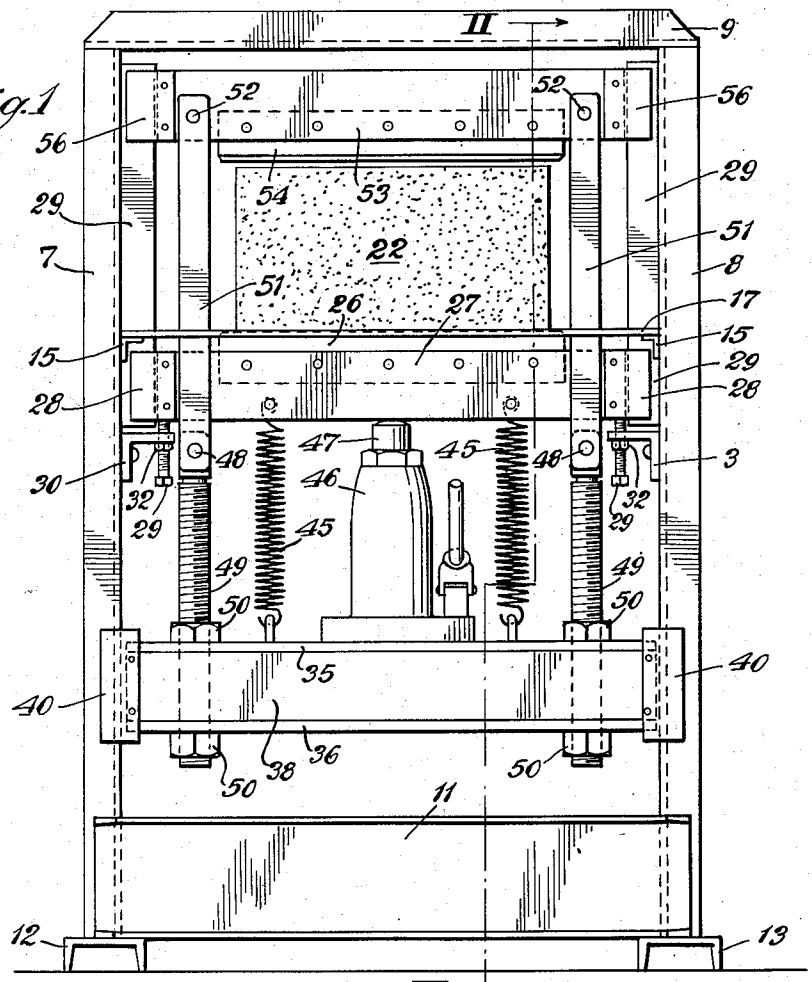
Nov. 3, 1953 C. GATZKE 2,657,681

MACHINE FOR SPLITTING CONCRETE BLOCKS, BUILDING STONES, AND THE LIKE

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Fig. 1



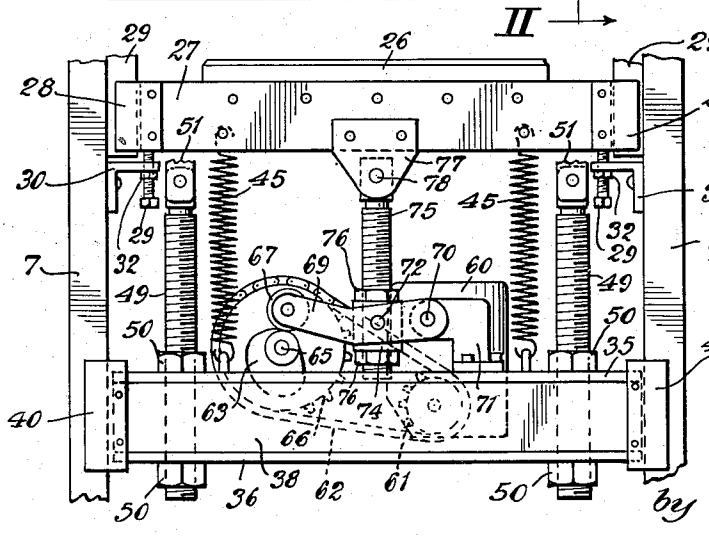


Fig. 5

Inventor
Charles Gatzke
Ham W. Hefter
Attorney
by

Nov. 3, 1953 C. GATZKE 2,657,681

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Fig. 2

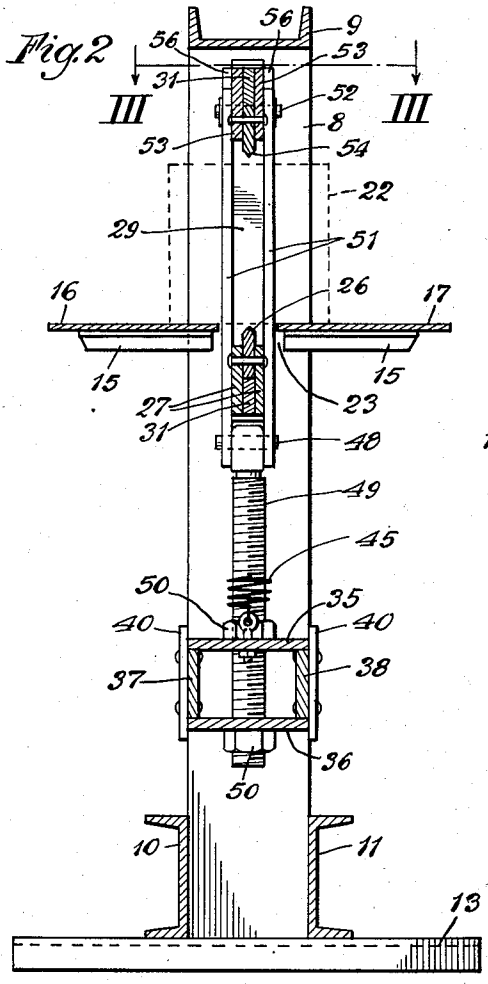


Fig. 3

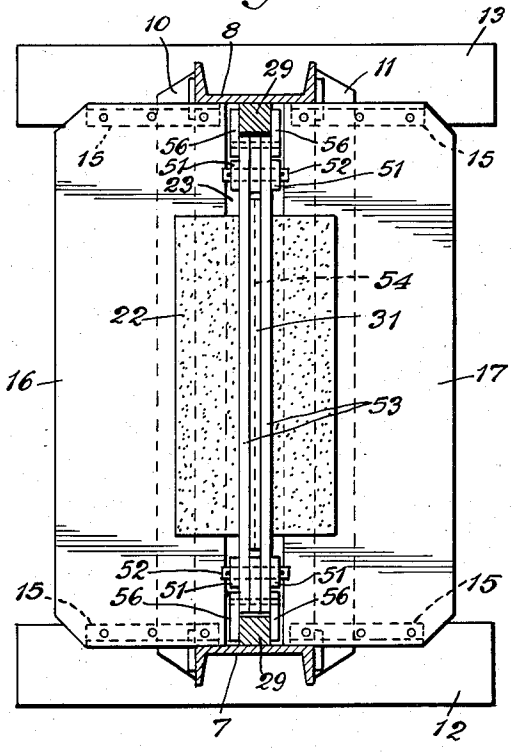
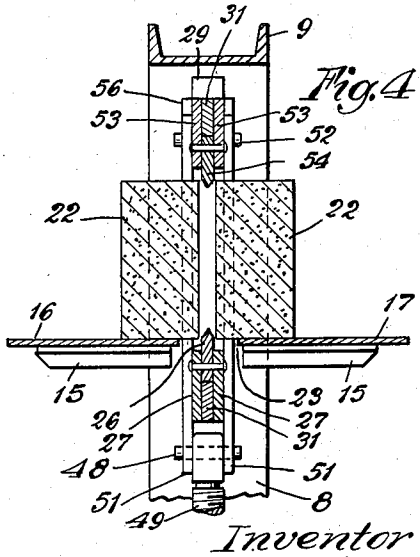


Fig. 4



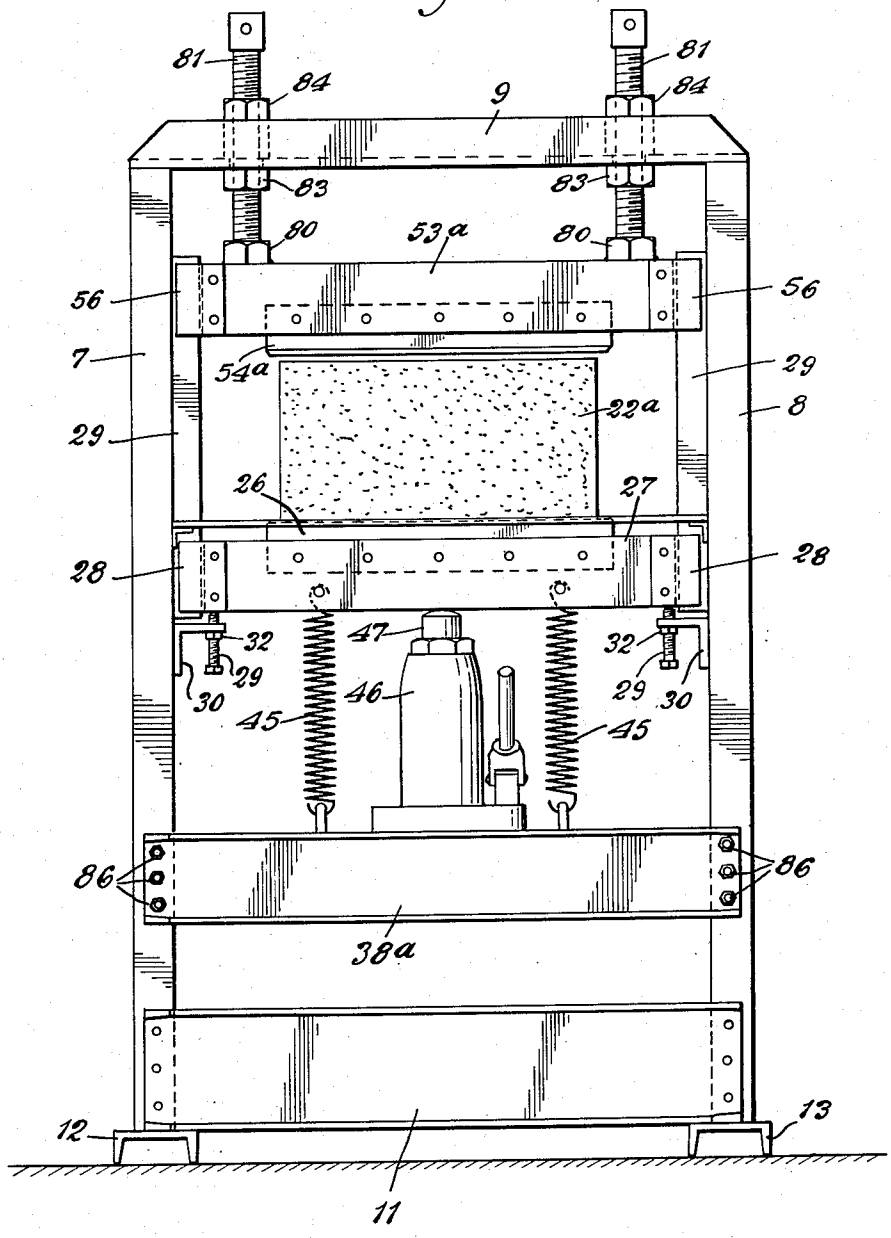
Inventor
Charles Gatzke
by Hans W. Hefter
Attorney

Nov. 3, 1953 C. GATZKE 2,657,681

MACHINE FOR SPLITTING CONCRETE BLOCKS, BUILDING STONES, AND THE LIKE

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Fig. 6



Inventor
Charles Gatzke

by Hans W. Hefter
Attorney

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UNITED STATES PATENT OFFICE

2,657,681

MACHINE FOR SPLITTING CONCRETE BLOCKS, BUILDING STONES, AND THE LIKE

Charles Gatzke, Des Plaines, Ill.

Application January 3, 1952, Serial No. 264,744

5 Claims. (Cl. 125—23)

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The invention relates to a machine for splitting concrete blocks, building stones and other hard stone-like materials employed in the building industry for erecting walls, floors, and the like.

A very important object of the invention is to provide a simple but effective machine provided with two knives for engaging with pressure opposite sides of a building stone, particularly a pre-formed concrete block to split the same in two or more pieces and whose split faces resemble natural stone in an effort to economically imitate Roman brick and natural stone.

Another object of the invention is to move at least one knife, but preferably both knives, in such a manner that the same are moved gradually into engagement with opposite sides of the building block to engage the same along their entire length in such a manner that upon gradual increase in pressure the knives enter slightly into the body of the block so as to split the same along straight edges uniformly and without waste in two parts of the desired sizes.

It is also an object of the invention to provide hydraulically operated means for actuating the movable knife and move it into engagement with gradual increasing force with the building block to be split.

Still another object of the invention is to provide a concrete block splitting machine with two oppositely movable horizontal knives and provide means for operatively connecting these two knives with each other in such a manner that upon operation of a single hydraulic jack, both knives are moved in opposite direction and into engagement with the concrete block positioned between the knives to engage and split the concrete block.

Still another object of the invention is to provide mechanically operated means such as a rotatable cam and a lever mechanism, either operated manually or by means of a motor, to operate the movable knife or both movable knives as the case may be, to bring the cutting edges of the knives into engagement with opposite sides of the concrete block for splitting the same.

The invention further consists in the several features hereinafter set forth and in the form and arrangement of the several parts and especially in the co-operative relation of the same to each other.

In the accompanying drawings, there are illustrated a few embodiments of the invention,

Fig. 1 is a front elevation view of one embodiment of the concrete block splitting machine of the invention,

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Fig. 2 is a vertical sectional view along the broken line II—II of Fig. 1,

Fig. 3 is a horizontal sectional view along the line III—III of Fig. 2,

Fig. 4 illustrates in a partial sectional view similar to Fig. 2 the knives of the machine in a position in which they have split a concrete block,

Fig. 5 illustrates a partial front elevation view of a modified machine in which the knives are activated by a motor driven cam and lever mechanism, and

Fig. 6 illustrates in front elevation view a modified machine in which only one of the two splitting knives is movable during the splitting operation.

Referring to the drawing, the machine frame comprises two spaced vertical posts 7 and 8 connected at their upper ends by a horizontal beam 9 and at their lower ends by a pair of horizontal beams 10, 11 secured by welding or in other manner to the side faces of the vertical posts 7 and 8 as particularly shown in Fig. 2. The lower end faces of the posts 7 and 8 are secured to horizontal beams 12 and 13 extending at right angles to the beams 10, 11 and forming the base which supports the frame on the floor. All the posts and beams are formed preferably of U-beams or channels as shown, but it should be obvious that if desired these beams or some of these beams may have another profile in cross section.

In a convenient height from the floor, there are attached to both inwardly directed faces of the vertical posts 7 and 8 angle iron pieces 15 which form a support for two plates 16 and 17 which are arranged in a common horizontal plane, forming a table top for supporting the concrete block 22 to be split. The plates 16 and 17 are separated by a slot 23 for accommodating the lower knife 26 adapted to engage the lower face of a concrete block placed on the table top.

The lower knife 26 is secured between two mounting plates 27 extending horizontally between the two vertical posts 7 and 8 and having secured at their ends two guide plates 28 slidably engaging for vertical movement opposite faces of vertical guide rails 29 fixedly secured to the vertical posts 7 and 8. The elevation of the lower knife 26 and its mounting 27 is adjustable by vertical screw bolts 29' extending threadedly through the horizontal flanges of angle iron pieces 30 attached to the posts 7 and 8 directly below the guide rails 29 and engaging with their upper ends the lower edge of the lower knife

mounting. Nuts 32 on the bolts 29' lock the latter in the desired position.

A horizontal beam structure comprising spaced parallel horizontal plates 35, 36 and spaced parallel vertical plates 37, 38 (Fig. 2) is mounted for vertical sliding movement between the two vertical posts 7, 8 a small distance above the horizontal beams 10 and 11.

Vertical guide plates 40 on the ends of the beam structure 35, 36, 37, 38 are in sliding engagement with the opposite longitudinal faces of the posts 7, 8 as shown in Figs. 1, 2 and 5. The beam structure is suspended from the mounting plates 27 of the lower knife by a pair of strong tension springs 45 which have the tendency to move the beam structure upwardly.

A manually operable hydraulic jack 46 is mounted on the top plate 35 of the beam structure in such a manner that the vertically movable piston 47 or other lifting member of the jack engages the lower edge of the lower knife structure 26, 27 (Fig. 1).

Two vertical screw spindles 49 extend through the horizontal beam structure and are each adapted to be locked to the latter in the desired position by a pair of clamping nuts 50, one engaging the top and the other the bottom plate of the beam structure. The upper ends of the screw spindle 49 are each pivotally connected at 48 with the lower ends of a pair of links 51 or straps extending vertically upwardly through the slot 23 in the table top 16, 17 to be pivotally connected at 52 with the ends of a pair of horizontal mounting plates 53 which have fixedly secured therebetween the upper splitting knife 54. The ends of the horizontal mounting plates 53 have secured thereto a pair of guide plates 56 slidably engaging opposite faces of the guide rails 29 to guide the upper knife 54 during its vertical movement (Fig. 1). Filler strips 31 are inserted in the space between the mounting plates 27 not occupied by the knives 26 and 54, respectively.

Prior to operation of the machine, the knives 26 and 54 are adjusted to the positions as shown in Figs. 1 and 2, in which the lower knife is positioned within the slot 23 a short distance below the top surface of the table top upon which the cement block 22 to be split is placed. The upper knife 54 is adjusted to lie with its edge just above the top surface of the cement block by vertically adjusting the top screw spindles 49 with respect to the beam structure 35 to 38.

The blocks to be split may consist of conventional concrete blocks used in the building trade and made from any suitable mixture of cement, sand and gravel and having for instance a length of about 16 inches and having a square cross section of about 8 inches. However, natural stones, such as Bedford or Indiana limestone when cut to uniform sizes may also be split in the same manner as concrete blocks formed by pouring a concrete mixture in suitable molds. The splitting of the blocks is done for the purpose of producing concrete or stone slabs having a relatively rough surface simulating in appearance Roman brick or natural stone. These stones or slabs are adapted to be used for constructing so-called veneer walls of buildings used as residences, stores and for other purposes.

The operation of the cement block splitting machine is as follows:

After having placed the block in position on the table top, the hydraulic jack is operated, either manually as indicated by the handle, or electrically by a motor, contactor controlled or the like. The upper knife 54 will descend first until it engages the top surface of the block uniformly along its entire length. The pivotal connections at 48 and 52 insure a slight tilting of the knife to effect such uniform engagement. Then the lower knife will be raised and also comes into uniform engagement along its entire length with the block. Upon continued operation of the hydraulic jack 46 there is built up a certain pressure on opposite sides of the block, the edges of the knives 26 and 54 enter very slightly into the body of the block until the block splits accurately and uniformly along the parallel lines formed by the edges of the knives. Upon release of the pressure in the jack the knives return immediately to their initial position owing to the action of the tension springs 45.

Fig. 5 illustrates an embodiment of the invention in which the hydraulic jack for operating the two knives is replaced by a cam and lever mechanism operated by an electric motor or other source of power. The electric motor 60 is mounted on the horizontal beam structure 37 to 38 and by means of a reduction gearing drive a sprocket 61 which in turn drives a chain 62 driving a larger sprocket 63 on a shaft 65 having a cam 66 secured thereto. The cam 66 is engaged by a roller 67 on one end of a lever 69 having its other end pivoted at 70 to a bracket 71 secured to the beam structure. The lever 67 between its ends is pivotally connected at 72 to a trunnion 74 adjustably secured to a screw spindle 75 by means of nuts 76. The upper end of the screw spindle 75 is pivotally connected at 78 to a bracket 77 carried by the lower knife mounting 27. Upon energizing the motor 60 the cam 66 is rotated so as to raise the lever 67 which in similar manner as the jack 46 actuates the two knives.

Fig. 6 illustrates a somewhat simpler embodiment of the invention in which the upper knife 54*a* with its mounting plates 53*a* is stationary during the splitting operation. In this Fig. 6, parts which are the same as in the first two described embodiments are designated with the same reference characters, such as the vertical beams 7, 8, the lower knife structure 26, 27, the hydraulic jack 46, 47, etc.

The upper knife structure 53*a*, 54*a* is, however, mounted for vertical adjustment in the frame. For this purpose, nuts 80 are secured to the upper edge of the mounting plates 53*a* and screw spindles 81 extend from said nuts 80 upwardly through holes 82 in the upper beam 9. Nuts 83 and 84 on these screw spindles 81 engage opposite sides of the beam 9 and permit a vertical adjustment of the upper knife to the size of the block to be split.

The lower beam structure 38*a* is fixedly secured to the vertical posts 7, 8 by any suitable fastening means, such as bolts 86, rivets or by welding. The operation is very similar to the one of the first two embodiments, except that upon operation of the hydraulic jack only the lower knife 27 moves upwardly, raises the block 22*a* until it engages the upper knife 54*a* and then the block is split. Of course, the hydraulic jack 46, 47 may be replaced by the cam and lever mechanism 61 to 72 shown in connection with Fig. 5.

What I claim is:

1. A machine for splitting concrete blocks, building stones and the like, comprising two spaced vertical posts, two vertically spaced horizontal knives mounted for vertical movement between said posts, means on said posts for guiding said knives for movement in a single vertical

plane, a horizontal beam structure mounted below said knives for vertical sliding movement between said posts, spring means connecting the lower knife with said horizontal beam structure, a hydraulic jack mounted on said beam structure and having a lifting member engaging said lower knife, link means extending upwardly from said beam structure, means connecting said link means with the upper knife, whereby upon operation of said jack the two knives are caused to move toward each other to engage with pressure opposite sides of a concrete block positioned between said knives, said spring means suspending said beam structure from said lower knife and returning said knives to their initial position upon release of the pressure in said hydraulic jack.

2. A machine for splitting concrete blocks, building stones and the like, comprising two spaced vertical posts, two vertically spaced horizontal knives mounted for vertical movement between said posts, means on said posts for guiding said knives for movement in a single vertical plane, supports on said posts which limit the downward movement of the lower knife and on which the lower knife is loosely carried, a horizontal beam structure mounted below said knives for vertical sliding movement between said posts, springs connecting the lower knife with said horizontal beam structure, a hydraulic jack mounted on said beam structure and having a lifting member engaging said lower knife, link means extending upwardly from said beam structure, means pivotally connecting said link means with the upper knife, whereby upon operation of said jack the two knives are caused to move toward each other to engage with pressure opposite sides of a concrete block positioned between said knives, said springs suspending said beam structure from said lower knife and returning said knives to their initial position upon release of the pressure in said hydraulic jack.

3. A machine for splitting concrete blocks, building stones and the like, comprising two spaced vertical posts, two vertically spaced horizontal knives mounted for vertical movement between said posts, means on said posts for guiding said knives for movement in a single vertical plane, means forming a table top secured to said vertical posts between said knives and upon which the block to be split is placed, a horizontal beam structure mounted below said knives for vertical sliding movement between said posts, spring means connecting the lower knife with said horizontal beam structure, a hydraulic jack mounted on said beam structure and having a lifting member engaging said lower knife, link means extending upwardly from said beam structure, means connecting said link means with the upper knife, whereby upon operation of said jack the two knives are caused to move toward each other to engage with pressure opposite sides of a concrete block positioned between said knives, said spring means suspending said beam structure from said lower knife and returning said knives to their initial position upon release of the pressure in said hydraulic jack.

4. A machine for splitting concrete blocks,

building stones and the like, comprising two spaced vertical posts, two vertically spaced horizontal knives mounted for vertical movement between said posts, means on said posts for guiding said knives for movement in a single vertical plane, supports on said posts which limit the downward movement of the lower knife and on which the lower knife is loosely carried, means forming a table top secured to said vertical posts between said knives and upon which the block to be split is placed, a horizontal beam structure mounted below said knives for vertical sliding movement between said posts, spring means connecting the lower knife with said horizontal beam structure, a hydraulic jack mounted on said beam structure and having a lifting member engaging said lower knife, link means extending upwardly from said beam structure, means pivotally connecting said link means with the upper knife, whereby upon operation of said jack the two knives are caused to move toward each other to engage with pressure opposite sides of a concrete block positioned between said knives, said spring means suspending said beam structure from said lower knife and returning said knives to their initial position upon release of the pressure in said hydraulic jack.

5. A machine for splitting concrete blocks, building stones and the like, comprising two spaced vertical posts, two vertically spaced horizontal knives mounted for vertical movement between said posts, means on said posts for guiding said knives for movement in a single vertical plane, supports on said posts which limit the downward movement of the lower knife, a horizontal beam structure mounted below said knives, springs connecting the lower knife with said horizontal beam structure, a hydraulic jack mounted between said beam structure and said lower knife, link means extending upwardly from said beam structure, means pivotally connecting said link means with the upper knife, whereby upon operation of said jack the two knives are caused to move toward each other to engage with pressure opposite sides of a concrete block positioned between said knives, said springs suspending said beam structure from said lower knife and returning said knives to their initial position upon release of the pressure in said hydraulic jack.

CHARLES GATZKE.

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