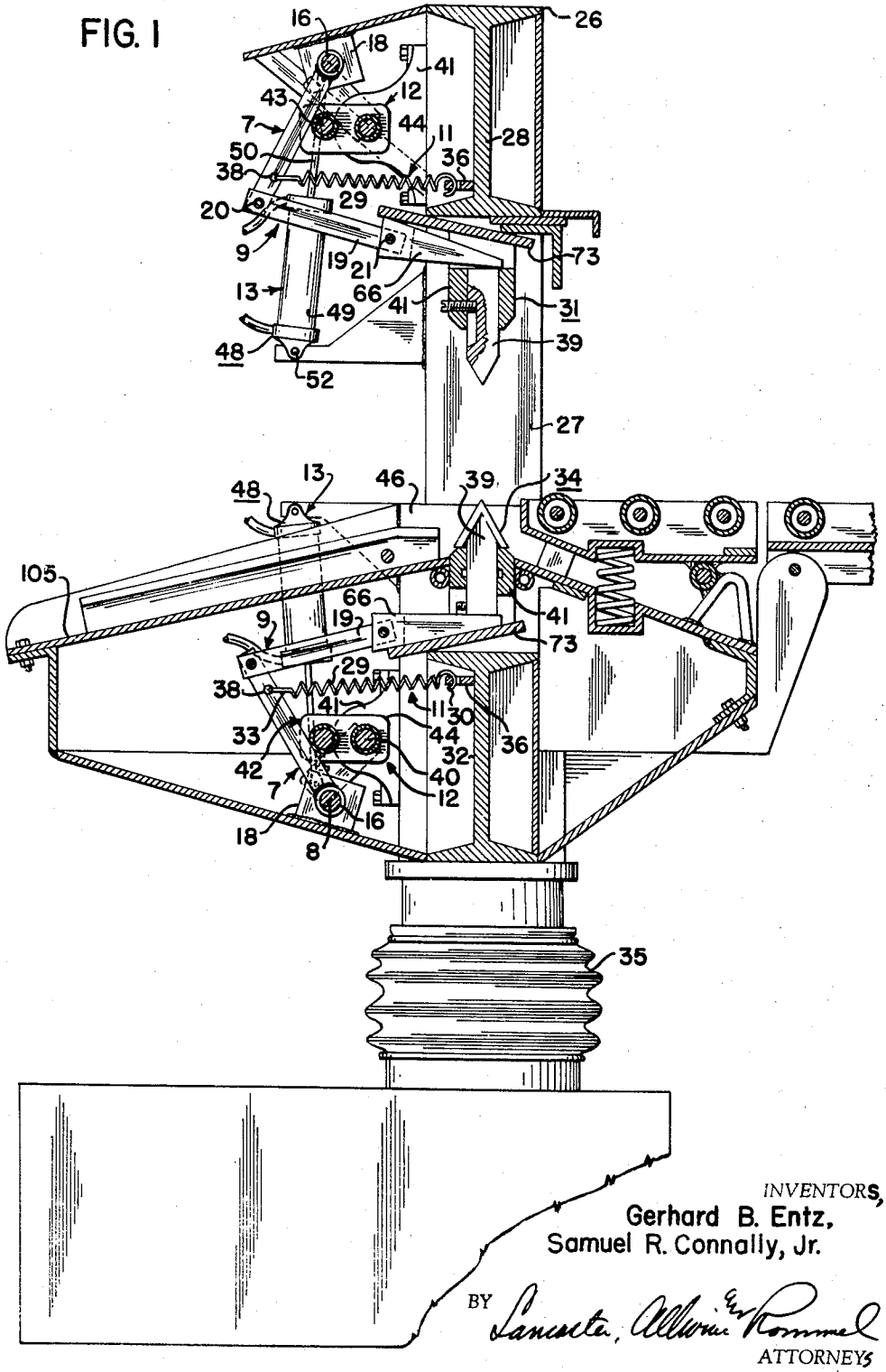
June 2, 1959 G. B. ENTZ ET AL 2,888,915

MACHINES FOR CUTTING OR SPLITTING STONES, BLOCKS AND SIMILAR MASONRY MATERIAL

Filed Dec. 13, 1956 3 Sheets-Sheet 1

FIG. 1



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FIG. 2

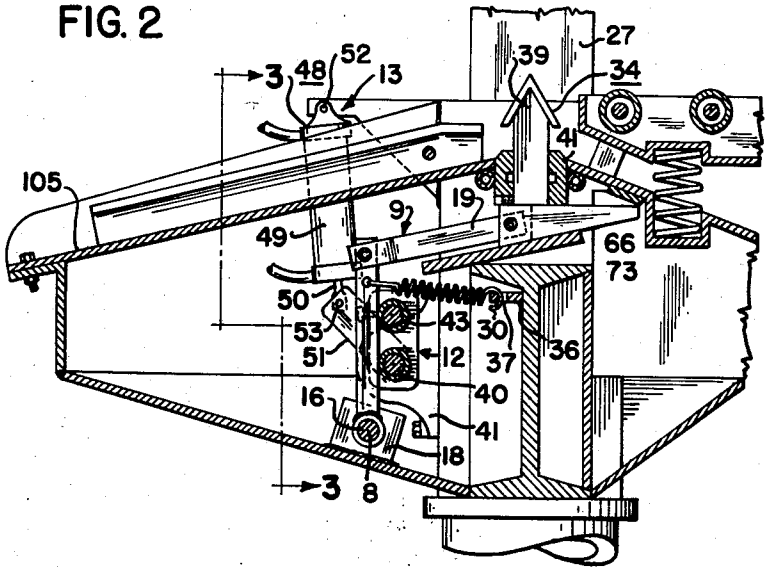


FIG. 4

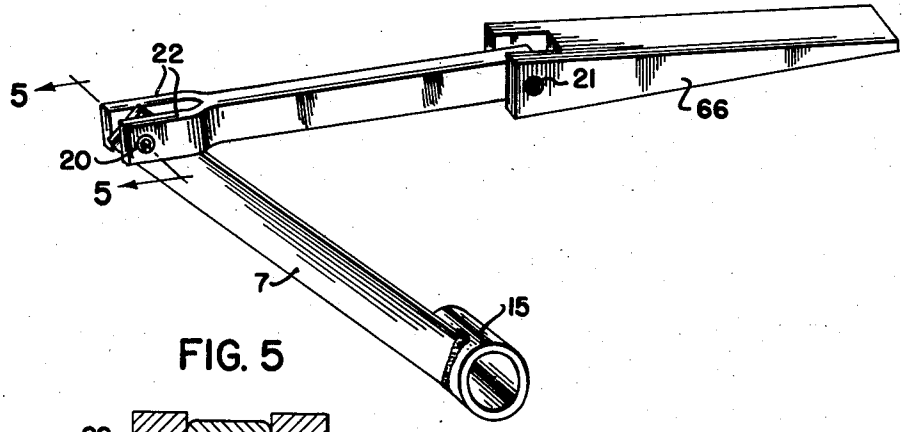
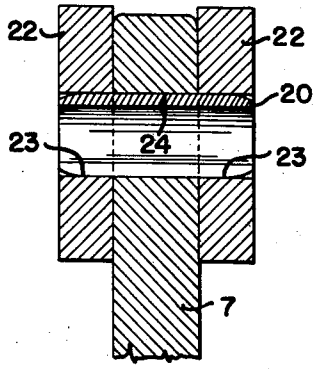


FIG. 5



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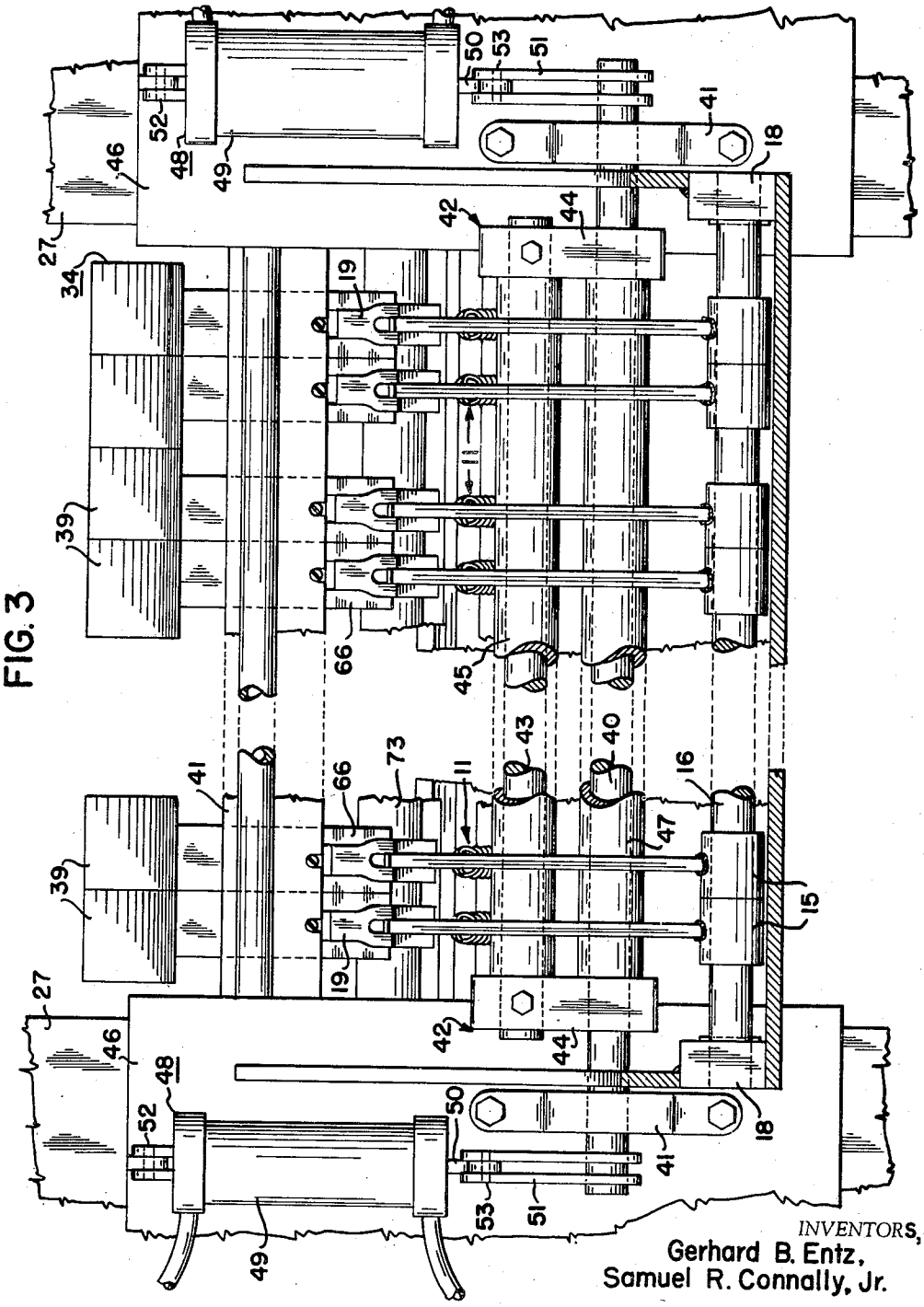
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FIG. 3



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MACHINES FOR CUTTING OR SPLITTING STONES, BLOCKS AND SIMILAR MASONRY MATERIAL

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Application December 13, 1956, Serial No. 628,150

4 Claims. (Cl. 125—23)

This invention relates to machines for cutting or splitting stones, concrete blocks and similar masonry material in which the cutting is accomplished by use of jaws, each of which comprises a series of chisels which may be individually set, by use of a wedge associated with each chisel, to the contour of the surface of the work where the cut or split is to be made and then moved in unison to accomplish the cutting or splitting of the work into separate masonry units, such as stone strips, sometimes termed "ashlar," concrete blocks, etc. Examples of such types of machines are disclosed in the patents to Johanning 2,152,193 of March 28, 1939, and Entz 2,762,359, and in the pending application of Gerhard B. Entz for "Machines for Cutting or Splitting Concrete Blocks and the Like," filed July 26, 1955, Serial No. 524,476.

Because of the great pressure required to cause the chisels to cut or fracture the work pieces so that, as to stone, the faces of the pieces which will be exposed to view in a wall, will not be too uneven as to be unsightly or, as to concrete blocks initially made in a mold, will, when cut or split, present faces each of varying texture of pleasing and inviting appearance, the chisels must be held firm against the work during the power stroke of the jaw. It has been proposed in the past to hold the chisels to the contour of the stone or work by various means, such as clamps acting on the shanks of the chisels, or by a hydraulic medium acting on a piston associated with each chisel, but these have not been found satisfactory due in part to slippage as to the clamp means, or loss of the hydraulic medium due to leakage. So far as we have been able to determine, the most satisfactory means for accomplishing the object in view is to associate a wedge with each chisel shank and to provide efficient means for actuating the wedges and holding them in set position and against slippage during the power stroke of the machine. However, in the past, such chisel actuating and holding means has been to some extent complicated due to the great number of parts making up same, rather slow in operation and requiring considerable time and labor, in the event of breakage of parts and the replacement or repair thereof, during which time the machine is idle.

The principal objects of the invention are to improve these types of machines using the wedges to hold the chisels of the upper jaw of the machine in set positions according to the upper surfaces of the work pieces and to actuate and hold the chisels of the lower jaw in set position with respect to the under surfaces of the work pieces by rendering the wedge actuating and setting mechanisms low in cost of manufacture, thus reducing the production costs of the machines, and capable of operating at a greater cycling speed.

Another object is to provide such wedge actuating and setting mechanism as may be readily assembled in a short period of time and readily dismembered in whole or in part for repair and/or replacement of worn or broken parts. According to the present invention any broken or worn moving part of the mechanism may be replaced

without cutting a single weld or removing any major portion of the machine.

A further object is to provide mechanism for wedge setting the chisels of the upper jaw of machines, such as are disclosed in the aforesaid Patents 2,152,193 and 2,762,359, no matter whether the upper jaw or the lower jaw is movable for the cutting or splitting operation, which is compact thereby enabling workmen at the delivery end of the machine to more readily observe what is taking place during operation of the machine and remove cut pieces of the work from the zone of the jaws of the machine without exercising the caution necessary where such mechanism is not compact but rather protrudes over all or a major portion of any receiving table or the like at the delivery end of the machine.

Other objects and advantages of the invention will appear in the following detailed description of a practical embodiment thereof, taken in connection with the accompanying drawings forming a part of this specification and in which drawings:

Fig. 1 is a vertical sectional view through a machine of the general type disclosed in Patent 2,762,359 but showing chisel actuating and setting mechanism of both upper and lower jaws of the machine constructed and arranged according to the present invention, and with the wedges retracted so that the chisels are positioned for receiving the work.

Fig. 2 is a similar but fragmentary view at the zone of the lower jaw and showing the relative position of parts of the chisel actuating and setting mechanism when the chisel has attained its maximum set position.

Fig. 3 is an enlarged fragmentary sectional view on substantially the line 3—3 of Fig. 2 with parts broken away and removed to condense the view.

Fig. 4 is an enlarged perspective view of lever and link mechanism associated with one of the wedges.

Fig. 5 is an enlarged sectional view on substantially the line 5—5 of Fig. 4.

The present invention is disclosed, by way of example, applied to a stone cutting machine of the type shown in the aforesaid Patent 2,762,359 comprising mainly an upright frame **26** including spaced parallel posts **27**; an upper reaction cross member **28** rigidly connected to the upper ends of posts **27**; a vertically movable elongated cross member **32** disposed with its end portions guided along the frame posts **27** by sleeve-like end units **46** which embrace the posts **27**; cutting means **31** carried by and disposed longitudinally of and below the upper cross member **28** for engagement upon the upper surface of the work to be cut along a predetermined line of fracture; cutting means **34** carried by and disposed longitudinally of and above the movable cross member **32** for engagement with the under surface of the work; means **35**, such as a hydraulic jack, for actuating the cross member **32**; and a table or slide **105** at the delivery end of the machine over which the cut pieces of masonry is moved by workmen after each cutting operation of the machine. The cutting means **31** and **34** have substantially the same characteristics in that each comprises a plurality of independently movable, side-by-side chisels **39** carried by chisel bars **41** extending longitudinally of their associated cross members **28** and **32**, as the case may be, the ends of the shanks of the chisels spaced from but confronting an inclined abutment or wedge plate **73**. A wedge **66** for each chisel is reciprocable in directions substantially normal to the axis of its respective chisel shank from a non-wedging position as shown in Fig. 1 to a wedging position as shown in Fig. 2. When in a wedging position it engages the end of the shank of its respective chisel **39** and the abutment plate **73**, and sets the chisel against movement with respect to its chisel carrying bar. The relative position of any par-

ticular chisel with respect to its chisel carrying bar, when the chisel is set, depends on the contour of the work, as is common in the art, or if there is no work in the zone of any particular chisel the wedge moves to a set position as shown in Fig. 2 projecting the chisel with respect to its chisel bar, to its fullest extent.

Briefly then, as is common in the art, the machine has an upper jaw comprising the cross member **28** and the cutting means **31**, and a lower movable jaw comprising the cross member **32** and cutting means **34**, but it is to be understood that the invention is applicable to machines when the upper jaw is movable as in the aforesaid Patent 2,152,193 or to machines where both jaws are movable if such is desired.

The wedge actuating and setting mechanism according to the present invention comprises a bank of levers **7** pivotally carried by the machine to oscillate about a common axis **8**, there being provided a lever **7** for each wedge **66**; first means **9** carried by each lever **7** for reciprocating its respective wedge upon oscillation of the lever; second means **11** normally acting to yieldably bias the wedges to wedging positions; third means **12** to actuate all of the levers **7** in a direction to move the wedges **66** to non-wedging positions against action of the means **11**; and, if desired, fourth means **13** for operating means **12**.

In the example shown each lever **7** is provided with a hub **15** which receives a horizontal shaft **16**, common to all of the levers of the bank of levers **16**, the shaft being secured at ends to the machine, as by brackets **18**, and paralleling, in spaced relation, the adjacent cross members **28** or **32** as the case may be. The axis **8**, above referred to is the axis of shaft **16**.

The means **9**, in the example shown comprises a series of links **19** (one for each lever **7** and its companion wedge **66**), each link being pivotally connected as by pin **20** to the free end portion of its respective lever, and pivotally connected as by pin **21** to the head end of its respective wedge **66**. In the example shown, each lever has its one end forked to provide spaced branches **22** provided with aligned holes **23** for the reception of its pin **20**, which also extends through a hole **24** in the free end of the lever, as shown in Fig. 5, and it is preferred to bifurcate the head end of the wedge **66** to provide branches **25** for receiving the pin **21**. The pins **20** and **21** are preferably of the split spring type known commercially as "Sel-Lok" examples of which are shown in the Rafter Patent No. 2,741,023 of April 10, 1956, since we have found that they are easily inserted, retain their set positions against movement due to vibration and other forces which might otherwise cause their displacement, yet they may be easily removed by punching operations if it is desired to withdraw any link **19** and its companion wedge for repair or replacement.

Referring now to the means **11** such preferably comprises a series of contraction springs **29**, having end hooks **30** and **33**, and a perforated bar **36** secured in any suitable manner to a suitable portion of the machine. There is a spring **29** provided for each wedge **66** and in the example shown the end hooks **30** are detachably engaged in perforations **37** of bar **36**, while the end hooks **33** are detachably engaged in a perforation **38** provided in the respective lever **7** of the associated wedge **66**. In the example shown, the bars **36** are secured to the webs of the cross members **28** and **32** of the respective upper and lower jaws of the machine.

As to the means **12**, it preferably comprises a horizontal shaft **40** disposed with its axis parallel to the axis of shaft **16** and carried by bearings **41** carried by the machine, such as to the upper ends of posts **27**, as to the upper jaw, and to the sleeves **46** of the lower jaw, in the example shown, and means **42** carried by the shaft **40** eccentrically thereof for engaging all of the levers **7** intermediate their ends, to move the levers simultaneously in a direction for actuating the wedges to a non-wedging position when the shaft **40** is moved in one direction (counter-clockwise from the position shown in Fig. 2, to the position shown in Fig. 1) and to permit the levers to move in a counter direction, responsive to means **11** when the shaft **40** is rotated in the opposite direction (clockwise from the position shown in Fig. 1, to the position shown in Fig. 2) thus actuating the wedges to a wedging position. The means **42** preferably comprises an axle **43** paralleling the shaft **40** and secured thereto by arms **44**, and roller or tubular member **45** freely revoluble on the axle, constituting an anti-friction medium for rolling engagement with the levers **7**. If desired a spacing tube **47** may surround the portion of shaft **40** between the brackets **41**. The shaft **40**, or its spacing tube may be so positioned, as shown in Fig. 2 that, when there is no work disposed between the chisels **39** and the shaft **40** is rotated in a direction for setting of the wedges in holding relation to their respective chisels, the levers **7** will be limited in their movement by engagement with the shaft **40**, or its spacing tube **47**, as the case may be so as to prevent the means **11** from jamming the wedges in tight contact with the chisel bar **41** and the abutment or wedge plate **73**.

While any suitable means **13** for operating means **12** may be provided, we disclose such means **13** as one or more servo-motors **48**, functioning in a manner similar to those in the aforesaid Patent 2,762,359, where the machine is hydraulically operated, comprising a cylinder **49** and a piston rod **50**; and, a lever **51** on the shaft **40**, the cylinder being pivoted to the machine as by pivot **52** and the piston rod **50** pivoted, as by pivot **53** to the free end of lever **51**.

The increase in operational or cycling speed is in part the result of a shortened stroke of the piston rod **50** of the servo-motor **48** for imparting movement to other parts of the mechanism as compared with the strokes of the servo-motor piston rods in the aforesaid Patent 2,862,359. In a typical example of a machine according to the present invention the piston rod stroke is 2⅛" in order to accomplish the object in view which is slightly less than one-half the stroke of the piston rods of the corresponding servo-motors in machine of the same capacity made according to the wedge actuating and setting mechanism disclosed in the aforesaid Patent 2,762,359.

It will be noted the wedge actuating and setting mechanism according to the present invention is comparatively inexpensive to manufacture, may be easily assembled and dismembered, and is very compact. This latter is especially important as to its use with the upper jaw of the machine, for by observation of Fig. 1, it will be noted that a workman at the delivery end of the machine guiding cut pieces of masonry above the table or slide **105** does not have a mass of mechanism near his head and may more readily observe the cutting and other operations from the delivery end of the machine without the necessity of exercising caution, so as to avoid head contact with parts of the machine.

We claim:

1. In a masonry cutting machine of the type in which a plurality of chisels, each having a shank, are carried in side-by-side relationship by a jaw of the machine and are individually set in cutting relation to the work by a wedge interposed between a portion of the chisel shank and an abutment, with the wedges reciprocable in directions substantially normal to the axis of its respective chisel shank from a wedging position to a non-wedging position with respect to the chisel and vice versa; the combination of a bank of levers pivotally carried by the machine to oscillate about a common axis, there being provided a lever of said bank of levers for each of said wedges; first means operatively carried by each of said levers for reciprocating its respective wedge upon oscillation of the lever; second means normally acting to yieldably bias said wedges to said wedging position; and third means to actuate all of said levers simultaneously in a

direction to move said wedges to non-wedging positions against action of said yieldable means, said third means comprising a shaft disposed with its axis parallel to said common axis and means carried by said shaft eccentrically thereof for engaging all of said levers to move them simultaneously in a direction for actuating said wedges to a non-wedging position when the shaft is rotated in one direction, and to permit said levers to move in a counter direction, responsive to said second means when said shaft is rotated in the opposite direction.

2. The machine as specified in claim 1 in which said shaft carried means comprises an axle paralleling its shaft and anti-friction means carried by said axle engaging said levers.

3. The machine as specified in claim 2 in which said

anti-friction means is a tubular member for simultaneous engagement with all of said levers.

4. The machine as specified in claim 1 in which said shaft limits movement of said levers in said counter direction and hence limits the extent to which the wedges may be moved to a wedging position responsive to said second means, as when there is no work with which the chisels engage.

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