diggers, and more particularly to an improved dirt baffling arrangement therefor.

While the invention is applicable to trenchers generally, it finds particular application to trenchers of the general type disclosed and claimed in U. S. Patents Nos. 2,519,075, 2,519,076, and 2,519,077, to Friedrich J. Schmidt, assigned to the assignee of this application.

One principal object of the invention is to provide a trencher having an effective baffling arrangement for intercepting and scattering the stream of earth elevated by the trencher.

Another object is to provide a chain type trencher having an improved arrangement for propelling the elevated dirt stream forwardly of the chain.

As applied to a trencher of the type having a swinging beam equipped with a digger chain for elevating a stream of earth, it is a further object to provide a baffling arrangement for diverting the earth stream downwardly and outwardly without interfering with the swinging movement of the beam.

Further objects and advantages will be apparent from the following description, taken with the accompanying drawing in which:

Figure 1 is a general perspective view of a tractor-mounted trench digging machine constructed in accordance with the invention.

Fig. 2 is a side elevational section taken centrally through the machine.

Fig. 3 is an enlarged fragmentary rear perspective view showing a dirt baffling arrangement incorporated in a digger beam and a mounting frame on the machine.

Fig. 4 is a rear perspective view of the mounting frame with the digger beam removed for clarity of illustration.

Fig. 5 is a front perspective view of the mounting frame, shown detached from the tractor.

While the invention is susceptible of various modifications and alternative constructions, there is shown in the drawings and will herein be described in detail the preferred embodiment, but it is to be understood that it is not thereby intended to limit the invention to the form disclosed, but it is intended to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

Referring to the drawings with greater particularity, the invention is illustrated therein as embodied in a trench digger **10** adapted for mounting on a vehicle such as a farm tractor **12** shown generally in Figs. 1 and 2. A mounting frame **14** is detachably secured to the tractor to provide a support for a digger beam **16**. The beam is pivotally mounted for swinging movement in a vertical plane by means of a pair of hollow shafts or sleeves **18** (Fig. 3) journaled in suitable bearings **20** (Fig. 4) on the mounting frame **14**. The inner ends of the sleeves **18** are connected to a central yoke or bracket **22** which in turn is secured to the upper end of the beam **16**. A suitable mechanism is provided for rotating the shafts

18 and thus lowering the beam into a rearwardly and downwardly inclined operative position, as shown in Figs. 1 and 2. Reference is made to the above-mentioned Schmidt patents for a detailed description of such a mechanism. For the present purposes, it will suffice to note that a sprocket wheel **24** is mounted on one of the hollow shafts **18**, and that a suitable drive, not shown, powered by hand or by the tractor is provided to rotate the sprocket wheel **24**.

The beam is provided with a digging mechanism comprising an endless loop of digger chain **26** trained around a pair of sprocket wheels **28** and **30** at the upper and lower ends of the beam, the sprocket wheel **28** at the upper end of the beam being positioned between the arms of the yoke **22** and mounted on a shaft **31** telescopically received in the hollow shafts **18**. A plurality of digger blades **32** are spaced along the chain. Mounted on the shaft **31** is a sprocket wheel **33** which is driven by a suitable mechanism (not shown) in a direction such that the digger blades on the lower flight of the chain move upwardly so as to elevate a stream of earth. The digger blades and the mechanism for driving the chain may be constructed as disclosed and claimed in the above-mentioned Schmidt patents, to which reference is made for a detailed description. For the present purpose it will suffice to note that the blades are smoothly contoured and unbroken by pockets or the like so that the earth is scraped or impelled upwardly by impact, and is discharged in front of the chain rather than being carried over the upper sprocket and dumped, as in the case of the more conventional bucket-type elevators.

The tractor is advanced at a slow rate, coordinated with the speed of the digger chain **26**, by means of a suitable mechanism (not shown), which may be of the type disclosed and claimed in the aforesaid Schmidt patents. The driving wheels or a winch **34** on the tractor may be utilized selectively or in combination to provide tractive effort.

In accordance with the invention, provision is made for separating the upwardly moving stream of earth from the digger blades and propelling the earth stream away from the digger chain. This is accomplished in the present case by mounting a guiding element in the form of an idler sprocket **40** on the beam **16** to engage the lower flight of the conveyor chain **26** so as to introduce an upward turn therein. The sprocket is spaced below the beam **16** at a point intermediate the main sprockets **28** and **30** so as to deflect the chain outwardly of the beam. When the beam is in its operative position as shown in Figs. 1 and 2, the idler sprocket **40** is positioned between the upper sprocket **28** and the ground level. Thus the chain negotiates the upper turn around the sprocket shortly after emerging from the ground, and in consequence, the stream of earth is impelled tangentially of the chain by centrifugal force. Much the greater part of the stream of earth is thereby disengaged from the chain so that a minimum amount of earth is carried upwardly toward the upper sprocket **28**.

In the present instance the idler sprocket **40** is advantageously utilized to drive one of a pair of augers **42** and **44** which distribute the elevated earth laterally of the trench formed by the digger blades. The other auger **44** is driven by a second idler sprocket **46** engaging the upper flight of the digger chain **26**. In the present instance the forward auger **42** is elevated above the ground level so as to perform an initial leveling operation, while the rearward auger **44** is substantially at the ground level so as to complete the earth removing operation. The augers **42** and **44** may be constructed and arranged as disclosed and claimed in the above-mentioned Schmidt patents.

As another feature of the invention, provision is made

for intercepting and forcibly scattering the earth stream thrown upwardly by the digger chain **26**. In furtherance of this aspect of the invention, a baffle in the form of a downwardly flanged horizontal plate **50** (Figs. 2 and 5) is positioned tangentially of the idler sprocket **40** substantially above and somewhat forwardly thereof. The rearward edge of the plate **50** is disposed immediately in front of the upward run of the conveyor chain **26** so that the plate is effective to divert and scatter substantially all of the earth discharged by the digger blades upon their emergence from the ground. By scattering the earth over a considerable area, the baffle **50** facilitates the disposal operation performed by the augers **42** and **44**.

The mounting frame **14** is provided with a pair of generally rectangular side housings **52** and **54** (Figs. 4 and 5) between which the horizontal baffle **50** extends. The housings project rearwardly from a box-like skeleton **56** (Fig. 5) adapted to nest over the differential housing on the tractor and to be attached to the rear axle housings by means of suitable clamps **57**.

Extending upwardly from the rear edge of the horizontal baffle **50** is a baffle plate **58** running generally parallel to the path of the chain and inclined forwardly at a small angle to the vertical. A portion of the small quantity of earth carried upwardly by the chain from the idler sprocket **40** is deflected rearwardly by the generally vertical baffle **58**. The side housings **52** and **54** terminate at their rearward ends in generally semi-cylindrical detachable sprocket covers **60** and **61**.

Fitting closely between the side housings **52** and **54** and in close proximity to the vertical baffle **58** is an arcuate generally drum-shaped shield **64** mounted radially on the beam-supporting pivot shafts **18** for swinging movement with the beam. In this instance the shield **64** is attached to the shafts **18** by means of a pair of split collar clamps **66**. In cooperation with the horizontal baffle **50**, the generally vertical baffle **58**, and the side housings **52** and **54**, the arcuate shield **64** intercepts the earth thrown off by the cutter blades and incidentally protects the tractor operator and the mechanisms of the trencher and the tractor from flying earth.

While the operation of the trench digging machine will be apparent from the foregoing description, it will be briefly summarized as follows:

After the tractor **12** has been maneuvered into the desired position, the beam **16** is lowered to bring the lower flight of the conveyor chain **26** into contact with the ground surface and to swing the arcuate shield upwardly into cooperative baffling relationship with the plates **50** and **58**. Power is then supplied to the digger chain **26** whereupon the digger blades cut into the ground and the beam swings downwardly into the earth so as to assume its normal inclined position, as shown in Figs. 1 and 2. At the same time, the arcuate shield swings upwardly into its position shown in these figures. The tractor is then set into forward motion at a slow rate so that the digger blades on the lower flight of the cutter chain **26** cut into the inclined working face of the trench. The earth loosened by the blades is carried upwardly in a continuous stream. As the cutter chain emerges from the ground and negotiates the turn around the sprocket **40**, the greater part of the stream of earth is disengaged from the blades by centrifugal force and impelled tangentially of the sprocket against the underside of the horizontal baffle **50**. Because of the elevated position of the baffle, the stream of earth is scattered laterally and forwardly over a considerable area. The forceful impingement of the earth upon the baffle shatters the larger lumps so that the earth moving operation performed by the augers **42** and **44** is considerably facilitated.

The relatively small amount of earth carried upwardly by the chain **26** from the sprocket **40** is diverted rearwardly and downwardly by the vertical baffle **58** and the arcuate shield **64** acting in cooperation with the side housings **52** and **54**.

When the trench digging operation has been completed, the beam **16** may be swung upwardly into an upright position for transportation to another location. As the beam **16** is swung upwardly, the arcuate shield **64** is rotated downwardly into an out-of-the-way position. By virtue of its inclined position forwardly of the conveyor chain, the generally vertical baffle **58** offers no interference to the swinging movement of the beam.

I claim as my invention:

1. In a trencher for mounting on the rear end of a tractor or the like, the combination comprising a mounting frame, a beam pivoted at its upper end on the frame for swinging movement in a vertical plane into an operative position with the beam extending rearwardly and downwardly into the earth, an endless loop of cutter chain running around the beam in a vertical plane and trained about the ends thereof, means for driving the chain in a direction to effect upward movement of the front flight thereof, a generally horizontal baffle on said frame, said horizontal baffle having its rear edge closely adjacent the front flight of the chain near the upper end of said beam for intercepting and scattering a portion of the earth propelled upwardly by the chain, an arcuate generally drum-shaped shield mounted on the beam and enclosing the chain at the upper end of the beam and adjacent said horizontal baffle for intercepting earth carried to the rear of said horizontal baffle by said chain, and an additional baffle on said frame extending upwardly from the rear edge of said horizontal baffle adjacent said chain and immediately forward of said arcuate shield for intercepting earth passing between said horizontal baffle and said shield.

2. In a trencher for mounting on the rear end of a tractor or the like, the combination comprising a mounting frame, an elongated beam, pivot means supporting said beam adjacent its upper end on said frame for swinging movement about a horizontal axis transverse to the axis of the beam to and from an operative position in which the beam extends rearwardly and downwardly into the earth, an endless loop of cutter chain running around the beam in a vertical plane and trained about the ends thereof, means for driving said chain in a direction to effect upward movement of the front flight of the loop, an arcuate shield dimensioned to extend crosswise over the upper end of the beam, means supporting said shield in overlying relation to the chain at the upper end of the beam and to swing with the beam about the axis of said pivot means, and means on said frame defining a horizontally disposed baffle having its rear edge positioned closely adjacent the front edge portion of said shield when the beam is in an operative position so as to intercept the earth propelled upwardly by the front flight of said chain.

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