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SUBDIVISION OF A BLOCK OF MATERIAL INTO UNITS OF SELECTED SHAPES AND SIZES

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Fig. 2.

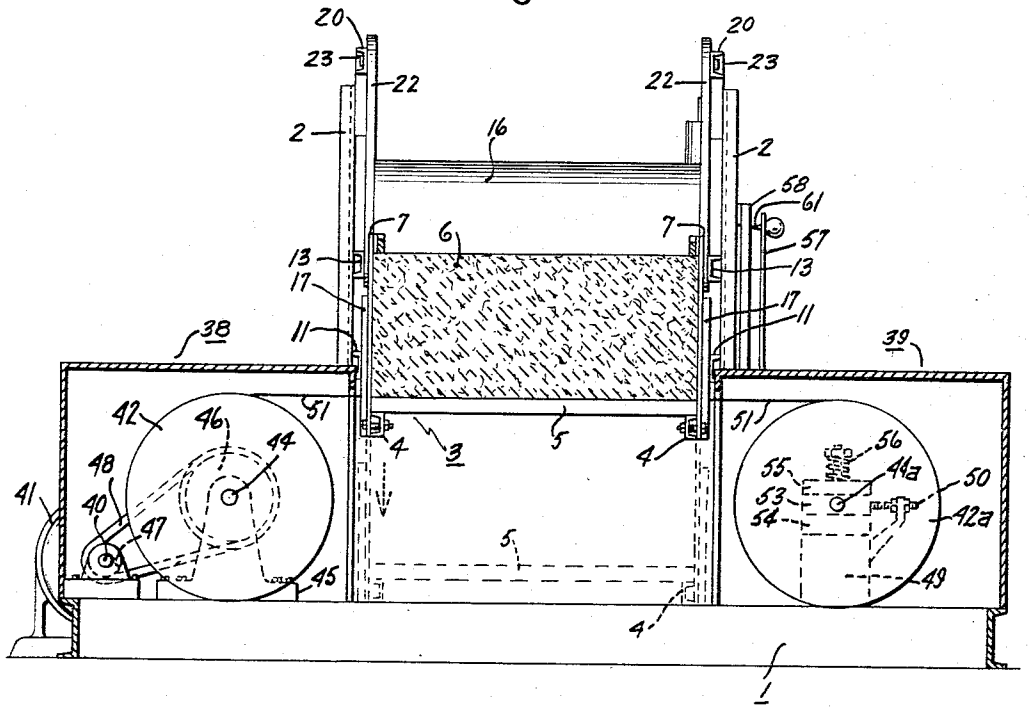
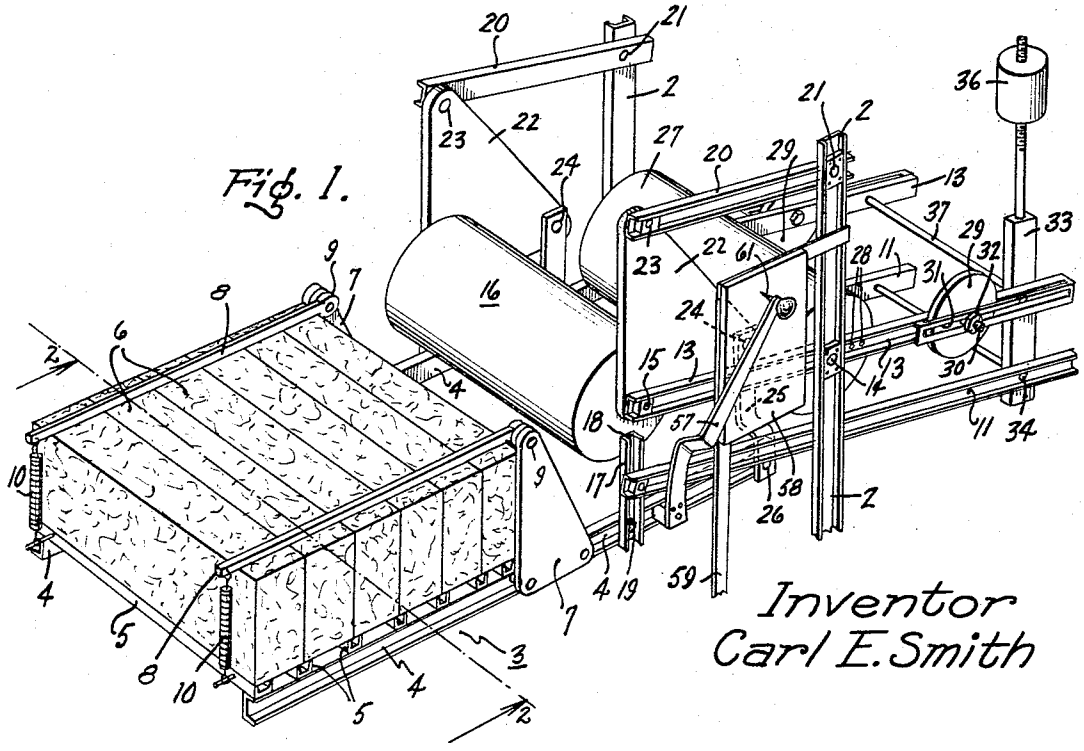


Fig. 1.



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SUBDIVISION OF A BLOCK OF MATERIAL INTO UNITS OF SELECTED SHAPES AND SIZES

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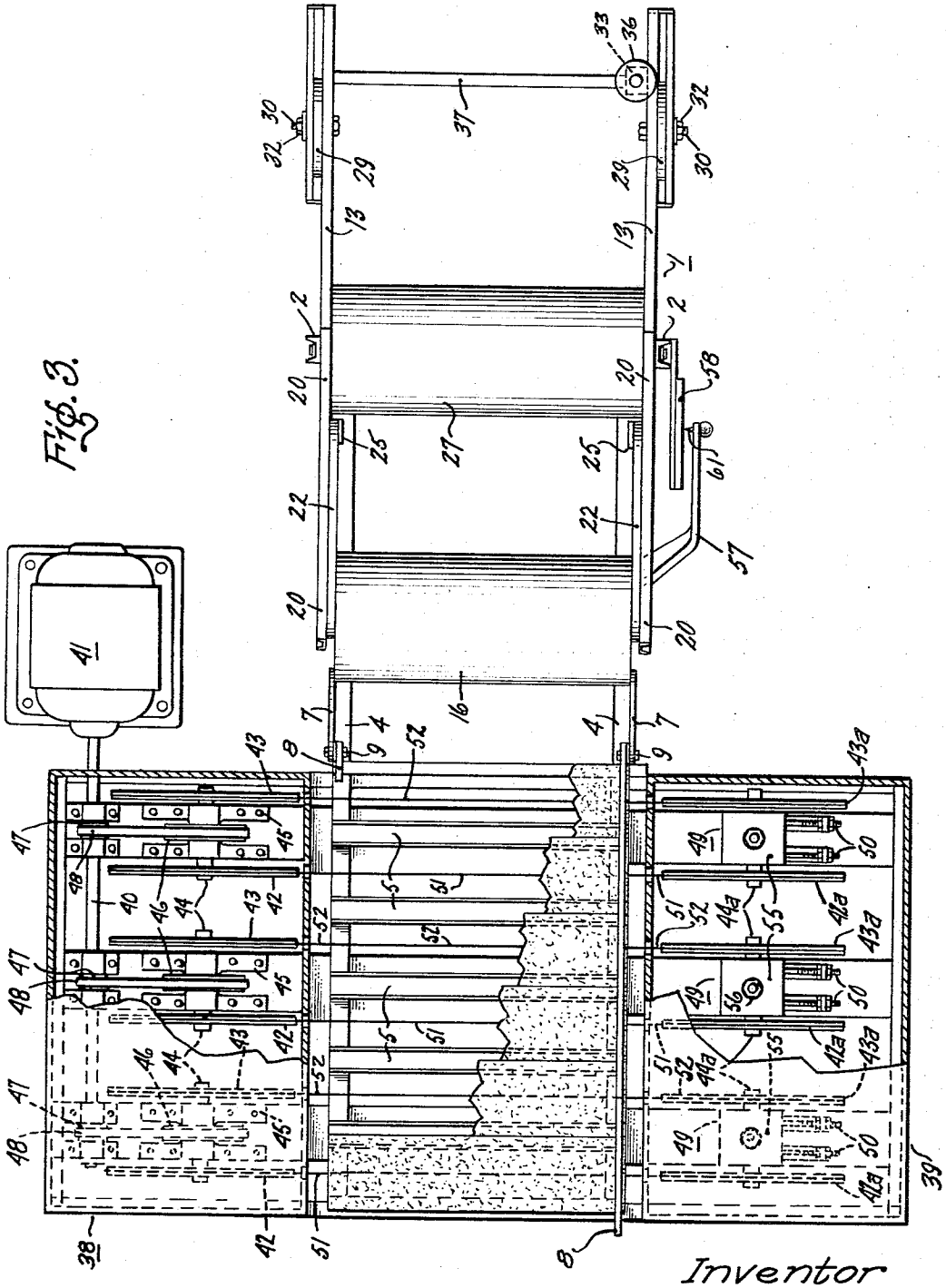
Fig. 3.



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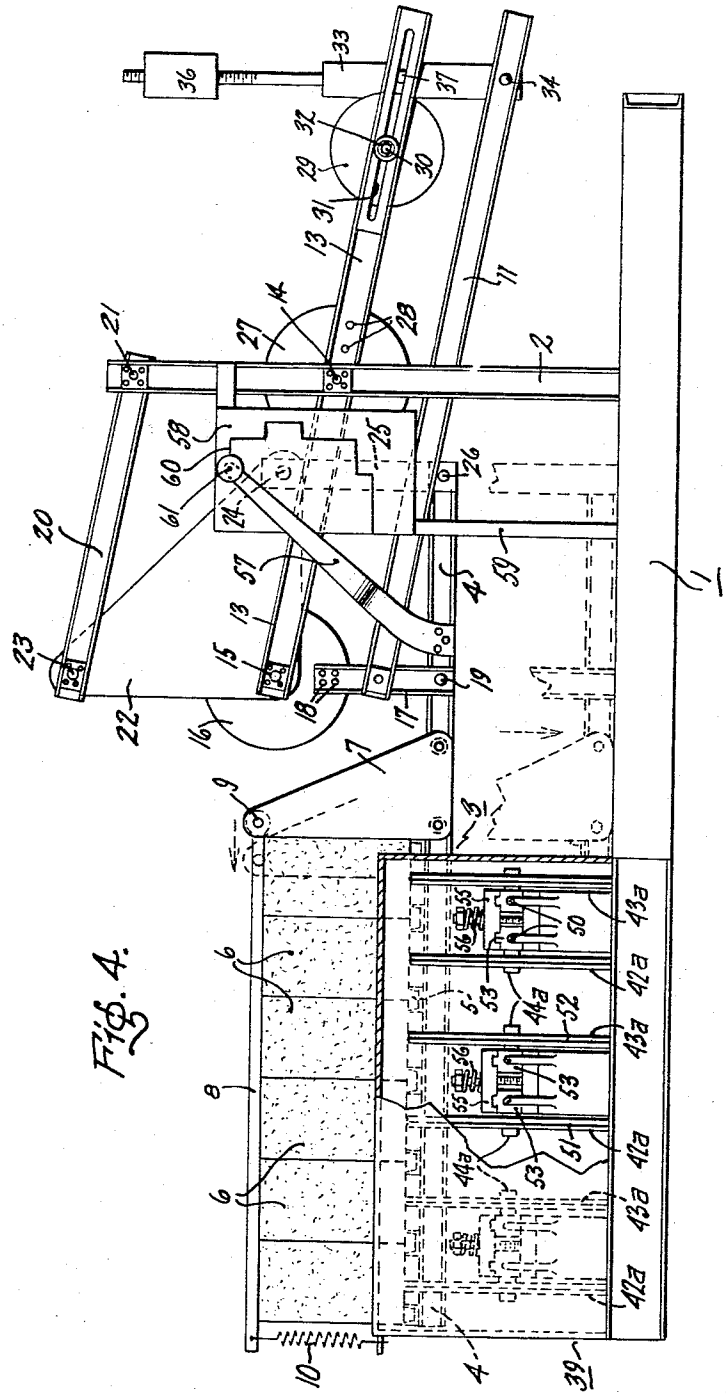

FIG. 4.

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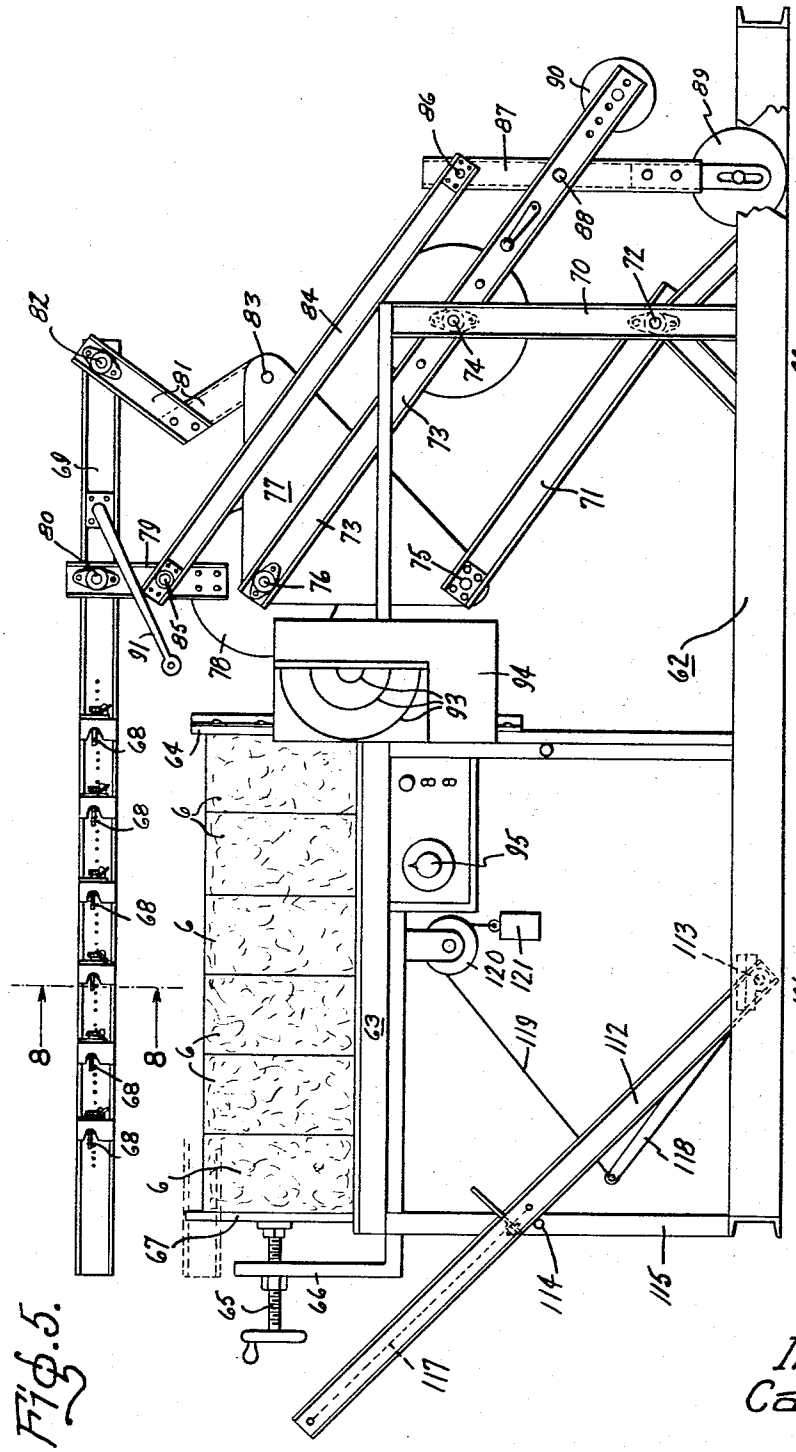

Fig. 5.

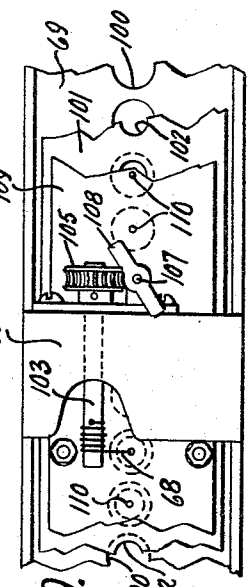

Fig. 9.

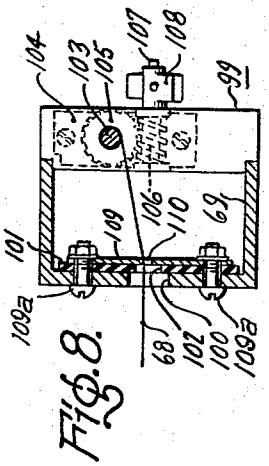

Fig. 8.

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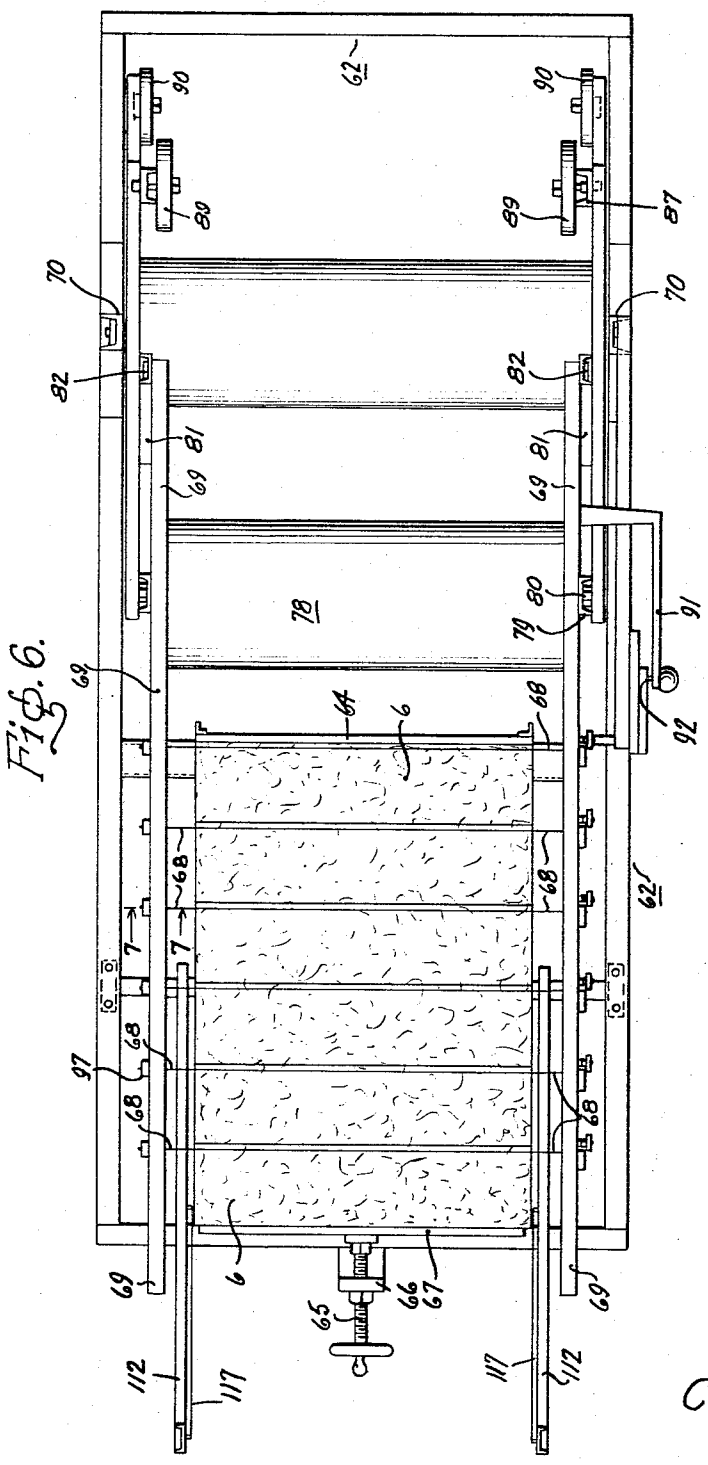

Fig. 6.

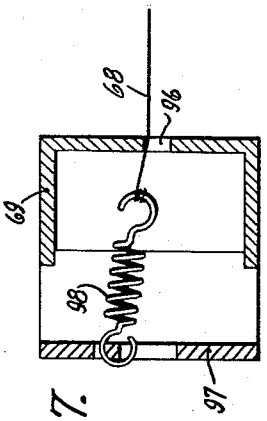

Fig. 7.

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United States Patent Office 3,333,494
Patented Aug. 1, 1967

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SUBDIVISION OF A BLOCK OF MATERIAL INTO UNITS OF SELECTED SHAPES AND SIZES

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Filed Dec. 13, 1963, Ser. No. 330,451
18 Claims. (Cl. 83—1)

This invention relates to devices for the subdivision of a block of material into a plurality of units of equal lengths but having any of various different selected cross-sectional shapes and sizes. Such devices are useful, for example, for subdividing blocks of rigid cellular plastics into lengths of pipe covering halves or cylindrical segments for use in covering pipes, and by forming a plurality of halves, simultaneously in one operation of a subdividing machine the cost of manufacture is at a minimum.

Objects of the invention are to provide a relatively simple and practical machine for making a plurality of accurately subdivided units from a block of material, such as cellular thermal insulation material, in one setting of a block of such material, which may be operated by relatively unskilled persons, which is suitable for making units of selected and various shapes and sizes in transverse cross-sections, which requires a minimum of manual operating forces, and which will be relatively inexpensive and simple in construction.

Other objects and advantages will be apparent from the following description of two embodiments of the invention and the novel features will be particularly pointed out in connection with the appended claims.

In the accompanying drawings:

FIG. 1 is a perspective of a subdividing device constructed in accordance with this invention and representing one example of it;

FIG. 2 is a cross-sectional elevation of the same, the section being taken approximately along the line 2—2 of FIG. 1;

FIG. 3 is a plan of the same, with portions broken away to expose to view, otherwise hidden details of construction;

FIG. 4 is a side elevation of the same, with portions broken away to expose to view details that would be otherwise hidden;

FIG. 5 is a side elevation of another subdividing device also constructed in accordance with the invention, but illustrating another embodiment of the same;

FIG. 6 is a plan of the same;

FIG. 7 is a sectional elevation of a detail of the second embodiment, the section being taken approximately along the line 7—7 of FIG. 6;

FIG. 8 is a sectional elevation of another detail of the same, with the section taken approximately along the line 8—8 of FIG. 5; and

FIG. 9 is a face elevation of the detail shown in FIG. 8.

The invention includes the support of a block of material to be subdivided into a plurality of units of selected sizes and shapes in transverse cross-section and of equal lengths, and the support of a plurality of stretches of parallel cutter wires disposed side by side but spaced apart. Relative movements of said supports in directions crosswise of the lengths of the stretches of the wires successively in accordance with selected guide patterns, will bring the wire stretches sidewise against the block to be subdivided and subdivide it into units whose cross-sectional shape will be governed by the relative movements of the supports. The wires may be endless bands with transverse cutting teeth and moving linearly in its opposite stretches, or may be non-moving but stretched taut and heated to a temperature at which they will melt or burn their way through the material of the block. While the block to be subdivided may be of different

materials, a cellular plastic foam, such as polystyrene with the machine shown in FIGS. 5 and 6, and polyurethane with the machine shown in FIGS. 1–4. Cellular materials are used for insulation and covering for pipes and conduits and they may be subdivided by this invention in desired shapes and sizes very quickly and relatively inexpensively.

In the embodiment of the invention illustrated in FIGS. 1 to 4, inclusive, the device includes a frame base **1** formed of metal, channel members coupled together and having upstanding, rigid, channel posts **2** of metal on opposite sides of the base and in side by side alignment. A platform **3** formed of paralleled side channel bars **4** is disposed on one end of the base **1** and extends along and above the base **1**. A plurality of parallel, narrow channel strips **5** extend across and above the bars **4** and are fixed to the upper edges of bars **4** but spaced apart along the length of bars **4** and upon which may rest a block **6** of the material to be subdivided. This block may be formed of one piece or a plurality of sections abutting and confined face to face. Plates **7** are fixed to bars **4** at opposite sides of the platform **3** to upstand therefrom at one end of the block **6**. Arms **8** are hinged by pivot **9** to the upper ends of the plates **7** and extend lengthwise over the block, to near the ends of the block, and are urged downwardly by springs **10** connected between the free ends of the arms **8** and end cross bar **5** for yieldingly and removably confining the block **6** upon the spaced apart cross bars **5**. The manner of mounting the platform that supports the block **6** will next be described.

At each side of the base (see FIG. 4), a channel bar **11** extends in a direction lengthwise of the base **1**. A second bar **13** at each side of the base is pivoted at **14** to the adjacent upright post **2**, and is generally equal in length to bar **11**. The forward ends of bars **13** rotatably support on an axis **15**, a cylindrical drum **16**, that extends between such forward ends of bars **13**. An arm **17** is fixed at **18** to each end of drum **16**, extends therefrom, in a direction radially of the drum, and at its lower end is pivoted by pin **19** to the channel bar **4** of the platform at that side of the base. An arm **20** is pivoted by pivot **21** to the top of the post **2**, at each side of the base, and extends therefrom generally toward the support for the block **6**.

A triangular plate **22** has one corner thereof pivoted by pivot **23** to the free end of arm **20** and another corner thereof is pivoted to the adjacent end of the adjacent bar **13** by the pivot **15**. The other corner of each plate **22** is pivotally connected by a pivot **24** to the upper end of a link **25**, whose lower end is pivoted by pin **26** to an end of adjacent bar **4**. Another cylindrical drum **27** extends between and contacts at its ends with the bars **13** and each bar **13** is fixed to the adjacent end of the drum by rivets, bolts or screws **28**. This drum **27** provides a rigid connection between bars **13**. Weights **29** are carried by the ends of bars **13** remote from drum **16**, to balance the linkage formed of bar **13** and drum **16**. The weights **29** have threaded end projections **30** and when tightened clamp the weights **29** in any positions along the slots **31** of arms **13** into which they may be shifted.

An arm **33** (FIG. 4) is pivoted at **34** to the end of one arm **11** which is remote from the block **6**, upstands therefrom, and has a weight **36** threaded lengthwise thereon. The arm **33** has a laterally extending pin **37** which is fixed to the arm **13** so that the arm **33** remains generally upright. This weight **36** serves to balance out the horizontal movements of the platform that supports the block **6**. With this arrangement of pivotally connected arms, bars and links, just described, the platform on which the block **6** is mounted is capable of lengthwise

and up and down movements in any pattern, one position in such movements being shown by dash lines in FIG. 4.

Referring next to FIGS. 2, 3, and 4, there is one housing **38** at one side of the base and aligned horizontally with the block **6**, and another and similar housing **39** at the opposite side of the base **1**. In the housing **38** a common drive shaft **40** runs parallel to the sides of the frame or base **1** and extends outwardly of the housing where it is connected to and driven by an electric motor **41**. Mounted in housing **38** are pairs of pulleys **42** and **43** spaced apart in a direction parallel to shaft **40**, and the pulleys of each pair are fixed on a common shaft **44**, and the latter is suitably mounted for rotation in a bearing **45**. Each shaft **44** between the pulleys **42** and **43** has fixed thereon a pulley **46** and aligned sidewise of it and fixed on shaft **40** is a smaller pulley **47**. A belt **48** passes around each pulley **47** on the shaft **40** and the pulley **46** aligned with it. Thus all of the pulleys **42** and **43** will be rotated at the same time by the motor **41**.

In the housing **39**, similar pairs of pulleys **42***a* and **43***a* are arranged in alignment, sidewise of the base frame, with the pairs in housing **39**, and the pulleys **42***a* and **43***a* of each pair are fixed on a shaft **44***a* of each pair fixed on a shaft **44***a* that is similar to the shaft **44** of housing **38**. The shafts **44***a* are freely rotatable in upstanding pedestals **49** and each shaft **44***a* is adjustable sidewise of itself by turning of screws **50**. Around the aligned pulleys **42** and **42***a* is an endless, flexible wire cutter **51** and a similar wire cutter **52** extends around the aligned pulleys **43** and **43***a*. This is duplicated for each pair of pulleys in housings **38** and **39**. Each wire has small, transverse, circular teeth spaced apart along it and when its upper stretch is pressed sidewise of itself against the block **6** while moving from pulley **42** to **42***a* and from pulley **42***a* to **43***a*, it will cut itself into and through the block in any path of relative movement of the block **6** and the cutter wires during movement of the block **6** in up and down and lengthwise paths. As shown in FIG. 2 each shaft **44***a* is rotatably supported in a bearing block **53** that is slidably confined against a horizontal flange **54** on a pedestal **49** by a plate **55**, which is pressed by a spring **56** toward flange **54**. By adjusting screws **50** in and out they shift the bearing block in directions to tighten or loosen the flexible wire cutters. The upper stretches of the wire cutters pass above the bars **4** and between the cross bars **5**, so that when the platform on which the block rests is lowered, the wire cutters will engage with the under side of the block at spaced apart intervals along it.

It is desirable to guide the platform and block **6** in various desired paths up and down and lengthwise in subdividing the block into units of desired shapes and sizes in transverse cross-sections. This is done by fixing to bar **11** at one side of the platform an arm **57** that extends at its free end in front of a plate **58** carried by a post **59** that upstands from the base or frame **1**. Raised patterns **60** (FIG. 4) are detachably fixed on the plate **58** behind the arm **57**, with outlines or grooves that correspond in size, shape and outline or grooves to the desired paths for the cutter wires to follow through the block **6**. The arm **57** has a follower pin **61** which one guides along the patterns to cause movements of the block in corresponding paths. This is easily possible with little effort because the platform and block are balanced with the weights **29** and **36** so that little force is necessary to move the platform and block **6**. After the wire cutters have subdivided the block **6** in this manner, the ends of the block units are cut off to the desired lengths.

In the embodiment illustrated in FIGS. 5–9, the block **6** to be subdivided remains stationary and the cutter wires are given the desired up and down and lengthwise movements. The base frame **62** has a stationary platform **63** on which the block **6** is mounted and pressed against an end wall **64** at one end of the block by a screw **65** threadedly adjustable through an abutment **66** at the other end of the block and pressing a plate **67** against the adjacent end of the block **6**. A plurality of straight, parallel stretches **68** of metal wires are stretched taut between side bars **69** and spaced apart sidewise as are the wire cutters **51** and **52** of FIGS. 1–4. Posts **70** are fixed to and upstand from the base **62** at opposite sides of the base. An arm **71** is pivoted at one end at **72** to each post **70** and extends toward the block **6**.

Another arm **73** at each side is disposed above the arm **71** and pivoted at **74** to post **70**. It extends toward block **6** in generally parallel relation to arm **71**. The ends of these arms **71** and **73** nearest to block **6** are pivoted at **75** and **76**, respectively, to two corners of a triangular plate **77**, the pivots **75** and **76** being normally vertically aligned. A drum **78** is rotatably mounted between arms **73** with its axis coincident with pivots **76**. An arm **79** is fixed to each end of the drum and extends upwardly therefrom in a direction radial to the drum, and at their upper ends the arms **79** are pivoted at **80** to the side bars **69**. A V-shaped arm **81** is pivoted at one end at **82** to end side bar **69**, and the other end of each is pivoted at **83** to the third corner of the adjacent plate **77**. Another arm **84** at each side of the device is pivotally connected at **85** to arm **79** between the drum **78** and pivot **80** and it extends from arm **79** in a direction generally parallel to arm **73**. At its free end it is pivoted at **86** to a vertical link **87** and the latter link is pivoted at **88** to an extension of adjacent arm **73**.

A weight **89** is adjustably carried by the lower end of each link **87** and a weight **90** is carried on the free end of each arm **73** and adjustable lengthwise along the arm **73**. This linkage when moved will shift the wire support bars **69** in directions up and down and lengthwise of block **6** in any combinations of these movements in the same manner as the block **6** was shifted relatively to the cutter wires in FIGS. 1–4. The weights **89** and **90** counterbalance the linkage and wire supports so that little effort is required to move the wires **68** sidewise of themselves against and through the block **6** to subdivide it.

An arm **91** (FIG. 5) is fixed to one of the bars **69** and at its free end it carries a pin follower **92** which can be moved easily to follow guide grooves or edges **93** of a pattern plate **94** that is fixed on a side of the frame that supports block **6**. A rheostat **95** controls electric circuits to each of the heating wires **68** to connect the wires in parallel in an electric circuit, with the current controlled in amount by the rheostat **95**. The wires are of a material commonly used in electric heaters and are heated to a temperature at which they will cut or melt their way through the material of the block **6**.

The manner of mounting each wire **68** at one end is shown in FIG. 7 where one side bar **69** has slots **96** in the vertical web of the bar. A block **97** extends across the open face of the channel of which the bar is formed, and has notches in its ends to enable the block to slightly enter the channel. A helical spring **98** is hooked at one end to the block **97** which serves to provide a resilient anchorage. The anchorage of the other end of each wire **68** is shown in FIGS. 8 and 9. The other side bar **69** is also a channel bar with its open face outermost, and a block **99** of insulating material is fixed across the channel face as shown in FIG. 8. The web of the channel of bar **69** has an aperture **100** through which the wire **68** loosely passes.

A plate **101** of insulating material is secured to the inner face of this web and has an aperture **102** through which the wire slidingly passes while out of contact with the web of bar **69**. The wire **68** is then secured to the peg **103** that is rotatably confined in the block or member **99** that is confined to the bar **69**. The peg **103** has a gear **105** on one end with which meshes a pinion **106** on a small shaft **107** (see FIG. 8), with a button-like turning handle **108**. This is like the tuning mechanism on banjos and guitars and the like, and is used to tighten the wire **68**, and stretch spring **98**. Then when the wire is heated it will elongate and this elongation is taken up by the spring **98**

so that wire remains taut even when heated. A metal plate **109** is secured to the insulation plate **101** by bolts **109***a* of insulating material and has a fine aperture **110** through which the wire **68** passes before being wound on the peg, and the peg is offset slightly from the aperture **110** so that the wire **68** will always be held against the wall of the aperture **110** and be in electrical contact with the plate **109**.

Circuit wires (not shown) are connected in parallel to the plates **109** to supply current to the wires **68**. Other circuit wires (not shown) may be connected to the other ends of the wires to complete a circuit through all wires **68**, or as shown, the latter may be grounded through the frame bar **69** to which they are anchored through the springs **98**. The springs **98** may be anchored to bolts in the member **97** when the latter is of insulation, and then all of such bolts can be electrically connected in parallel for inclusion in the heating circuit that also includes a source of electricity adequate to heat the wires to the desired temperature.

After the block has been subdivided by the wires **68**, it is well to cut all of the subdivisions to the same lengths. To do this a bar **112** at each side of the frame (FIG. 5) is fixed at its lower end on a shaft **113** that is rotatably mounted on the base **62**. Each bar **112** extends upwardly at an acute inclination to a position at the rear of the block **6**. It normally rests against a pin **114** on a vertical post **115** from the base that supports the platform **63** on which the block **6** rests. It may be more firmly secured in this position, if desired. Each arm **112** carries a heater wire **117**, insulated from the arm, in a position to move with arm **112** across the adjacent end of the block **6** and when heated hot to burn, melt or cut its way through the end of the subdivisions of the block **6**.

A suitable heater circuit, not shown, is connected to the ends of each wire **117** to heat it. The shaft **113** has fixed thereon, between its ends and beneath platform **63**, an arm **118** that is inclined at about the same angle of inclination as the arms **112**, and a flexible cable **119** connected to the free end of arm **118** passes upwardly and over a pulley **120** which is rotatably supported below and from the platform **63** and then carries a counterbalance weight **121**. When arms **112** are moved past vertical, it again raises the weight **121**. The weight makes the arms **112** easier to move for cutting off the ends of the subdivided blocks. A similar means for cutting off the ends of subdivided blocks may be provided on the embodiment shown in FIGS. 1–4 if desired.

It will be understood that various changes in the details, materials and arrangements of parts, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of this invention, as phrased in the appended claims.

I claim:

1. A device for subdividing blocks of solid material into forms of selected shapes which comprises:

(a) one support for mounting blocks to be subdivided,

(b) a plurality of spaced apart and taut subdividing wires capable of subdividing said blocks,

(c) another support for mounting said wires,

(d) parallelogram linkage means at each side of said supports for mounting said supports on said base for relative movements of said supports in a path in a plane normal to said wires and causing relative travel of said wires through any of said material on said one support,

(e) a stationary pattern having a guide surface corresponding to the desired path of said relative movement between said wires and a block to be subdivided while on said one support, and

(f) means connected to the linkage means of the movable one of said supports and having a follower engageable with said pattern for guidance by the pattern of said relative movement, carrying said wires in that pattern progressively through a block on said support,

(g) and rigid cylindrical means extending in a direction crosswise of the supports and at its ends rigidly connected to two corresponding links of each linkage, and keeping said linkages aligned with one another in all of their movements.

2. A device for subdividing a block of solid material into forms of selected shapes which comprises:

(a) a base,

(b) one support mounted stationarily on said base,

(c) another support mounted on said base by parallelogram linkage at each side of the base for movements in all directions parallel to a plane, a link of said linkage at one side of said supports being rigidly connected by a rigid cylinder to the corresponding link at the other side of said support, to keep aligned the linkages at opposite sides of said support,

(d) a guide pattern having a guiding surface corresponding in shape to the desired movements of said another support,

(e) follower means carried by said another support and engageable with and capable of following said guiding surface in said directions desired for said another support,

(f) means for releasably confining a block of said material that is to be subdivided to one of said supports and

(g) a plurality of parallel subdividing wires of a type capable of forming a path through any block of said material when pressed sidewise against and moved within it, mounted on the other of said supports,

(h) whereby during relative movements of said supports, as guided by said guiding surface of said guide pattern, said wires will form through any block of said material a path that corresponds to said guiding surface and subdivide the block into units having a cross-sectional shape determined by said surfaces of said pattern.

3. The device according to claim **2**, wherein:

(a) the linkage of the movable one of said supports is approximately counterbalanced on said base to facilitate guidance of said follower means along and in contact with said guiding surface of said pattern.

4. The device according to claim **2**, wherein the linkage at each side of said base includes:

(a) one parallelogram linkage having a member as one link thereof,

(b) a second parallelogram linkage supported by the other linkage and having for its sides, said another support, said member, and links connecting spaced parts of said support to said member, one connection to said member being at the pivotal connection of that member in said one parallelogram, and its other connection to said member remote from the pivotal connections of said member in said one linkage.

5. The device according to claim **1**, wherein said linkages means at each side of said support includes two parallelogram linkages having one side common to both linkages.

6. A device for subdividing a block of solid material into units of selected sizes and shapes which comprises:

(a) a base frame having at each side thereof an upstanding post,

(b) two links pivoted to each of said posts at different heights thereon,

(c) a member at each side of said base frame pivoted to and connecting the adjacent free ends of said links and forming a parallelogram linkage with the post and said two links at each side of the frame,

(d) a platform frame,

(e) one element pivotally connected to said member and to one part of said platform frame,

(f) another element pivoted to another part of said platform frame and to one of said links, with the platform frame, said elements and said member forming at each side of said base a second parallelogram linkage that supports said platform frame from said one linkage,

(g) follower means connected to one of said parallelogram linkages,

(h) a guide which said follower means may engage and follow in paths parallel to possible paths of movement of said second parallelogram linkage and by which the platform frame may be guided in selected directions,

(i) wire-like cutting means disposed in directions from side to side of the platform frame and carried by one of said frames,

(j) whereby when a block to be subdivided is mounted on the other of said frames, the relative movement of said frames by said linkages may carry said cutting means in selected paths through said block and subdivide it.

7. A device for use in subdividing a block of solid material into units of selected shapes and sizes, which comprises:

(a) a base frame,

(b) a pair of links pivoted to said frame at different heights thereon, at each side thereof,

(c) a member pivoted to each pair of said links and forming therewith a parallelogram linkage at each side in which linkage the frame, said links, and the member form the sides of the linkage,

(d) another frame,

(e) an element at each side of and pivoted to spaced parts of said another frame, and also pivotally connected to said member at that side, one of said connection to said member being at one of the pivotal connections of said member to a link, and the other connection being remote from said one of the said pivotal connections, and forming a second parallelogram linkage of which said member is one side,

(f) one of said frames carrying wire-like means capable of cutting through said material when pressed in contact therewith,

(g) the other of said frames being formed to hold a block of said material to be subdivided for contact with said cutting means upon relative movements of said frames, and

(h) means controlled by a selected guide for guiding the relative movements of said frames and carrying said wire-like means through any body of said material on said other of said frames in selected directions and extents of movement.

8. A device for subdividing blocks of solid material into units of selected shapes and sizes which comprises:

(a) a base having upstanding posts at opposite sides thereof,

(b) a platform for supporting a block of material to be subdivided and having a side bar along each side of the base, and cross bars extending between and fixed upon the tops of said side bars in spaced relation to one another along the length of said side bars,

(c) a plurality of endless loops of flexible wire each having an upper stretch extending from side to side above the side bars and between the adjacent cross bars, and each wire having cutting teeth along it,

(d) means for adjusting one pulley of each pair toward and from the other to pull taut the wire that passes around the pulleys of that pair,

(e) means connected to one pulley of each pair for rotating it and causing linear endwise travel of the wire thereon, and

(f) means including parallelogram linkage units at opposite sides of said base for causing limited shifting of said platform in directions upwardly and downwardly and also in opposite directions cross-wise of the upper stretches of the wires, and for pressing said block downwardly and sidewise of itself against the upper stretches of said wires while they are moving endwise between the pulleys and back and forth lengthwise of the platform to cut the block into units of selected shapes and sizes, and

(g) pattern means for guiding said linkages and through them said platform in its said movements to determine the shapes and sizes of said units.

9. A device for subdividing a block of solid material into units of selected shapes and sizes which comprises:

(a) a base having at each side thereof an upstanding post,

(b) a pair of links pivoted to said post at different heights thereon,

(c) a plate pivoted to and connecting the free ends of said pair of links, with the post, links and plate forming a parallelogram linkage,

(d) a support on said base for holding a block to be subdivided firmly thereon,

(e) a platform disposed above said block and horizontally over-running said parallelogram linkage,

(f) a member at each side of said platform pivoted at one end to a side of said platform, depending therefrom, and at its other end pivoted to the adjacent plate remotely from the connection of the plate to the said pair of links,

(g) a drum disposed between and pivotally connected to said plates, with its axis coincident with the pivot connection of said plates to corresponding ones of said links at opposite sides of the base, and rotatable on its said axis,

(h) an arm pivoted to each side of said platform to depend therefrom and at its lower end fixed to an end of said drum,

(i) a further link at each side of said platform pivoted at one end to said depending arm intermediate of the ends of that arm, extending therefrom generally parallel to said pair of links and above them,

(j) still another link pivoted to the free end of said further link and to one of said pair of links,

(k) a plurality of wires stretched taut between opposite sides of said platform in parallel relation to one another and spaced apart along the length of the platform,

(l) means for passing an electric current through each said wire to heat it to a temperature at which it can cut its way through a block of said material when pressed sidewise of itself against any block of said material to be subdivided,

(m) a pattern having a guiding surface mounted on said base at one side thereof, and

(n) an arm fixed to said one side of said platform and having a follower at its free end engageable with and guided by said guiding surface for causing said platform to move in a direction forwardly and rearwardly and upwardly and downwardly and carry said hot wires sidewise in similar directions against and through any block of said material that is mounted on said base.

10. The device according to claim 9, and

(a) an end cutting arm mounted on each side of said base for movement in a direction lengthwise of the base and across the adjacent end of any block of said material which is confined on said base,

(b) a cutting wire carried by each said cutting arm in a vertical plane and when heated it will sever the ends of a block of said material on said base and make said block and any units into which it may be subdivided of selected uniform lengths, and

(c) means for heating said cutting wire to a temperature at which it will cut itself through said material.

11. A device for subdividing a block of solid material into units of selected shapes and sizes which comprises:

(a) a base,

(b) one support on which a block of said material may be confined, mounted on said base,

(c) another support mounted on said base,

(d) subdividing wires mounted on said another support,

(e) the mounting of one of said supports on said base including a parallelogram type of linkage enabling movement of that support relatively to the other support in directions to carry said subdividing wires in all directions sidewise of themselves against and through any block of said material that is mounted on said one support,

(f) pattern means mounted on said base and having guide surfaces corresponding to the cross-sectional shape and size desired by the subdivided units, and

(g) a guide on the movable one of said supports which can engage and move along said guide surfaces and thereby cause the desired movements of said wires through said block.

12. A device for subdividing a body of solid material which comprises:

(a) a frame,

(b) a parallelogram linkage system at each side of said frame, aligned and spaced apart from one another, side by side,

(c) means connecting corresponding portions of said linkage at opposite sides of the frame and keeping the systems aligned in their movements,

(d) a guide having a cam surface carried by said frame and corresponding to the desired movements of said linkage systems, disposed in a plane parallel to the directions of movements of said linkage,

(e) one support on said frame,

(f) another support carried by said linkage system,

(g) wire-like means carried by one of said supports and extending in a direction crosswise of said frame, and capable of dividing a body of said material that may be pressed against it,

(h) the other of said supports being formed to receive and hold a body of such material to be subdivided in the relative path of movement between said supports caused by such systems, and

(i) means carried by said another support for engagement with and movement along said cam surface to guide said another support in a desired path with said linkage systems while said body and wire-like means are in contact with one another,

13. The device according to claim 12, wherein said means connecting corresponding portions of said linkage at opposite sides of the frame includes a rigid, cylindrical drum whose axis is approximately concentric with the axis of a pivot of such linkage.

14. The device according to claim 12, wherein said means connecting corresponding portions of said linkage includes a rigid, cylindrical drum extending between said systems and keeping them aligned side by side.

15. The device according to claim 12, said means that connects corresponding portions of said linkage at opposite sides of the frame including two rigid drums extending between, and at their ends rigidly coupled to, corresponding links of said systems, said drums being spaced apart along said linkages.

16. The device according to claim 12, and means connected to said linkage systems for counterbalancing them and the means connecting the linkage systems for holding the latter in alignment.

17. A device for subdividing a body of solid material into forms having selected shapes and sizes in cross section, which comprises:

(a) a frame,

(b) one support mounted stationarily on said frame,

(c) another support free of said frame,

(d) a post carried by said frame at each side thereof,

(e) a pair of arms pivoted on each post at different levels thereon and disposed in superposed relation to one another,

(f) a bell crank element having one arm and its apex pivoted to and connecting superposed, corresponding free ends of said arms at each side,

(g) a rigid cylinder extending between and pivoted to said free ends of the lower one of said arms at each side,

(h) one member rigidly fixed to each end of said cylinder and extending radially from the ends of the cylinder,

(i) another member pivoted to the other arm of said element and extending generally parallel to said one member, the lower ends of said members being pivoted to spaced parts of said another support,

(j) a third arm pivoted at one end to said one member and extending generally parallel to the free ends of said pair of arms and having an articulated linkage connection between the opposite ends of said third arm and the lower one of said pair of arms,

(k) wire-like means carried by one of said supports for dividing any of said material with which it contacts,

(l) a guide pattern surface on said frame in a plane perpendicular to the length of said wire-like means, and

(m) a follower attached to said third arm and engaging said pattern surface for guiding the movable one of said supports in a path corresponding to said surface.

18. Cutting apparatus, comprising in combination, a cutting member located in a fixed position for cutting a workpiece in a horizontal line, a workpiece holder supporting a workpiece for vertical movement and for horizontal movement transverse to the line of cut of said cutting member, said workpiece holder comprising a first pantograph having means for holding a workpiece and providing horizontal movement relative to said cutting member, and a second pantograph mounted on a fixed support and supporting said first pantograph for vertical movement relative to said cutting member, and balancing means for said workpiece and said workpiece holder providing adjustable balance for the weight of the workpiece and for its swing to either side of a neutral position of said first pantograph on said second pantograph.

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