Jan. 6, 1959 J. BAER 2,867,046

CANAL WALL TRIMMER

Filed Dec. 20, 1954 10 Sheets-Sheet 1

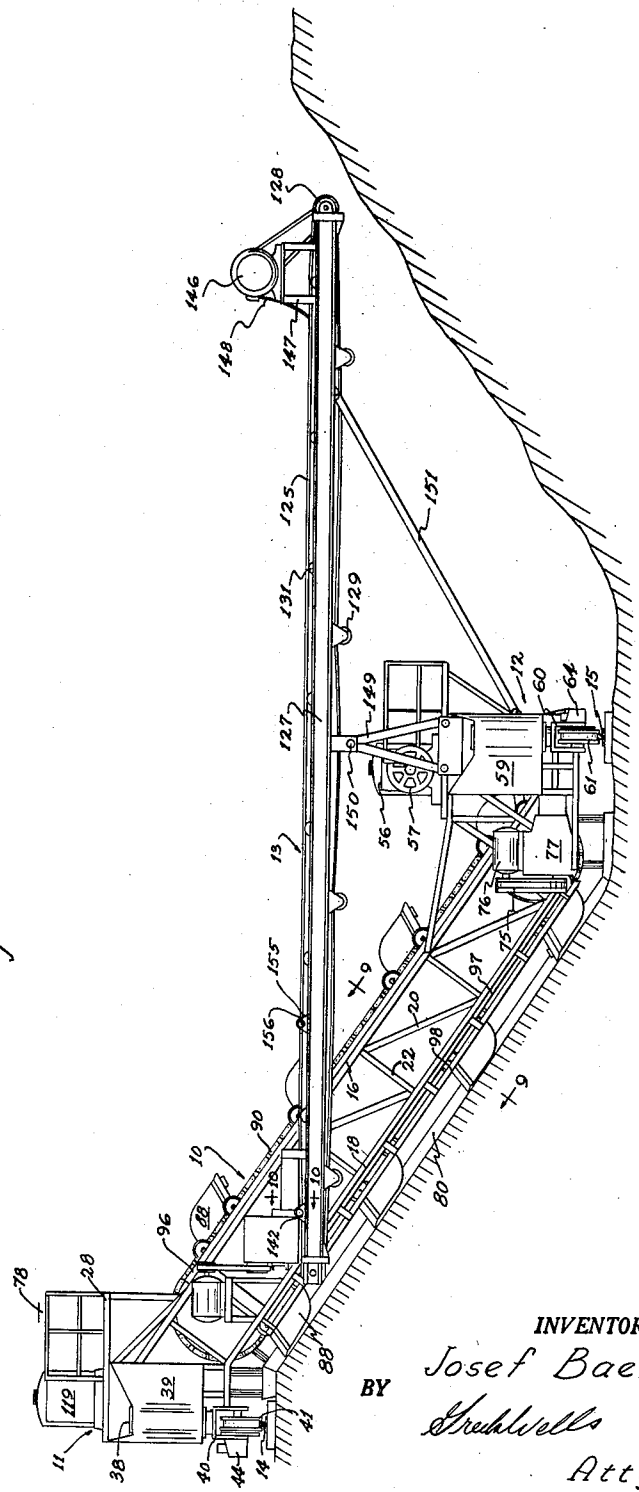


Fig. 1

INVENTOR.

BY Josef Baer

Strehlwells

Atty.

Jan. 6, 1959 J. BAER 2,867,046

CANAL WALL TRIMMER

Filed Dec. 20, 1954

10 Sheets-Sheet 2

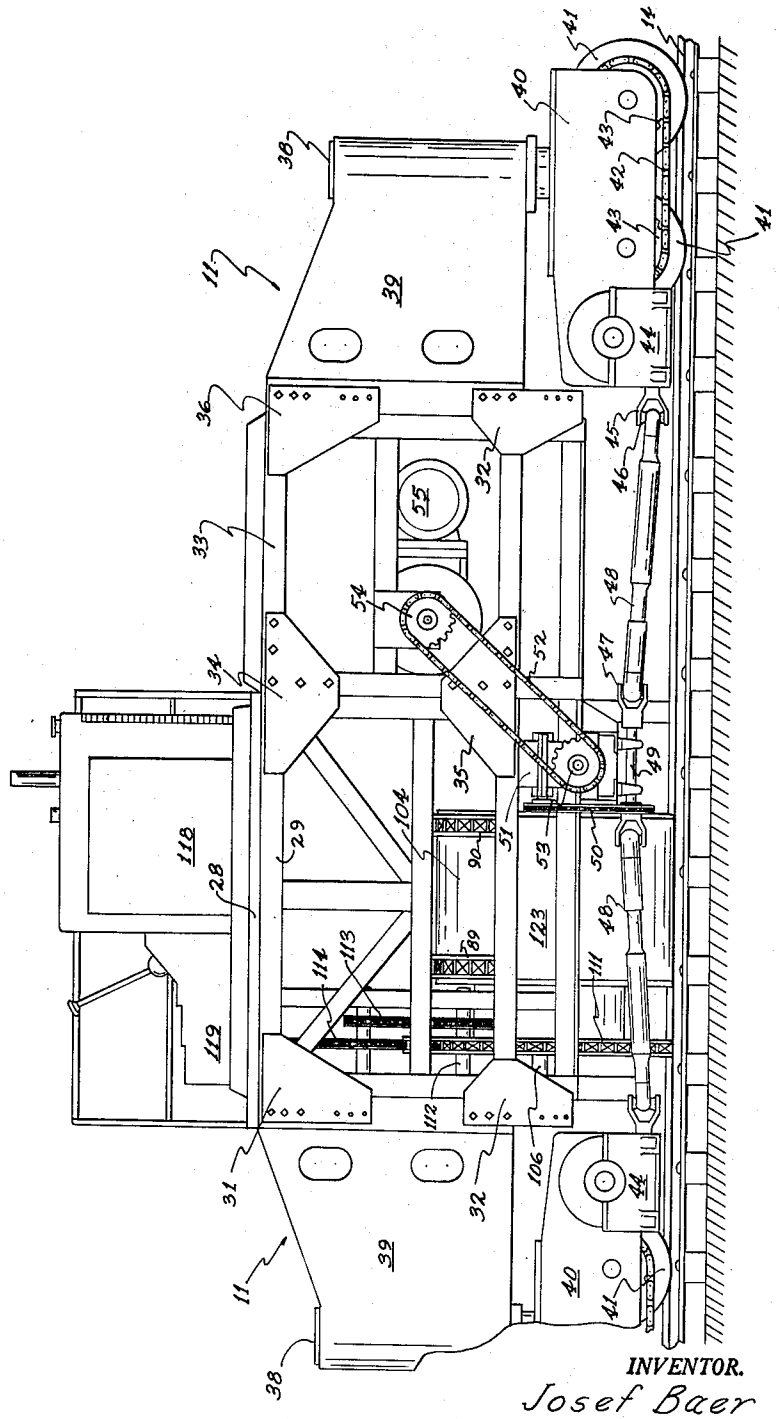


Fig. 2

INVENTOR.
Josef Baer
BY
Strecklusells
Atty.

Jan. 6, 1959 J. BAER 2,867,046

CANAL WALL TRIMMER

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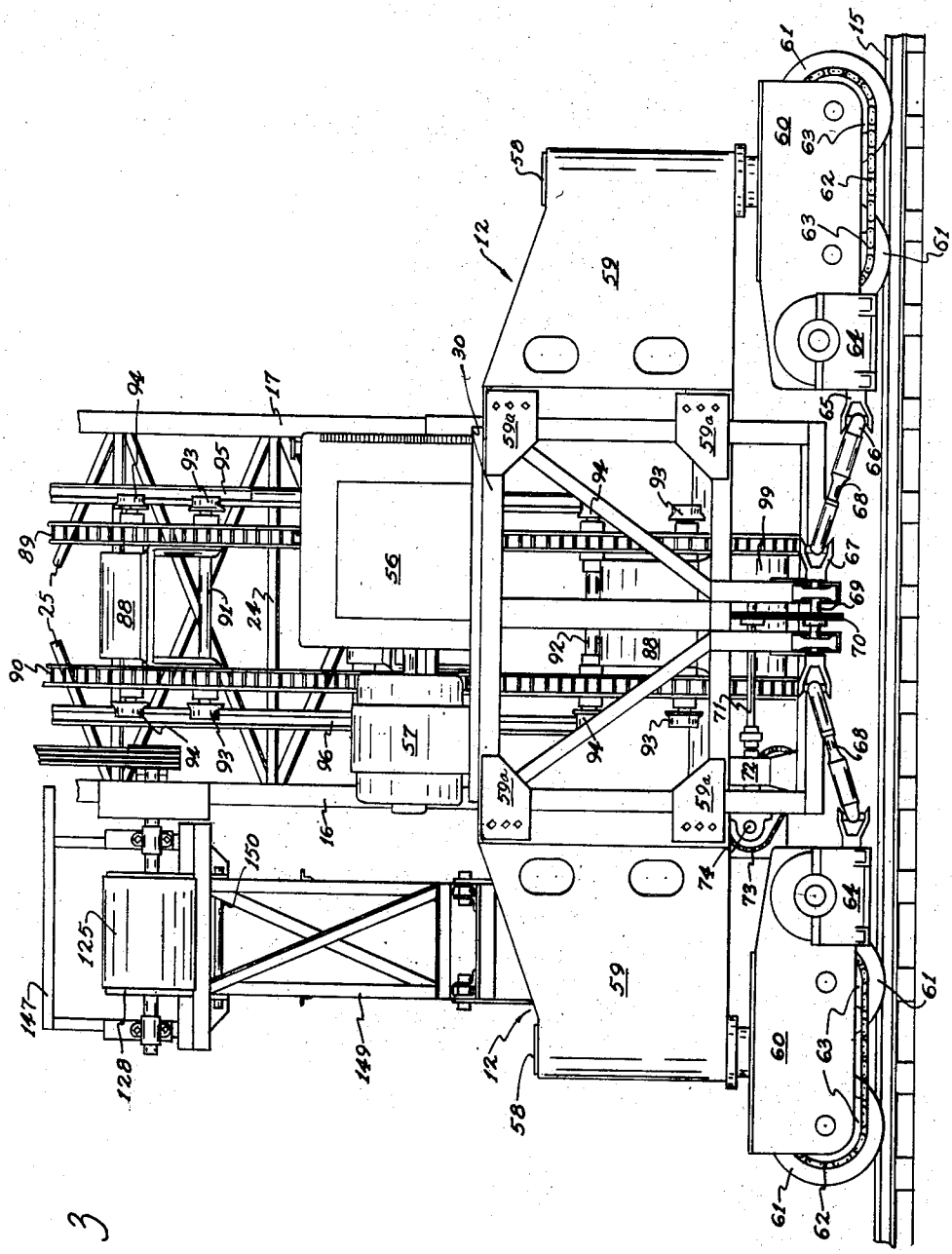


Fig. 3

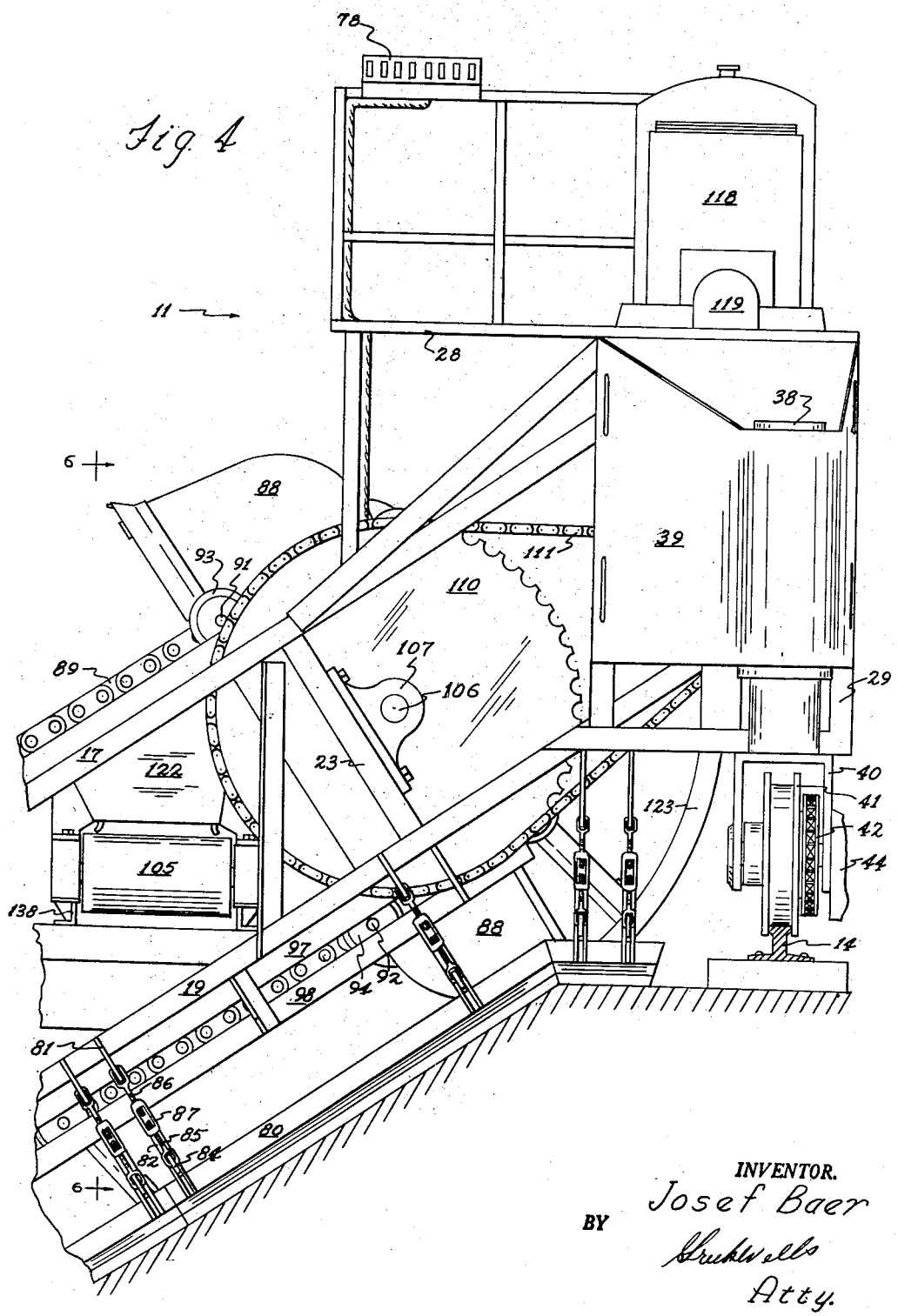
INVENTOR.
Josef Baer
BY
Strudwells.
Atty.

Jan. 6, 1959 J. BAER 2,867,046

CANAL WALL TRIMMER

Filed Dec. 20, 1954 10 Sheets-Sheet 4

Fig 4




INVENTOR.
Josef Baer

BY Strickwells
Atty.

Jan. 6, 1959 J. BAER 2,867,046

CANAL WALL TRIMMER

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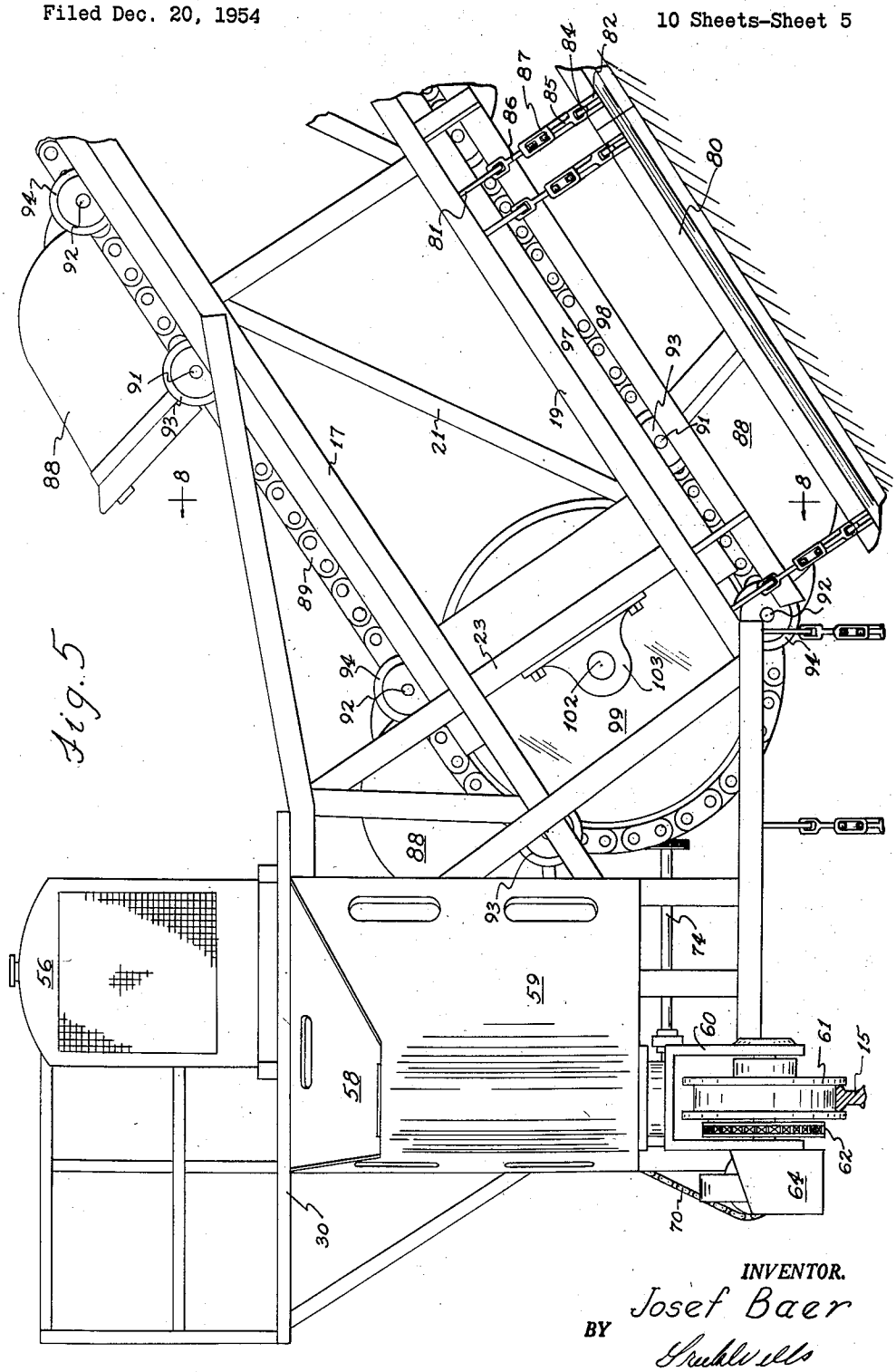



Fig. 5

INVENTOR.
Josef Baer
BY Strahlwells
Atty.

Jan. 6, 1959 J. BAER 2,867,046

CANAL WALL TRIMMER

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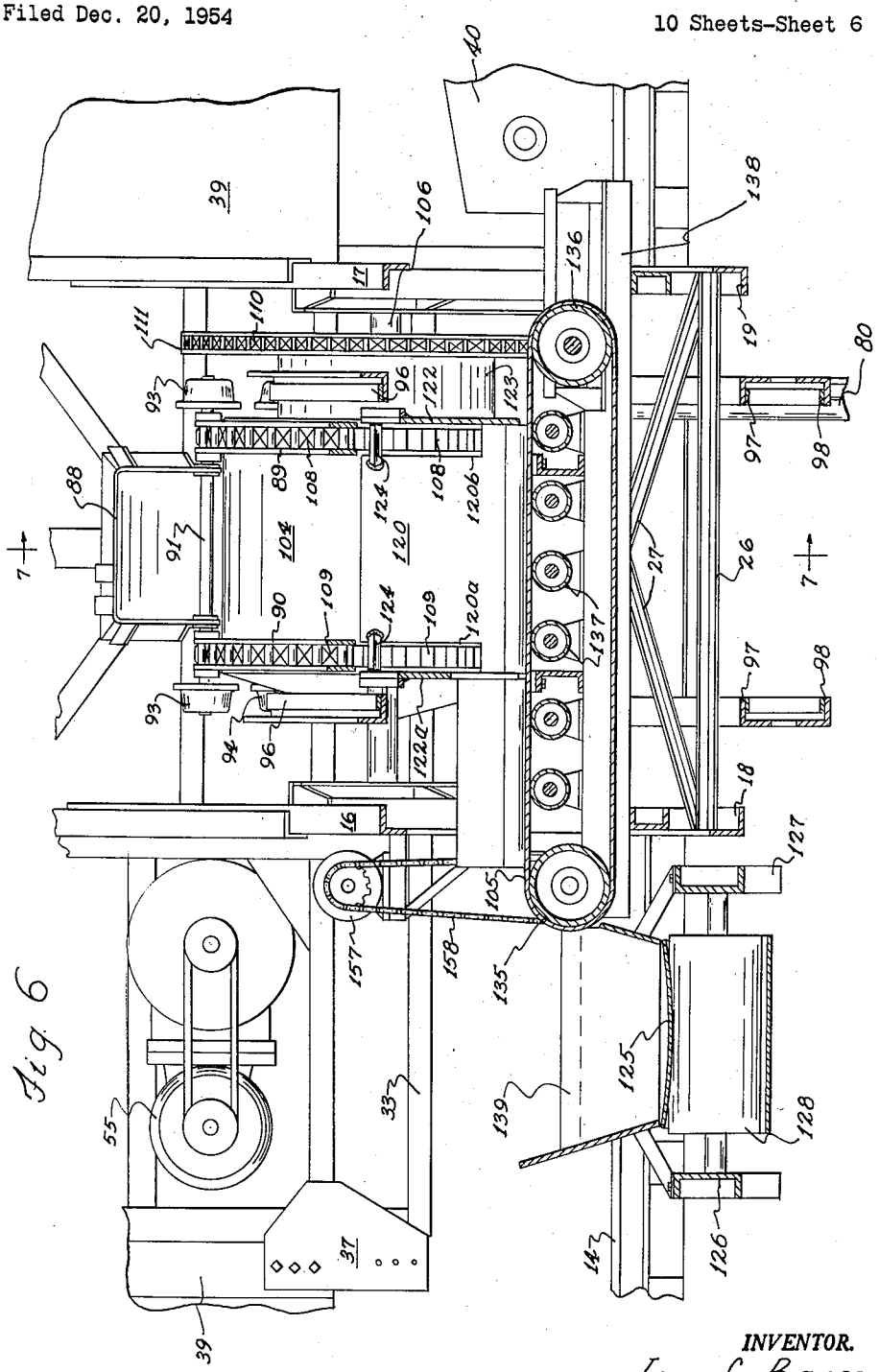



Fig. 6

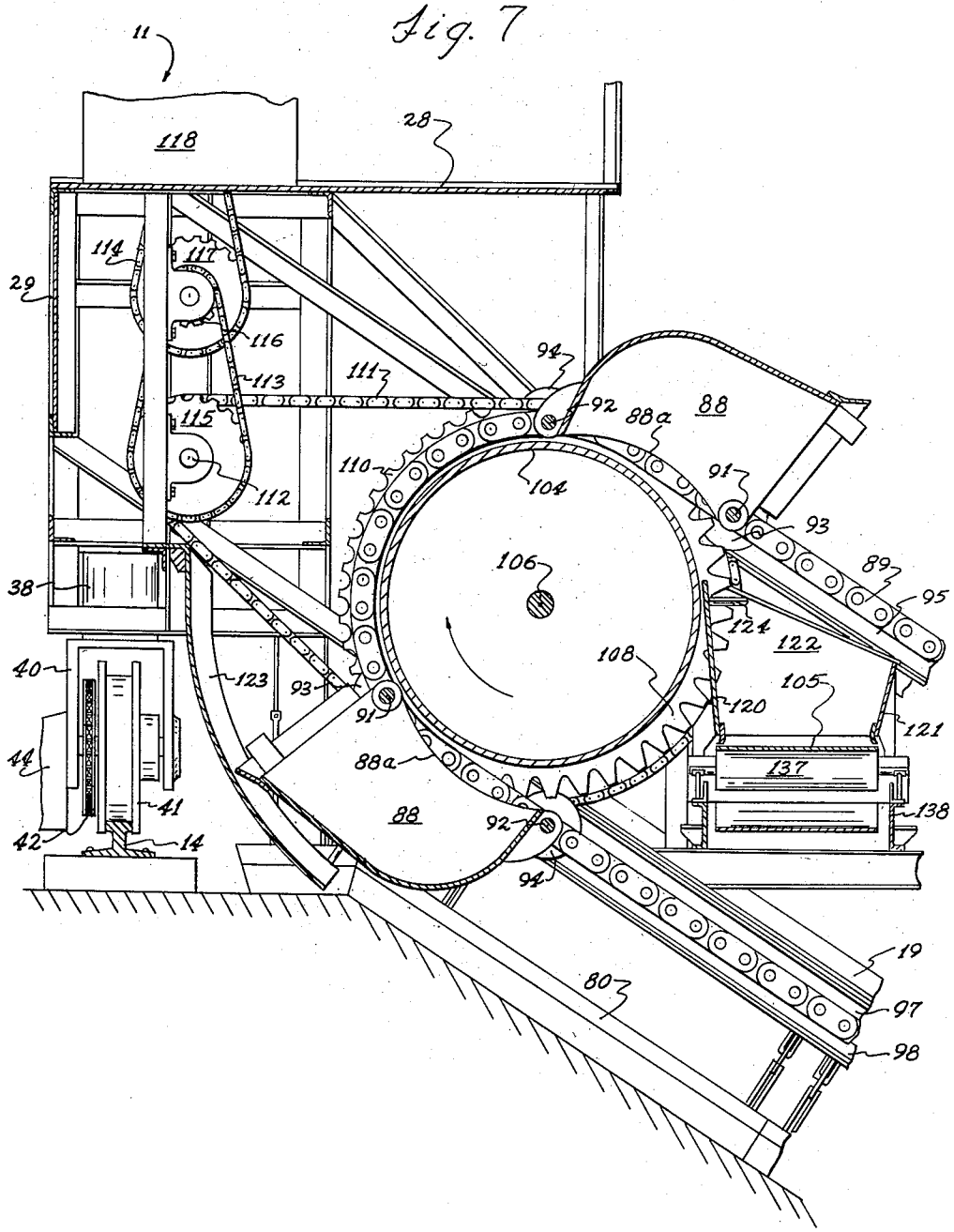
INVENTOR.
Josef Baer
BY
Strahl & Wells
Atty.

Jan. 6, 1959 J. BAER 2,867,046

CANAL WALL TRIMMER

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Fig. 7




INVENTOR.

BY Josef Baer

Grubbwell

Atty.

Jan. 6, 1959 J. BAER 2,867,046

CANAL WALL TRIMMER

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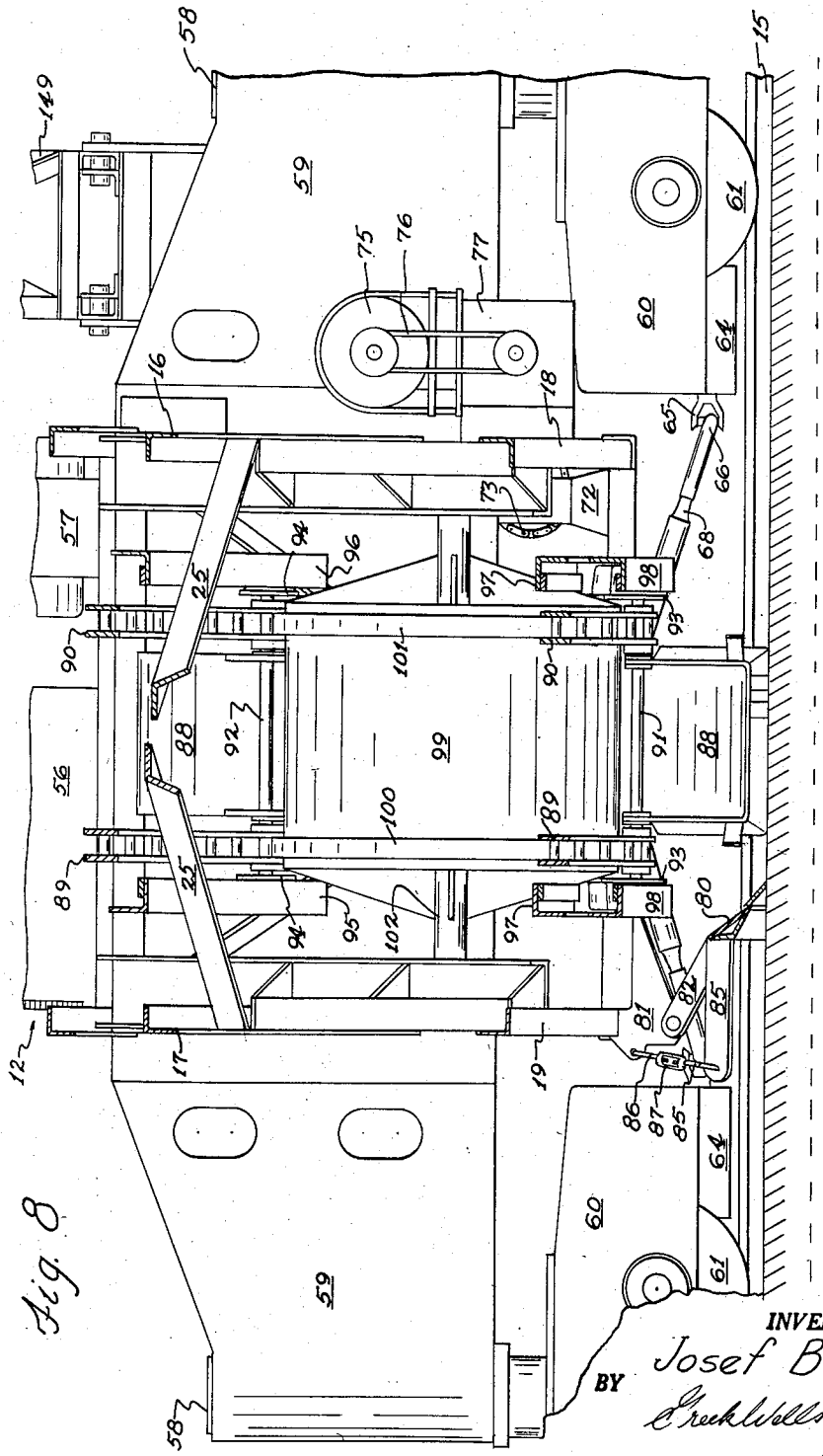



Fig. 8

INVENTOR.

BY Josef Baer

Greenwalds

Atty.

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Fig. 9

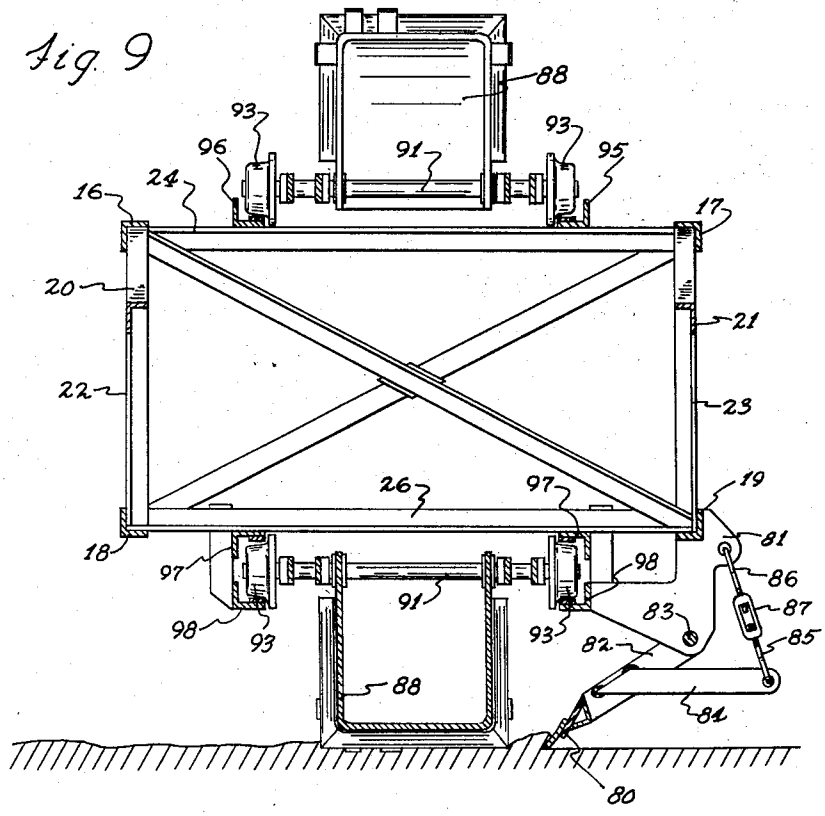
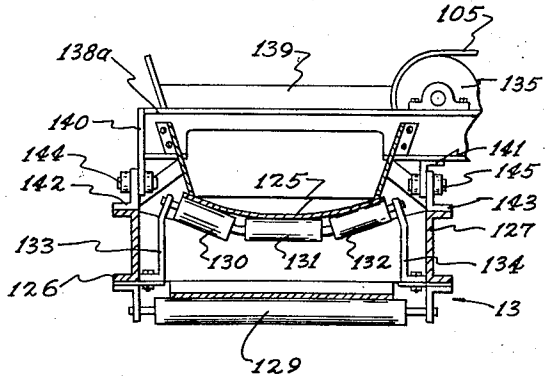



Fig. 10




INVENTOR.

BY Josef Baer

Grubb Wells

Atty.

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CANAL WALL TRIMMER

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Fig. 11

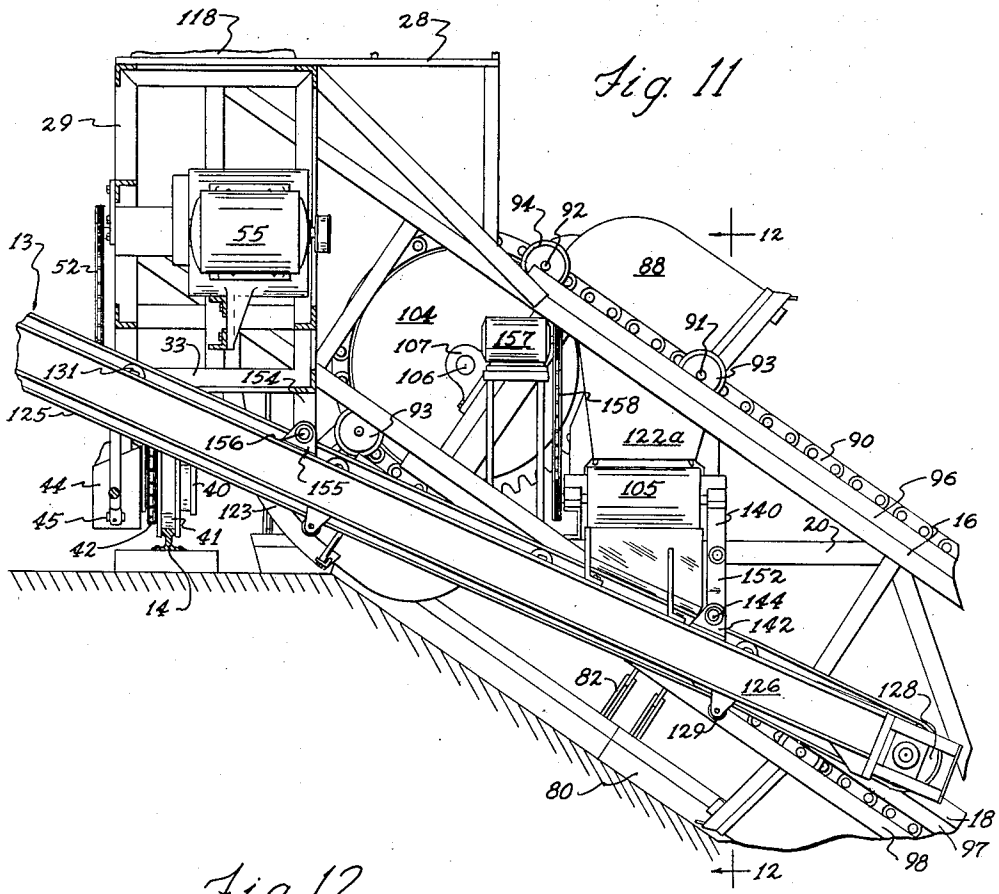
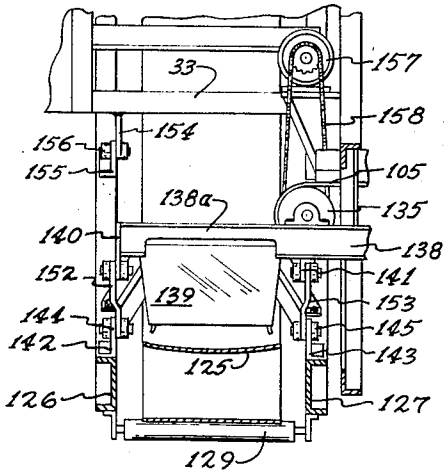



Fig 12




INVENTOR.

BY Josef Baer

Grubbs Wells

Atty.

United States Patent Office

2,867,046

Patented Jan. 6, 1959



2,867,046

# CANAL WALL TRIMMER

Josef Baer, Auburn, Wash., assignor to Baer Steel Products, Inc., Auburn, Wash., a corporation of Washington

Application December 20, 1954, Serial No. 476,373

14 Claims. (Cl. 37—85)

The present invention relates to improvements in a canal trimmer. In digging large canals such as are used as the main water distribution canals in an irrigation system, the practice is to first dig a trench in broad V-form with a relatively flat bottom. In order to properly prepare the canal, it is then necessary to apply a suitable surfacing aggregate of large and fine particles of stone and to compact this surfacing aggregate along the sloping walls and the bottom wall of the canal. After the aggregate has been compacted, it is then necessary to trim the walls of the canal to accurate dimensions so that the canal, when lined with a suitable lining material, will have a uniform cross section. In the prior practice in this field it has been customary to use a trimming machine which extended across the canal from one side to the other and remove the excess surfacing aggregate from both sides. These machines either piled up the surfacing aggregate removed from the middle of the canal for hauling away by trucks or discharged it at the sides of the canal. Machines of this character are extremely cumbersome and so difficult to place and replace that their use on small sections of a canal is prohibitive in cost. They require excessive handling of the aggregate used to surface the canal walls before applying a finishing lining.

It is the purpose of the present invention to provide a canal trimming machine which is simple in construction in which a trimming mechanism is mounted between an upper transport unit at one side of the canal and a lower transport unit which runs along a rail at the bottom of the canal. The trimming mechanism embodies means for removing the excessive surfacing aggregate upwardly along the sloping wall of the canal and transferring it to the opposite sloping wall of the canal to be used there as a surfacing aggregate.

It is also a purpose of the present invention to provide a trimming mechanism of the character referred to above, with means whereby the surfacing aggregate being removed can be applied in front of the machine as it travels at the upper edge of the slope of the canal to fill any low spots that may have resulted from washing out as the surfacing aggregate has been compacted.

It is also a purpose of the invention to provide a machine of the character described which is composed of individual sections comprising the upper transport unit, the lower transport unit, the trimming mechanism and the stacking conveyor for transferring the excessive aggregate so that the several units can be readily picked up and moved from one position to another.

The invention is embodied in a canal trimming machine which is characterized by the fact that it moves along the canal on two rails, one of which is at the bottom of the canal and the other of which is along the top wall of the canal at one side only and the necessary aggregate removing equipment is operated from power units which are carried by the transport units that ride on the rails. The construction is such that the amount



of aggregate being removed can be varied by simple adjustments that can be made while the machine is in place and in fact, while it is operating if necessary. The trimming mechanism embodies a trimming blade and a bucket conveyor which moves buckets upwardly and along the slope of the canal side in front of the trimming blade so that the aggregate to be removed is continuously being drawn up to the top of the slope and loaded upon a conveyor system that carries it to the other side of the canal for use there as a surfacing aggregate.

The nature and advantages of the invention will appear more fully from the following description and the accompanying drawings illustrating a preferred form of the invention. It should be understood, however, that the drawings and description are illustrative only and are not intended to limit the invention except insofar as it is limited by the claims.

In the drawings:

Figure 1 is a front view of a canal trimmer embodying the invention as it appears in a canal;

Figure 2 is an end view of the upper end portion of the canal trimmer on a larger scale than Figure 1;

Figure 3 is an end view of the lower end portion of the trimmer on the same scale as Figure 2;

Figure 4 is an enlarged rear side view of the upper end of the canal trimmer;

Figure 5 is an enlarged side view of the lower end of the canal trimmer;

Figure 6 is a sectional view taken substantially on the line 6—6 of Figure 4;

Figure 7 is a sectional view taken on the line 7—7 of Figure 6;

Figure 8 is a sectional view taken on the line 8—8 of Figure 5;

Figure 9 is an enlarged sectional view taken on the line 9—9 of Figure 1 with all of the parts except the main frame and the bucket and blade mountings, left off;

Figure 10 is an enlarged fragmentary sectional view taken on the line 10—10 of Figure 1 through the stacker conveyor;

Figure 11 is a fragmentary front view of the upper end portion of the trimmer showing the stacker conveyor in a changed position where it is used to remove the excess surfacing aggregate over the side of the canal; and

Figure 12 is a sectional view through the stacker conveyor mechanism taken substantially on the line 12—12 of Figure 11.

Referring now to the drawings and in particular to Figures 1, 2 and 3, the canal trimmer of the present invention comprises six major units. These units are a main framework 10 which embodies the actual trimming mechanism, front and rear upper transport units 11 which carry the upper end of the frame 10, front and rear lower transport units 12 which carry the lower end of the frame 10, and a stacker conveyor unit 13 which is supported at one end from the upper part of the main frame 10 and which extends across the canal to the opposite slope for depositing the surfacing aggregate removed by the trimming mechanism to the other side of the canal. The upper transport unit 11 runs on a rail 14 which is laid alongside the canal. The lower transport unit 12 runs on a rail 15 at the bottom of the canal. As illustrated best in Figures 1, 2, 4 and 9, the main framework 10 is made up of structural members including four main longitudinal frame members 16, 17, 18 and 19 which extend from the upper end of the frame 10 to the lower end. These members are connected together and braced by diagonal braces 20 connecting the members 16 and 18, and diagonal braces 21 connecting the members 17 and 19. The cross bars 22 also connect the members 16 and

18 and similar cross members 23 connect the members 17 and 19. The members 16 and 17 are connected by cross bars 24 and diagonally running braces 25. The members 18 and 19 are connected in a similar manner by cross bars 26 and diagonally running braces 27. At the upper end of the frame 10, a power unit and operator supporting platform 28 is mounted on a framework 29 which is secured to the members 16, 17, 18 and 19 of the main frame 10. A power unit supporting framework 30 is provided at the lower end of the main frame 10 and is secured to the members 16, 17, 18 and 19. The main frame 10 with the frameworks 29 and 30, comprise the major unit of the trimmer and carries the trimming mechanism in its entirety.

The upper framework 29 has the transport units 11, of which there are two, bolted to it. The rear transport unit 11 is directly bolted to the upper framework 29 by means of gusset plates 31 and 32 which are provided on the framework 29. The front transport unit 11 is bolted to an auxiliary framework 33 which is bolted to the framework 29 by means of gusset plates 34 and 35. The auxiliary framework 33 has gusset plates 36 and 37 which mount the front transport unit 11. Each transport unit 11 comprises a pedestal 38 which mounts the connecting frame 39 and which in turn is supported by a truck assembly 40. Each truck assembly 40 has two wheels 41 riding on the rail 14 and the wheels are connected together by a sprocket chain 42 and sprocket wheels 43. A gear unit 44 forms part of each of the truck units and is connected to the adjacent wheel 41 to rotate the wheel. Power is supplied to the gear unit 44 through a shaft 45, universal joints 46 and 47 and a connecting extensible shaft 48. The power supply shaft for the two truck assemblies 40 is shown in Figure 2 at 49. This shaft receives its power through a chain drive 50 from a gear box 51 which in turn is powered by a chain drive 52 and sprocket wheels 53 and 54 from a motor 55 which is mounted on the auxiliary framework 33. Power for the motor 55 is obtained from an engine and generator unit that is mounted on the lower end frame 30 of the main frame 10 and illustrated at 56 and 57 in Figure 3. This unit also supplies power for the other motors that will be described later.

The construction of the lower transport units 12 is essentially the same as that described for the upper units 11. There are two of the transport units 12. Each one has a pedestal 58 which in turn supports the mounting frameworks 59 which are bolted to gusset plates 59*a* on the framework 30. The pedestals 58 are carried by truck assemblies 60 which are similar in all respects to the truck units 40. Wheels 61 ride on the rail 15 and are connected by a sprocket chain 62 and sprocket wheels 63. The wheels 61 are driven through a gear box 64 which receives its power through a shaft 65, universal joints 66 and 67 and a connecting shaft 68. The power shaft 69 for the two truck assemblies 60 and 61 is carried by the frame 30 and is driven by a chain drive 70 from a shaft 71 which in turn receives its power from a gear box 72. The gear box 72 is powered by a chain drive 73 from a shaft 74 which in turn is driven by a motor 75 through a belt 76 and a transmission unit 77. (See figure 8).

The motor 75 receives its current from the generator unit 57 driven by the engine unit 56 in the same manner as the motor 55 receives its current. Both motors are under the control of the operator on the platform 28 through an electrical control box 78 which is suitably wired to the various motor supply lines. The particular manner of supplying power to the truck assemblies may be varied and is not of importance to the invention so long as suitable manually controlled power means is provided for the truck assemblies.

The trimming mechanism comprises a trimming blade 80 which is carried by a plurality of brackets 81 depending from the frame 10. The blade 80 is carried on arms 82 which are pivoted to the brackets 81 at 83. The arms 82 have bars 84 welded to them and extending rearwardly beyond the pivot point 83. The rear end bars 84 are secured to the bracket 81 by two eye bolts 85 and 86 and a turn buckle 87. It will be observed from Figures 4, 5 and 7, that the blade 80 is made in several sections which abut each other. It will also be noted that the brackets 81 with their associated parts 82 to 87 are arranged at the ends of the blade sections so that there are two adjacent turn buckles 87 where two sections of the blade 80 meet. With this construction, the blade 80 can be adjusted up and down quickly to adapt the machine to particular conditions necessary in clearing the right amount of aggregate from the slope of the canal.

The excess aggregate which has to be trimmed from the canal slope is picked up by a series of buckets 88 which are operated by endless conveyor chains 89 and 90. The buckets are carried on front and rear cross shafts 91 and 92 which mount flanged wheels 93 and 94 at each side of the bucket. The chains 89 and 90 are secured on the shafts 91 and 92 between the wheels and the bucket proper. Top rails 95 and 96 are provided on the frame 10 to support wheels 93 and 94 throughout the length of the frame 10. Likewise beneath the frame 10, there are upper and lower guide rails 97 and 98 to receive the wheels 93 and 94 between them. The brackets 81 are connected to the lower rear guide rail 98 as well as to the frame member 19 so as to provide adequate support of the brackets. At the lower end of the frame 10, the sprocket chains 89 and 90 travel around a flanged drum 99 which has flanges 100 and 101 on which the rollers of the sprocket chains 89 and 90 ride to keep the sprocket chains properly aligned. The drum 99 is journalled for rotation by having its shaft 102 mounted in bearings 103 that are provided on each of the cross members 22 and 23 at the lower end of the frame 10. It will be observed from Figures 8 and 5 of the drawings, that when the buckets are passed around the drum 99, the wheels leave the upper rails 95 and 96 on the frame 10 and the wheels then enter the guide rails 97 and 98 when the buckets reach their lowermost point of travel and start to pick up their load.

At the upper end of the frame 10 the buckets must discharge their load and they are so arranged that they cooperate with a drum 104 to carry their load upwardly away from the slope of the canal wall and dump it onto a cross conveyor 105. The drum 104 is also provided with the drive means for the endless conveyor chains 89 and 90 which move the buckets 88. The drum 104 is fixed on a shaft 106 which in turn is journalled in bearings 107 that are provided on the uppermost cross frame members 22 and 23 on the frame 10. The drum 104 has sprocket teeth 108 and 109 adjacent to its ends receiving the chains 89 and 90. The shaft 106, which is fixed to the drum 104, has a large sprocket wheel 110 thereon. This sprocket wheel is driven by a sprocket chain 111 from a shaft 112. The shaft 112 is driven through a series of chains 113—114 and sprocket wheels 115, 116, and 117 from an engine 118 through a transmission gear 119. The engine 118 and the transmission gear 119 are mounted on the platform 28 so that the operator can control the drive of the drum 104 and through it the travel of the buckets 88. It will be noted from Figure 7 that the side walls of the buckets 88 are cut on a curve at 88*a* to match the curvature of the drum 104 so that in traveling around the drum 104, they seat closely to the drum and yet do not bind. It will be noted that the buckets 88 have openings therein between the edges 88*a* to permit the scooped up aggregate, etc. to be discharged when the buckets 88 are inverted. The conveyor to which the buckets 88 are secured, that is, the conveyor made up of chains 89 and 90 and cross shafts 91 and 92, also has openings therein between the cross shafts 91 and 92 and the chains 89 and 90 through which

the discharged material may pass. Thus, when the buckets **88** pass around the drum **104**, their contents are transferred through the conveyor to the drum surface. As the buckets begin to leave the top of the drum **104**, their contents are discharged over the drum onto the belt **105**. Hopper wall **120** next to the drum and hopper wall **121** remote from the drum, and end walls **122** and **122***a* confine the aggregate as it leaves the bucket **88** and the drum **104** so as to make it fall on the cross conveyor belt **105**. In order to cause the bucket **88** to pick up the aggregate cleanly as it leaves the slope of the canal, a curved guard plate **123** is provided on the upper framework **29** as illustrated best in Figures 4 and 7. It will be noted from Figure 6 that the plate **120** is cut away at the sides as indicated at **120***a* and **120***b* to provide clearance for the teeth **108** and **109** on the drum **104**. The plate **120** is secured to the end plates **122** and **122***a* by angle iron braces which are shown at **124** in Figures 6 and 7.

The cross conveyor **105** is adapted to carry the aggregate picked up by the buckets **88** forwardly in front of the machine and deliver the picked up aggregate onto the stacker conveyor **13**. This stacker conveyor **13** comprises an endless belt **125** which is carried by two main side frames **126** and **127** which mount suitable rollers such as **128** at the ends of the belt **125**, and supporting rollers **129** below the frame members **126** and **127** as well as troughing rollers **130**, **131** and **132** which are supported on brackets **133** and **134** from the side frames **126** and **127**.

The cross conveyor **105** is supported by two rollers **135** and **136** at the ends and a plurality of intermediate rollers **137** which are mounted on a cross frame **138** that carries the cross conveyor. This cross frame **138**, as illustrated best by Figure 10, extends beyond the end of the conveyor **105** to provide a support for the stacker conveyor **13** and to provide mounting means for a hopper **139** to confine the material dumped onto the belt **125** from the cross conveyor **105**. The extended portion **138***a* of the frame **138** is shown in Figure 10 as provided with two depending brackets **140** and **141** from which the stacker conveyor **13** is pivotally suspended by two brackets **142** and **143** and pivot pins **144** and **145**. The stacker conveyor has its belt **125** driven by applying power to one of the end rollers **128** from a motor **146** that is mounted on a framework **147**. Power is supplied to the motor **146** through conductors indicated at **148** and the control of this power is through the control box **78** on the platform **28**. The stacker conveyor is supported by an A-frame **149** which is mounted on the lower end frame **30** of the main frame **10**. This A-frame has a cross shaft **150** at its upper end for mounting the stacker conveyor **13**. A brace arm **151** is also used to brace the delivery end of the stacker conveyor **13**.

In the normal operation of the machine the buckets will gather up the excess surfacing aggregate from one side of the canal which has already been compacted after being given a surface fill of the proper aggregate. The buckets will dump the excess aggregate onto the cross conveyor **105** which in turn will convey it to the stacker conveyor **13** and the stacker conveyor will deliver the excess aggregate to the other side of the canal where it is used as part of the fill aggregate needed for that side. In some instances there may be a settling away or washing away of the aggregate along the upper edge of the canal slope that is being trimmed. In order to take care of supplying the necessary aggregate into these washed away places, the conveyor belt **125** is so driven that it can be reversed and the motor **146** is a reversible motor. Thus the aggregate picked up on the lower slope of the canal as the machine moves along, can be dumped onto the upper slope in advance of the trimming by the simple expedient of temporarily reversing the direction of movement of the belt **125**.

When the second side of the canal is being trimmed, it is then of course undesirable to deposit the trimmed off aggregate on the already trimmed side of the canal. The present machine provides a means for reversing the stacker conveyor **13** from the position shown in Figure 1 to the position shown in Figures 11 and 12. To do this, it is only necessary to release the stacker conveyor from its mountings to the brackets **140** and **141** and insert two links **152** and **153** between the brackets **142** and **143** on the stacker conveyor and the mounting brackets **140** and **141**. The stacker conveyor is of course, turned around end for end and it is released from the brace **151** and the A-frame **149**. Provision is made by means of brackets **154** on the auxiliary frame **33** and similar brackets **155** on the stacker conveyor to secure the stacker conveyor to the auxiliary frame **33** by simply inserting securing pins **156**.

The cross conveyor **105** is driven by an electric motor **157** through a chain drive **158** to the end roller **135**. This motor, like the other power motor heretofore described, is also connected to the control box **78** by suitable wiring, not shown, so that it may be directly under the control of the operator.

It is believed that the nature and advantages of the present invention will be apparent from the foregoing description. The particular feature of the invention which makes it applicable to the trimming of canals in small sections is the provision of a simple trimming device which picks up the excess aggregate along one slope of the canal while it is advancing lengthwise of the canal and delivers this excess aggregate either to the other unfilled slope of the canal or over the canal boundary when the other slope is already finished. This feature of the invention, together with the fact that it can be used to deliver back to the top of the slope being finished, a certain amount of the aggregate by simply reversing the travel of the belt **125**, makes the device very efficient in the use of surfacing aggregate. This improved trimmer also has the advantage that it is constructed of separable component parts which can be readily lifted individually by a crane for turning it around or for loading it on transports. The transport units **11** which are heavy individual units, are readily removable from the main frame **10** and the stacker conveyor, together with the auxiliary frame **33** are also removable so that the main frame **10** can be moved as a unit and the other parts can also separately be moved. In practical operation it has been found that the single lower rail **15** and the upper rail **14** carry the machine along the true path it should follow without any substantial tendency toward lateral displacement.

Having thus described my invention, I claim:

1. A canal trimmer for sloping walled canals comprising an upper transport vehicle adapted to travel along one bank of a canal, a second transport vehicle provided with wheels adapted to travel on a rail at the bottom of the canal, power means for moving said vehicles, a trimmer frame, one end of which is fixed to the upper vehicle and the other end of which is fixed to the lower vehicle, said trimmer frame extending up one wall of the canal parallel to the slope of said wall, a bucket conveyor supported on said trimmer frame and having an upwardly moving lower flight extending along said frame from a rotatable support near the lower end of the frame to a second rotatable support near the upper end thereof, said bucket conveyor being operable to trim off excess surfacing aggregate from a canal wall as the frame is moved along the canal by said vehicles and elevate the excess material to the upper edge of the canal wall, a cross conveyor on said frame adjacent to the upper end thereof onto which the bucket conveyor deposits said aggregate, and a stacking conveyor carried by said frame and positioned beneath the discharge end of the cross conveyor, said stacking conveyor extending across the canal above the lower transport vehicle and being supported on the lower end of said frame, whereby to deliver the excess aggregate to the upper portion of the other sloping wall of the canal.

2. A canal trimmer for sloping walled canals comprising an upper transport vehicle adapted to travel along one bank of a canal, a second transport vehicle provided with wheels adapted to travel on a rail at the bottom of the canal, power means for moving said vehicles, a trimmer frame, one end of which is fixed to the upper vehicle and the other end of which is fixed to the lower vehicle, said trimmer frame extending up one wall of the canal parallel to the slope of said wall, a bucket conveyor supported on said trimmer frame and having an upwardly moving lower flight extending along said frame from a rotatable support near the lower end of the frame to a second rotatable support near the upper end thereof, said bucket conveyor being operable to trim off excess surfacing aggregate from a canal wall as the frame is moved along the canal by said vehicles and elevate the excess material to the upper edge of the canal wall, a cross conveyor on said frame adjacent to the upper end thereof onto which the bucket conveyor deposits said aggregate, said cross conveyor extending forwardly beyond the frame to discharge the aggregate elevated by the bucket conveyor in front of the frame, and a stacking conveyor carried by said frame and positioned beneath the discharge end of the cross conveyor, said stacking conveyor extending across the canal above the lower transport vehicle and being supported on the lower end of said frame, whereby to deliver the excess aggregate to the upper portion of the other sloping wall of the canal.

3. A canal trimmer for sloping walled canals comprising an upper transport vehicle adapted to travel along one bank of a canal, a second transport vehicle provided with wheels adapted to travel on a rail at the bottom of the canal, power means for moving said vehicles, a trimmer frame, one end of which is fixed to the upper vehicle and the other end of which is fixed to the lower vehicle, a bucket conveyor on said frame operable to trim off excess surfacing aggregate from a canal wall as the frame is moved along the canal by said vehicles and elevate the excess material to the upper edge of the canal wall, a cross conveyor on said frame adjacent to the upper end thereof onto which the bucket conveyor deposits said aggregate, said cross conveyor extending forwardly beyond the frame to discharge the aggregate elevated by the bucket conveyor in front of the frame, and a stacking conveyor carried by said frame and positioned beneath the discharge end of the cross conveyor, said stacking conveyor extending across the canal above the lower transport vehicle and being supported on the lower end of said frame, whereby to deliver the excess aggregate to the upper portion of the other sloping wall of the canal, said stacking conveyor being reversible to deposit aggregate in front of the trimmer at the upper portion of the canal wall over which the trimmer advances.

4. A canal trimmer for sloping walled canals comprising an upper transport vehicle adapted to travel along one bank of a canal, a second transport vehicle provided with wheels adapted to travel on a rail at the bottom of the canal, power means for moving said vehicles, a trimmer frame, one end of which is fixed to the upper vehicle and the other end of which is fixed to the lower vehicle, a bucket conveyor on said frame operable to trim off excess surfacing aggregate from a canal wall as the frame is moved along the canal by said vehicles and elevate the excess material to the upper edge of the canal wall, a cross conveyor on said frame adjacent to the upper end thereof onto which the bucket conveyor deposits said aggregate, a stacking conveyor carried by said frame and positioned beneath the discharge end of the cross conveyor, said stacking conveyor extending across the canal above the lower transport vehicle and being supported on the lower end of said frame, whereby to deliver the excess aggregate to the upper portion of the other sloping wall of the canal, a multiplicity of blades arranged end to end along the frame behind the bucket conveyor, the blades being individually mounted to the frame for movement up and down, and means connected to each blade operable manually to move the blade up or down.



5. A canal trimmer for sloping walled canals comprising an upper transport vehicle adapted to travel along one bank of a canal, a second transport vehicle provided with wheels adapted to travel on a rail at the bottom of the canal, power means for moving said vehicles, a trimmer frame, one end of which is fixed to the upper vehicle and the other end of which is fixed to the lower vehicle, a bucket conveyor on said frame operable to trim off excess surfacing aggregate from a canal wall as the frame is moved along the canal by said vehicles and elevate the excess material to the upper edge of the canal wall, a cross conveyor on said frame adjacent to the upper end thereof onto which the bucket conveyor deposits said aggregate, a multiplicity of blades arranged end to end along the frame behind the bucket conveyor, the blades being individually mounted to the frame for movement up and down, and means connected to each blade operable manually to move the blade up or down.

6. A trimming mechanism adapted to trim excess aggregate from one sloping wall of a substantially V-shaped canal and to deposit the excess aggregate ahead of the mechanism on one of the sloping walls, said mechanism comprising a main frame provided at its ends with two upright power plant supporting frameworks, wheeled transport units supporting each of said frameworks for movement longitudinally of the canal, the main frame between the frameworks being parallel to the slope of one of the canal walls and extending at an angle to the horizontal so that one framework may be supported by the wheels of its transport units on a rail at the canal bottom while the other framework is supported by wheels of its transport units on a rail alongside the canal and the frame extends from top to bottom of the wall to be trimmed, means on said frameworks for driving the transport units, a trimming means carried by said main frame including a bucket conveyor carried on said main frame and having an upwardly moving lower flight extending parallel to the main frame and operable to pick the excess aggregate and elevate it as the frame is moved along the canal wall, and blade means carried on the frame and extending parallel to the lower flight of said bucket conveyor on the side thereof facing away from the direction of travel of the frame along the canal wall, said blade means being mounted to the frame for movement up and down with respect thereto and being operable to scrape excess aggregate from the canal wall and to push said excess into the path of the bucket conveyor, a conveyor carried by said frame and extending from the upper portion thereof across the canal to the other sloping wall, and means to transfer the aggregate from the buckets to said conveyor.

7. A trimming mechanism adapted to trim excess aggregate from one sloping wall of a substantially V-shaped canal and to deposit the excess aggregate ahead of the mechanism on one of the sloping walls, said mechanism comprising a main frame provided at its ends with two upright power plant supporting frameworks, wheeled transport units supporting each of said frameworks for movement longitudinally of the canal, the main frame between the frameworks being parallel to the slope of one of the canal walls and extending at an angle to the horizontal so that one framework may be supported by the wheels of its transport units on a rail at the canal bottom while the other framework is supported by wheels of its transport units on a rail alongside the canal and the frame extends from top to bottom of the wall to be trimmed, means on said frameworks for driving the transport units, a trimming means carried by said main frame including a bucket conveyor carried on said main frame and having an upwardly moving lower flight extending parallel to the main frame and operable to pick the excess aggregate and elevate it as the frame is moved along the canal wall, and blade means carried on the frame and

extending parallel to the lower flight of said bucket conveyor on the side thereof facing away from the direction of travel of the frame along the canal wall, said blade means being mounted to the frame for movement up and down with respect thereto and being operable to scrape excess aggregate from the canal wall and to push said excess into the path of the bucket conveyor, a conveyor carried by said frame and extending from the upper portion thereof across the canal to the other sloping wall, means to drive said conveyor in either direction, and means to transfer the aggregate from the buckets to said conveyor.

8. A trimming mechanism adapted to trim excess aggregate from one sloping wall of a substantially V-shaped canal and to deposit the excess aggregate ahead of the mechanism on one of the sloping walls, said mechanism comprising a main frame provided at its ends with two upright power plant supporting frameworks, a wheeled transport unit in front of each framework and bolted thereto, a similar wheeled transport unit behind each framework and bolted thereto, the frame between said frameworks extending at an angle to the horizontal so that one framework may be supported by the wheels of its transport units on a rail at the canal bottom while the other framework is supported by wheels of its transport units on a rail alongside the canal and the frame extends from top to bottom of the wall to be trimmed, means on said frameworks for driving the transport units, a plurality of pairs of brackets depending from the main frame, trimming blade sections suspended from said brackets and positioned thereby in end to end relation by arms pivoted to the brackets and fixed to said blades, bars fixed to said arms and extending rearwardly away from the frame, extensible link members extending from the bars to the brackets for raising and lowering the blade sections, an endless bucket conveyor in front of the blade sections, and a cross conveyor in the main frame adjacent to the upper framework to receive the aggregate picked up by said bucket conveyor.

9. A trimming mechanism adapted to trim excess aggregate from one sloping wall of a substantially V-shaped canal and to deposit the excess aggregate ahead of the mechanism on one of the sloping walls, said mechanism comprising a main frame provided at its ends with two upright power plant supporting frameworks, a wheeled transport unit in front of each framework and bolted thereto, a similar wheeled transport unit behind each framework and bolted thereto, the frame between said frameworks extending at an angle to the horizontal so that one framework may be supported by the wheels of its transport units on a rail at the canal bottom while the other framework is supported by wheels of its transport units on a rail alongside the canal and the frame extends from top to bottom of the wall to be trimmed, means on said frameworks for driving the transport units, a plurality of pairs of brackets depending from the main frame, trimming blade sections suspended from said brackets and positioned thereby in end to end relation by arms pivoted to the brackets and fixed to said blades, bars fixed to said arms and extending rearwardly away from the frame, extensible link members extending from the bars to the brackets for raising and lowering the blade sections, an endless bucket conveyor in front of the blade sections, a cross conveyor in the main frame adjacent to the upper framework to receive the aggregate picked up by said bucket conveyor, said cross conveyor extending forwardly from the main frame, a stacking conveyor having one end positioned below the forwardly extended end of the cross conveyor and means on said main frame supporting the stacking conveyor.

10. A canal trimmer for sloping walled canals comprising an inclined trimmer frame positioned above a canal wall and extending from the bottom of the canal to the top of the wall, means supporting said inclined frame for movement longitudinally of the canal, an endless bucket conveyor carried by said frame, said conveyor having a downwardly moving upper flight and having an upwardly moving lower flight operable to trim off excess surfacing aggregate from the canal wall thereunder as the frame is moved over the wall, said bucket conveyor including rotatable supports at the opposite ends of the frame, flexible endless members supported thereby and bucket members secured on said endless members, the rotatable support at the upper end of the frame comprising a cylindrical drum, the material scooped by said buckets being deposited on said drum as the buckets pass therearound, a cross conveyor on the frame adjacent the drum and between the upper and lower flights of the conveyor, the material deposited on the drum being received therefrom by said cross conveyor and transported forwardly of the frame, and a stacker conveyor supported by said frame in front thereof and beneath the discharge end of the cross conveyor and extending across the canal to the opposite side thereof, said stacker conveyor being reversible whereby to deposit aggregate on either wall of the canal near the top thereof.

11. A canal trimmer for sloping walled canals comprising an inclined trimmer frame positioned above a canal wall and extending from the bottom of the canal to the top of the wall, means supporting said inclined frame for movement longitudinally of the canal, an endless bucket conveyor carried by said frame, said conveyor having a downwardly moving upper flight and having an upwardly moving lower flight operable to trim off excess surfacing aggregate from the canal wall thereunder as the frame is moved over the wall, said bucket conveyor including rotatable supports at the opposite ends of the frame, flexible endless members supported thereby and bucket members secured on said endless members, the bucket members being operable to scoop excess aggregate as they travel upwardly on the lower flight, and operable to dump their loads downwardly as they pass over the upper rotatable support, cross conveyor means on the frame adjacent the upper support and between said upper and lower flights operable to receive aggregate dumped from the buckets and convey it forwardly of the frame, a stacker conveyor carried by the frame in front thereof and under the discharge end of the cross conveyor means, said stacker conveyor extending across the canal to the opposite wall thereof, and blade means extending parallel to said frame behind the lower flight of said bucket conveyor, said blade means being mounted to the frame for movement up and down with respect thereto, and means connected to the blade means and to the frame operable manually to move the blade means up and down.

12. A canal trimmer for sloping walled canals comprising an upper transport vehicle adapted to travel along one bank of a canal, a second transport vehicle provided with wheels adapted to travel on a rail at the bottom of the canal, power means for moving said vehicles, a trimmer frame, one end of which is fixed to the upper vehicle and the other end of which is fixed to the lower vehicle, a bucket conveyor on said frame operable to trim off excess surfacing aggregate from a canal wall as the frame is moved along the canal by said vehicles and elevate the excess material to the upper edge of the canal wall, a multiplicity of blades arranged end to end along the frame behind the bucket conveyor, the blades being individually mounted to the frame for movement up and down, and means connected to each blade operable manually to move the blade up and down.

13. A canal trimmer for sloping walled canals comprising an inclined trimmer frame positioned above a canal wall and extending from the bottom of the canal to the top of the wall, means supporting said inclined frame for movement longitudinally of the canal, an endless bucket conveyor carried by said frame, said conveyor having a downwardly moving upper flight and having an upwardly moving lower flight operable to trim off excess surfacing aggregate from the canal wall thereunder as the frame is

moved over the wall, said bucket conveyor including a first rotatable support near the lower end of the frame and a second rotatable support near the upper end of the frame, flexible endless members supported thereby and bucket members secured on said endless members, the bucket members being operable to scoop excess aggregate as they travel upwardly on the lower flight, a conveying means on the frame receiving said excess aggregate from said bucket conveyor and conveying it away from the frame, blade means carried by the frame and extending parallel to the lower flight of said bucket conveyor along the side thereof facing away from the direction of travel of the inclined frame along the canal wall, said blade means being mounted on the frame for movement up and down with respect thereto and being operable to scrape excess aggregate from the sloping wall therebeneath and to push said scraped off aggregate into the path of said bucket conveyor, and means connected to the blade means and to the frame to move the blade means up and down with respect to the inclined frame.

14. In a canal trimming machine for trimming the sloping walls of a canal and including an inclined frame positioned above one of said sloping walls and extending parallel to the slope of said wall, means suppporting said inclined frame for movement along said sloping wall, upper and lower rotatable supports journalled in said frame, and a conveyor carried by said rotatable supports and having a downwardly moving upper flight and an upwardly moving lower flight, the improvement comprising a plurality of buckets mounted on said conveyor, said buckets having openings therein adjacent the plane of the conveyor, said conveyor having openings therein adjacent said buckets whereby to permit discharge of material from the buckets through the conveyor as the buckets are inverted in passing over the upper rotatable support, and a cylindrical drum on the upper rotatable support operable to engage with said conveyor and buckets to close said openings in the buckets and the conveyor as the buckets travel around said upper rotatable support, said drum receiving the material from said buckets as the buckets are inverted, a hopper supported adjacent said drum on the frame and receiving the material deposited on the drum as the drum rotates, and conveying means receiving said material from the hopper and discharging it on one of the banks of the canal.

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