

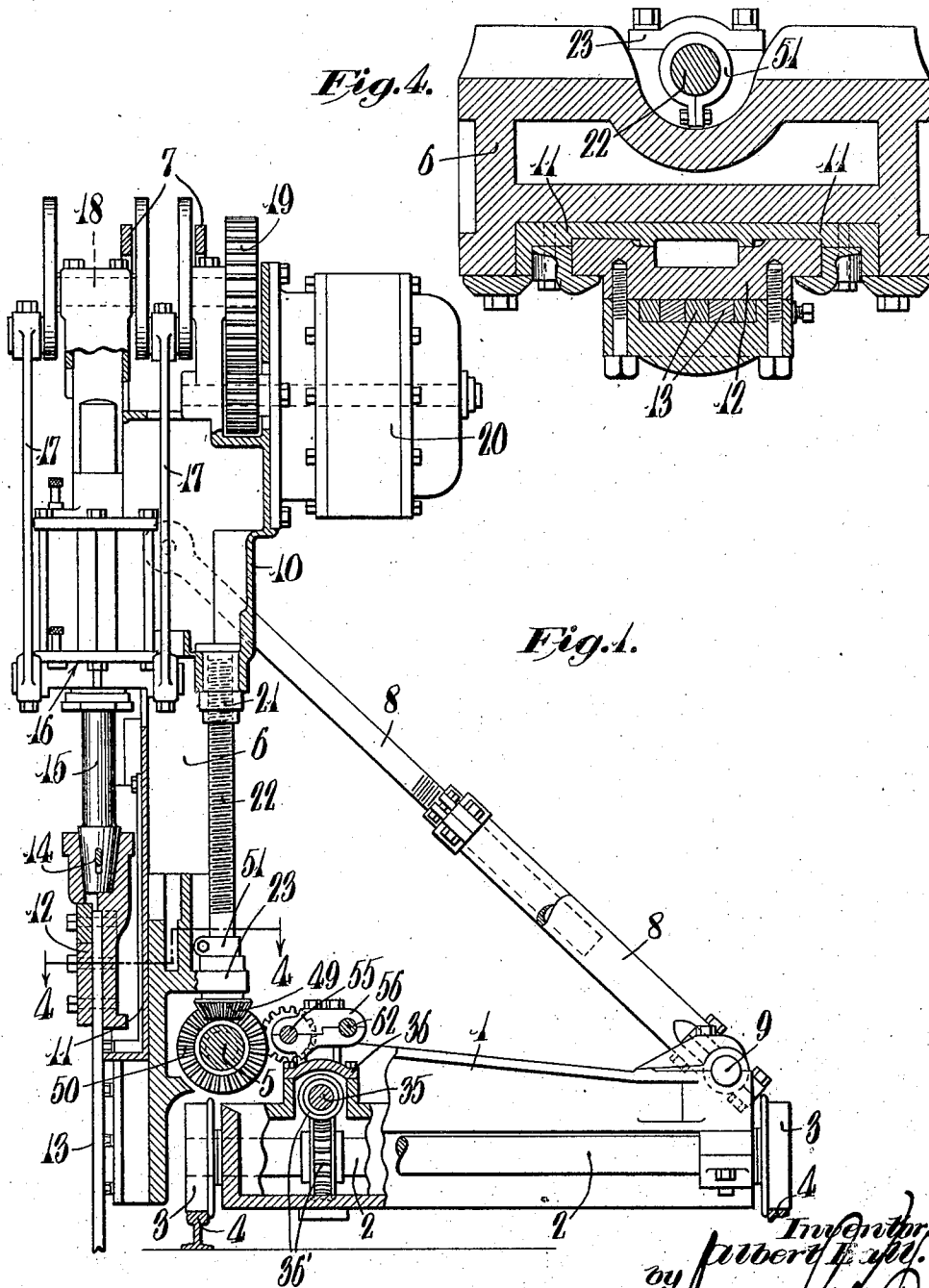
Dec. 30, 1924.

1,520,995

A. BALL

CHANNELING MACHINE

Original Filed June 1, 1912 2 Sheets-Sheet 1



Inventor
by *Robert E. Ball*
Atty

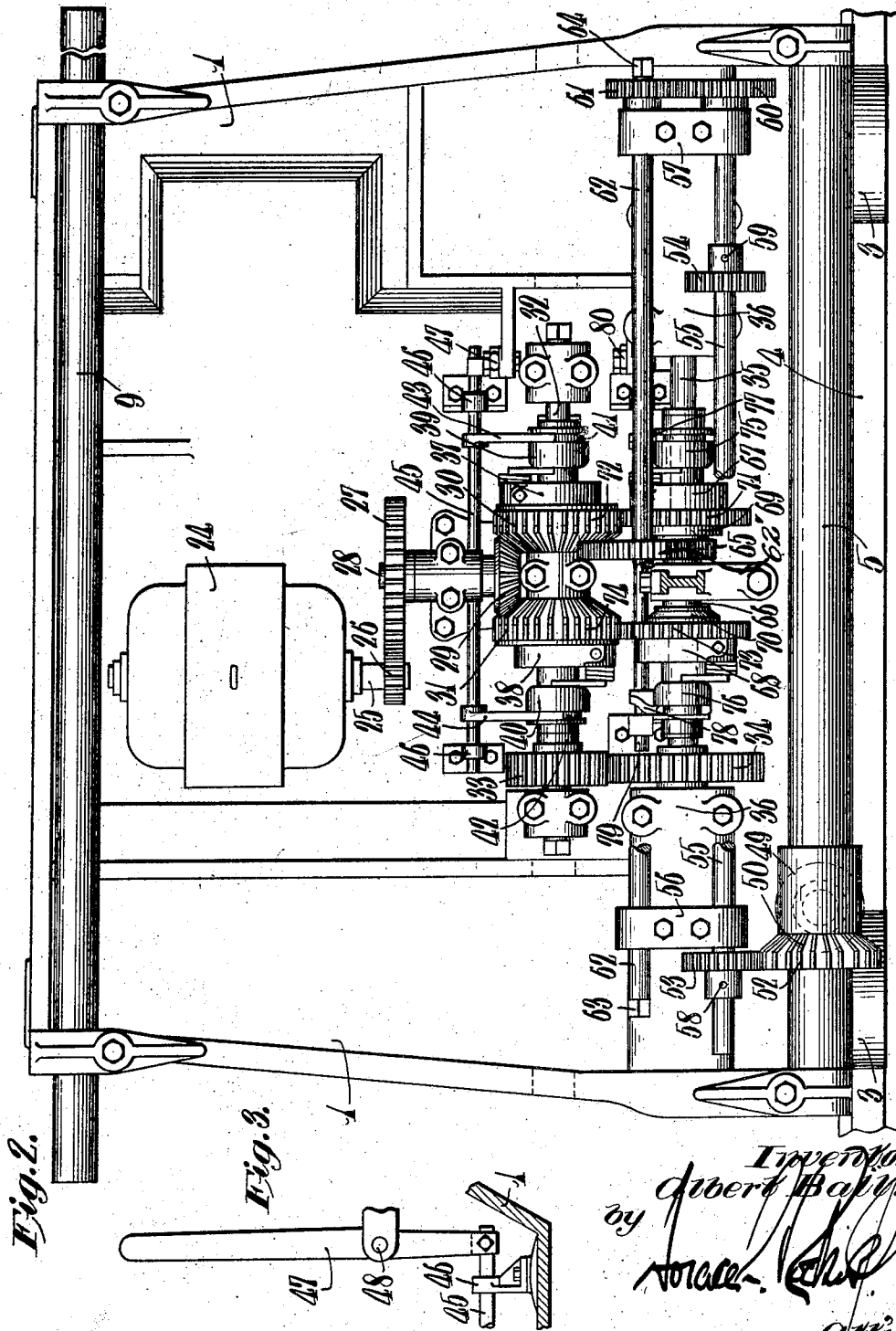
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UNITED STATES PATENT OFFICE.

ALBERT BALL, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR TO SULLIVAN MACHINERY COMPANY, A CORPORATION OF MASSACHUSETTS.

CHANNELING MACHINE.

Original application filed June 1, 1912, Serial No. 452,226. Divided and this application filed May 21, 1924. Serial No. 714,972.

To all whom it may concern:

Be it known that I, ALBERT BALL, a citizen of the United States, residing at Claremont, in the county of Sullivan and State of New Hampshire, have invented certain new and useful Improvements in Channeling Machines, of which the following is a full, clear, and exact specification.

My invention relates to channeling machines.

An object of my invention is to provide an improved channeling machine. Another object of my invention is to provide improved feeding mechanism for a channeling machine. A further object of my invention is to provide improved feeding mechanism for the tool-actuating mechanism of a channeling machine. A still further object of my invention is to provide an improved feeding mechanism for the tool-actuating mechanism of a power driven channeler having an improved arrangement of parts. These and other objects and advantages of my invention will, however, hereinafter more fully appear.

In the accompanying drawings I have shown for purposes of illustration one form which my invention may assume in practice.

In these drawings,—

Fig. 1 is an end elevation, partially in vertical section, of a channeling machine in which my improved feeding mechanism is incorporated.

Fig. 2 is a plan view, partially in horizontal section, of the mechanism shown in Fig. 1, with certain parts removed.

Fig. 3 is a detail in side elevation showing one of the controlling levers.

Fig. 4 is a horizontal transverse sectional view on an enlarged scale taken substantially on line 4—4 of Fig. 1.

In this application, which is a division of my copending application, Ser. No. 452,226, stone working machines, filed June 1, 1912, I have shown for purposes of illustration, a channeling machine of standard form having a base or main frame 1 which may be of any suitable type of construction, having axles 2, having thereon truck wheels 3 whereby the machine may be moved on the bottom of the quarry along the usual tracks consisting of rails 4. Suitably mounted on the base in suitable brackets thereon is a trunnion bar or shaft 5, whereon is pivoted in

any suitable manner an upright standard 6, the same consisting of upright supporting and guiding members united at the bottom and at the top joined by arch pieces or yokes 7. The standard may be positioned at any desired point lengthwise of the machine upon the trunnion shaft 5, and may be bolted at any desired angle in any suitable manner, as by the use of adjustable braces 8, pivotedly connected at their upper end to the standard and at their lower ends to a bar or shaft 9 mounted on the base 1 at the back of the machine.

Mounted for adjustment upon the standard 6 toward and away from the work is a sliding frame 10 to the bottom of which a sliding guide 11, for a crosshead 12, is bolted. The crosshead 12 carries a gang of cutting tools 13 suitably secured thereto and which crosshead is secured, as at 14, to a piston rod 15 adapted to be actuated by suitable tool-actuating mechanism, generally designated 16, of the same general type described in my co-pending application mentioned above, and which is driven through connecting rods 17 and a crank shaft 18, suitably journaled on the sliding frame 10 which is driven through suitable gearing 19 from a suitable motor 20, herein an electric motor, which may be mounted on any suitable part of the machine, but is preferably secured to the sliding frame.

The sliding frame 10 may be raised and lowered on the standard toward and away from the work by feeding mechanism of improved form, herein being provided for this purpose with a non-rotatable nut 21 suitably carried by the frame 10, said nut receiving therein a rotatable feed screw 22 which is journaled in a suitable bearing 23 carried in a suitable manner by the standard. This feed screw is rotated by suitable means, to be hereinafter described, providing for an angular adjustment of the standard and parts carried thereby without disturbing the driving connection with the feed screw. Suitably mounted on the base 1 is a driving motor 24, herein an electric motor, provided with an armature shaft 25 on which a pinion 26 is suitably secured and which meshes with a gear 27 suitably secured to a transverse shaft 28. From this it will be seen that the transmission shaft 28 carries fixedly secured to its outer end a bevel gear 29, the

latter meshing with two gear members 30 and 31 and acting to drive both of the latter at the same speed, but in opposite directions. The gear members 30 and 31 are mounted to rotate loosely upon a counter shaft 32, but either may be clutched thereto at will to turn the shaft in either direction, and thereby turn a pinion 33 keyed to said shaft and meshing with a gear 34, the latter being keyed to a longitudinal driving shaft 35 which is mounted in bearings 36 and provided at each end with suitable worm gearings 36' (see Fig. 1) for driving the truck wheels 3 secured to the axles 2.

Any suitable form of clutching means may be employed but since the particular character of the same is not of great consequence and is not essential to the illustration of my present invention, it will suffice to say that gear members 30 and 31 are provided with clutches 37 and 38 respectively operated by sliding collars 39 and 40 provided respectively with circumferential grooves 41 and 42. These grooves receive yoke-shaped arms 43 and 44, secured to a clutch shifting slide rod 45 mounted to slide in guides 46 on the base 1. One end of the slide rod (see Fig. 3) is suitably connected to a hand lever 47, pivoted at 48 upon the frame, so that by moving the hand lever, the gear members 30 and 31 may be clutched to and unclutched from the counter shaft 32, it being understood, of course, that when one is clutched, the other is unclutched. Preferably the slide rod and handle are so arranged that they may be moved to any one of the three positions, one of which is effective to drive the truck wheels in one direction, another in the opposite direction, and a third or intermediate position for securing inaction or rest.

During the operation of the machine, the channeler is advanced along the track-way, the tools 13 acting to cut a channel groove of increasing depth. For adjustably feeding the tools with their actuating faces downward upon the standard to adapt them to the increasing depth of the cut or for lifting the tools out of the cut, the feed screw and nut, hereinbefore described, are employed. Referring now to the mechanism for driving the feed screw, a bevel gear member 49 is suitably secured to the feed screw 22, below the bearing 23, which meshes with a bevel gear 50 suitably journaled on the base 1 concentric with the pivotal axis of the standard and preferably journaled on the trunnion shaft 5. A thrust collar 51 may be provided above the bearing 23 to receive the longitudinal thrust of the feed screw in the one direction, while the hub of the gear 49 receives the thrust of the feed screw in the opposite direction. The gear member 50 may be provided with a spur gear portion 52, which may be placed

in mesh with either of the spur gears 53 and 54 suitably secured to a shaft 55 journaled in suitable bearings 56 and 57 on the base 1. When the standard is slid along the trunnion shaft from one end of the machine to the other, the standard carries with it the bevel gear 50 and spur gear 52, and in order to avoid possible breaking of the teeth of the gears 52, 53 and 54, the two latter gears are preferably secured to the shaft 55 by suitable means, as for example set screws 58 and 59 which permit these gears to be slid out of the way, and after the standard has been moved into place, either gear, as the case may be, is slid back into mesh with the gear 52 and held in place by its set screw. It will now be evident that when the standard is set at one end of the machine, the gear 52 will be driven by the gear 53, and when the standard is set at the other end of the machine the gear 52 will be driven by the gear 54.

The shaft 55 may be driven in any suitable manner from the transmission gear, hereinbefore referred to, but for that purpose said shaft herein has a gear 60 secured thereto meshing with a gear 61, the latter secured to a shaft 62 journaled in the bearings 56 and 57, hereinbefore referred to. If desired, the shaft 62 may be provided with squared ends 63 and 64 to receive a suitable crank (not shown) by means of which shaft 62 and consequently the shaft 55 may be manually rotated to elevate and depress the sliding frame 10 and the cutting tools 13 carried thereby when there is no power on. Secured to the shaft 62 is a spur gear 62' similar to the gears 53 and 54, which meshes with a gear 65, the latter (see Fig. 2) being formed on or secured to a sleeve 66, which sleeve is mounted for loose rotation on the driving shaft 35. For turning the sleeve 66 in either direction at will, thereby to raise or lower the tools 13, the sleeve may be provided at opposite ends thereof with suitable clutch devices 67 and 68 which may be clutched to or unclutched from oppositely driven driving members 69 and 70 by devices generally similar to those previously described. The driving member 69 is provided with a spur gear 71 which meshes with a spur gear 72 formed on the truck driving gear member 30, while the tool feeding driving member 70 is provided with a spur gear 73, meshing with a similar gear 74 formed on the truck driving gear 31. From this it follows that the driving members 69 and 70 are constantly driven in opposite directions so that by clutching one or the other to drive the spur gear 65 as described, the tools may be raised or lowered. The clutching devices 67 and 68 are adapted to be actuated by sliding sleeves 75 and 76, simultaneously shifted in either direction by arms 77 and 78 attached to a longitudinally

shiftable actuating rod 79 adapted to be shifted by a hand lever 80 similar to the hand lever 47, thereby causing the shaft 35 to be driven in opposite directions. By these described connections the feed screw may be rotated in one direction or the other or allowed to remain stationary at will.

As a result of my improved mechanism, it will be noted that the location of the feed screw below the sliding frame where it has operative engagement at its upper end with the sliding frame and at its lower end directly with the tool feeding mechanism on the truck, not only provides a very inconspicuous and exceedingly compact arrangement of tool feeding parts, but leaves the upper portion of the sliding frame and the standard free for the disposition of the motor driven tool reciprocating mechanism. It will further be observed that the feeding mechanism is composed of exceedingly simple parts which may be applied to a channeler of standard form with a minimum of change and that this arrangement of parts provides a mechanism which reduces the overall height of the machine and presents a more compact construction. It will be noted still further, that when the standard is tilted about the axis of the trunnion bar there is no disengagement of the feeding mechanism and no need for manual adjustment of the parts.

While I have in this application specifically described one form which my invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a machine of the class described, the combination of a base, a standard pivoted on said base, a frame mounted on said standard, tool-actuating mechanism carried by said frame, and feeding mechanism for feeding said frame on said standard including a driving member arranged concentric with the axis of said standard.

2. In a machine of the class described, the combination of a base, a standard pivoted on said base, a frame mounted on said standard, tool-actuating mechanism carried by said frame, and feeding mechanism for feeding said frame on said standard including a pair of driving gears, one of which is arranged concentric with the axis of said standard.

3. In a machine of the class described, the combination of a base, a standard pivoted on said base, a frame mounted on said standard, tool-actuating mechanism carried by said frame, and feeding mechanism for feeding said frame including a shaft

journaleed on said standard, a driven gear secured to said shaft, and a driving gear arranged concentric with the axis of said standard.

4. In a machine of the class described, the combination of a base, a standard pivoted on said base, a frame mounted on said standard, tool-actuating mechanism carried by said frame, and feeding mechanism for feeding said frame including a feed-screw journaled on said standard, a cooperating nut carried by said frame, a driven gear secured to said shaft, and a driving gear arranged concentric with the axis of said standard.

5. In a machine of the class described, the combination of a base, a trunnion-shaft mounted on said base, a standard pivoted on said trunnion-shaft, a frame mounted on said standard, tool-actuating mechanism carried by said frame, and feeding mechanism for feeding said frame on said standard including a driving element journaled on said trunnion-shaft and a driven element journaled on said standard.

6. In a machine of the class described, the combination of a base, a trunnion-shaft mounted on said base, a standard pivoted on and mounted to slide longitudinally of said trunnion-shaft, a frame mounted on said standard, tool-actuating mechanism carried by said frame, and feeding mechanism for feeding said frame on said standard including a driving element journaled on and mounted to slide longitudinally of said trunnion-shaft, and a driven element journaled on said standard.

7. In a machine of the class described, the combination of a base, a trunnion-shaft mounted on said base, a standard pivoted on and mounted to slide longitudinally of said trunnion-shaft, a frame mounted on said standard, tool-actuating mechanism carried by said frame, and feeding mechanism for feeding said frame on said standard including a feed-screw journaled on said standard, a cooperating nut carried by said frame, a driven gear secured to said feed-screw, and a driving gear journaled on and mounted to slide longitudinally of said trunnion-shaft.

8. In a machine of the class described, the combination of a base, a trunnion-shaft mounted on said base, a standard pivoted on and mounted to slide longitudinally of said trunnion-shaft, a frame mounted on said standard, tool-actuating mechanism carried by said frame, and feeding mechanism for feeding said frame on said standard including a feed-screw journaled on said standard, a cooperating nut carried by said frame, a driven gear secured to said feed-screw, a driving gear journaled on and mounted to slide longitudinally of said trunnion-shaft, and means on said base

having provision for rotating said driving gear in a plurality of positions of adjustment longitudinally of said trunnion-shaft.

9. In an apparatus of the class described, the combination with a motor driven truck of a standard, a sliding frame on said standard, cutting appliances on the frame, and feeding mechanism for the cutting appliances including a driving member below the frame driven by said truck driving motor and a feed screw operatively connected to the lower part of the frame and extending downwardly to have operative engagement with said driving member.

10. In an apparatus of the class described, the combination with a truck of a standard, a frame movably mounted thereon, cutting appliances on the frame, feeding mechanism for the cutting appliances including a driving gear on the truck, a feed screw, and a nut carried by the frame and engaging said feed screw, said feed screw extending downwardly from said nut and a gearing member on the lower end of said feed screw and in operative engagement with said driving gear on the truck.

11. In an apparatus of the class described, the combination with a motor driven truck, of a standard, a sliding frame on said standard, cutting appliances on the frame, and a feed screw for feeding the cutting appliances towards the work, said feed screw being located below the frame and operatively connected to said truck driving motor.

12. In an apparatus of the class described, the combination with a main support, a standard pivoted thereon, a sliding frame on the standard, a motor mounted on the frame, cutting appliances reciprocated by said motor, and tool feeding mechanism for feeding the cutting appliances to the work including a feed screw extending radially from said standard pivot between the motor and the main support.

13. In a channeling machine, a wheeled truck, a standard pivotally mounted thereon, a sliding frame carried by said standard, a non-rotatable nut carried by said sliding frame, a feed screw journaled on said standard, and means including a member disposed concentric with the standard pivot for rotating said feed screw.

14. In a channeling machine, a wheeled truck, a standard pivotally mounted thereon, a sliding frame carried by said standard, a non-rotatable nut carried by said sliding frame, a feed screw journaled on said standard, and means including a member disposed concentric with the standard pivot for rotating said feed screw in opposite directions.

15. In a channeling machine, a tool actuating mechanism including a pivoted standard, power actuated means for driving the truck, and power actuated means

including a gear disposed concentric with the standard pivot for feeding the tool actuating mechanism toward or from the work, while driving the truck, irrespective of the movement of the truck.

16. In a channeling machine, a truck, a standard pivoted thereon adapted to support the cutting appliances, and means disposed between the standard and the truck for adjusting the position of the cutting appliances irrespective of the position of the standard about its pivot including a feed screw driven from its lower end and movable angularly about an axis adjacent the latter.

17. In a channeling machine, a truck, a standard pivoted thereon adapted to support the cutting appliances, and means including a non-rotatable nut carried thereby and a feed screw extending radially from said standard pivot and cooperating with said nut driven from its lower end and disposed between the standard and the truck for adjusting the position of the cutting appliances irrespective of the angular position of the standard about its pivot.

18. In a channeling machine, the combination with a truck, of a pivoted standard, a sliding frame on said standard, cutting appliances on said frame, and feeding mechanism for said cutting appliances including a driving member disposed below said frame coaxially with said standard pivot, and a feed screw operatively connected to the lower part of said frame and extending downwardly to have operative engagement with said driving member.

19. In a channeling machine, the combination with a truck, of a standard slidable longitudinally thereof, a sliding frame on said standard, cutting appliances on said frame, and feeding mechanism for said cutting appliances including driving members disposed at opposite ends of said truck, and a feed screw operatively connected to the lower part of said frame and extending downwardly adapted to have selectively operative engagement with said driving members.

20. In a channeling machine, the combination with a truck, of a pivoted standard mounted to slide longitudinally relative thereto, a frame mounted on said standard, tool actuating mechanism on said frame, and feeding mechanism for feeding said frame on said standard including a driving element journaled on and mounted to slide longitudinally of said standard pivot, and a driver element journaled on said standard.

21. In a channeling machine, a wheeled truck, a standard pivotally mounted thereon, a sliding frame carried on said standard, cooperating rotating and stationary elements carried by said sliding frame and said standard respectively, and means including

a member disposed coaxially with said standard pivot for driving said rotating element.

22. In a channeling machine, a wheeled truck, a standard mounted thereon and pivoted on and slidable along the same axis, a sliding frame on said standard, and means for adjusting said frame relative to said standard including a driving element disposed coaxially with said axis.

truck, a bar mounted on said truck, a standard pivotally mounted on said bar and slidable longitudinally relative thereto, a frame slidably mounted on said standard, and means for adjusting said frame relative to said standard including an element carried by said standard and a cooperating driving element journaled on said bar.

In testimony whereof I affix my signature.

ALBERT BALL.