Jan. 16, 1923.

1,442,205.

E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919.

17 SHEETS—SHEET 1.

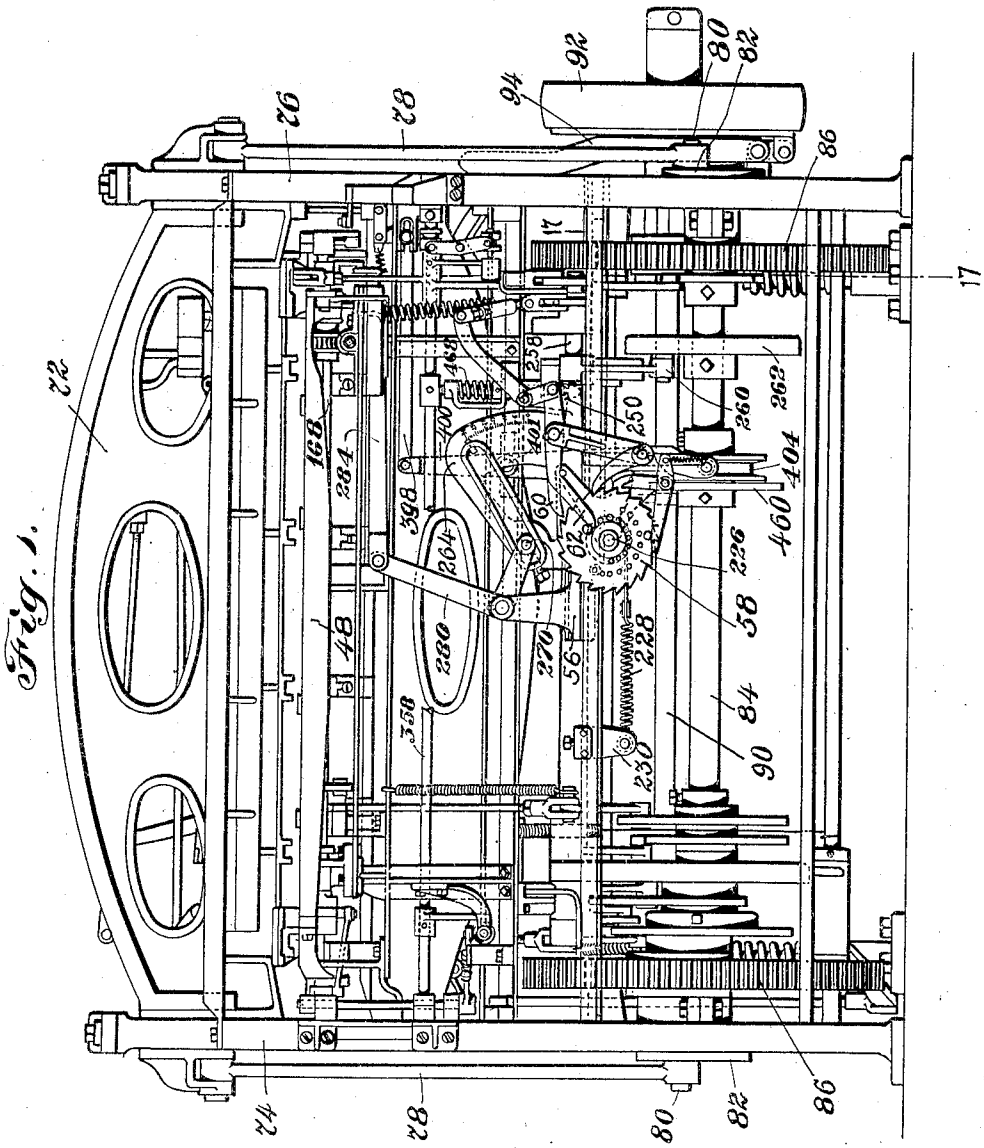


Fig. 1.

Witness:
Robert F. Marsh

Inventor,
Ernestus E. Winkley
by his attorneys
Paul Ernest, Fish & Fleischmann

Jan. 16, 1923.

1,442,205.

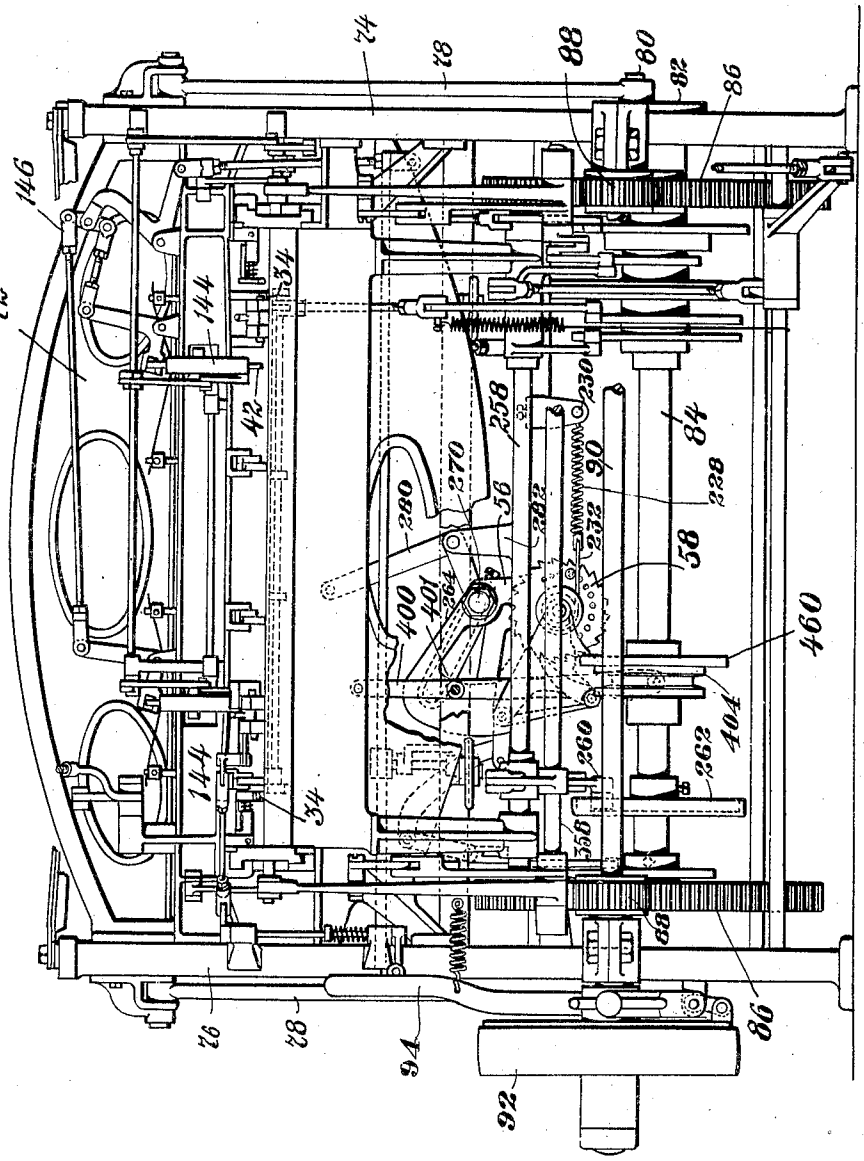
E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919.

17 SHEETS—SHEET 2.

Fig. 2.



Witness,
Robert A. Marsh

Inventor,
Erastus E. Winkley
by his Attorneys
Dodge Essen, Fish & Hildreth

Jan. 16, 1923.

1,442,205.

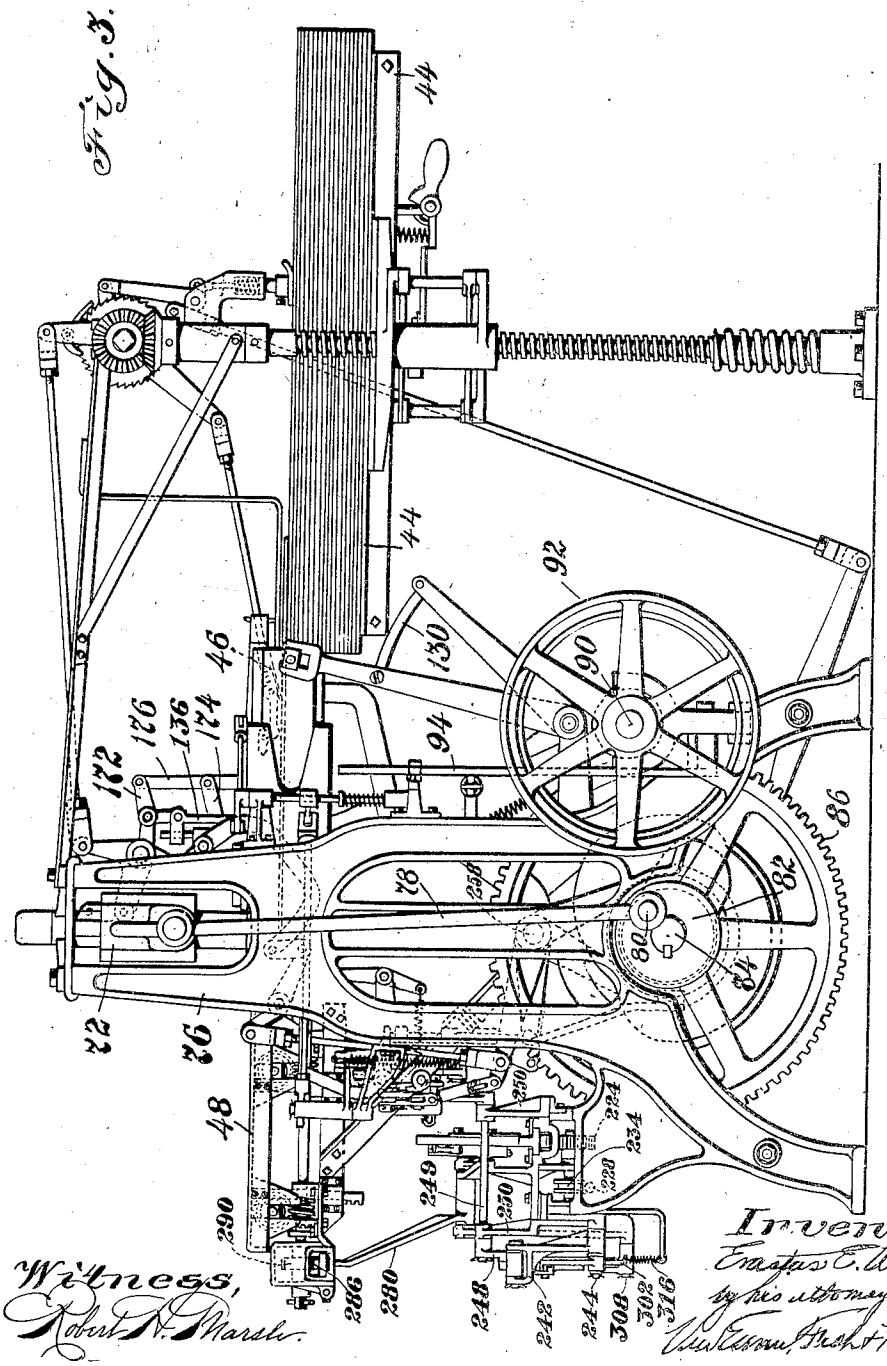
E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919.

17 SHEETS—SHEET 3.

Fig. 3.



Witness,
Robert N. Marsh.

Inventor
Enastus E. Winkley
by his attorneys
Wilkinson, Fresh & Fitzsimmons

Jan. 16, 1923.

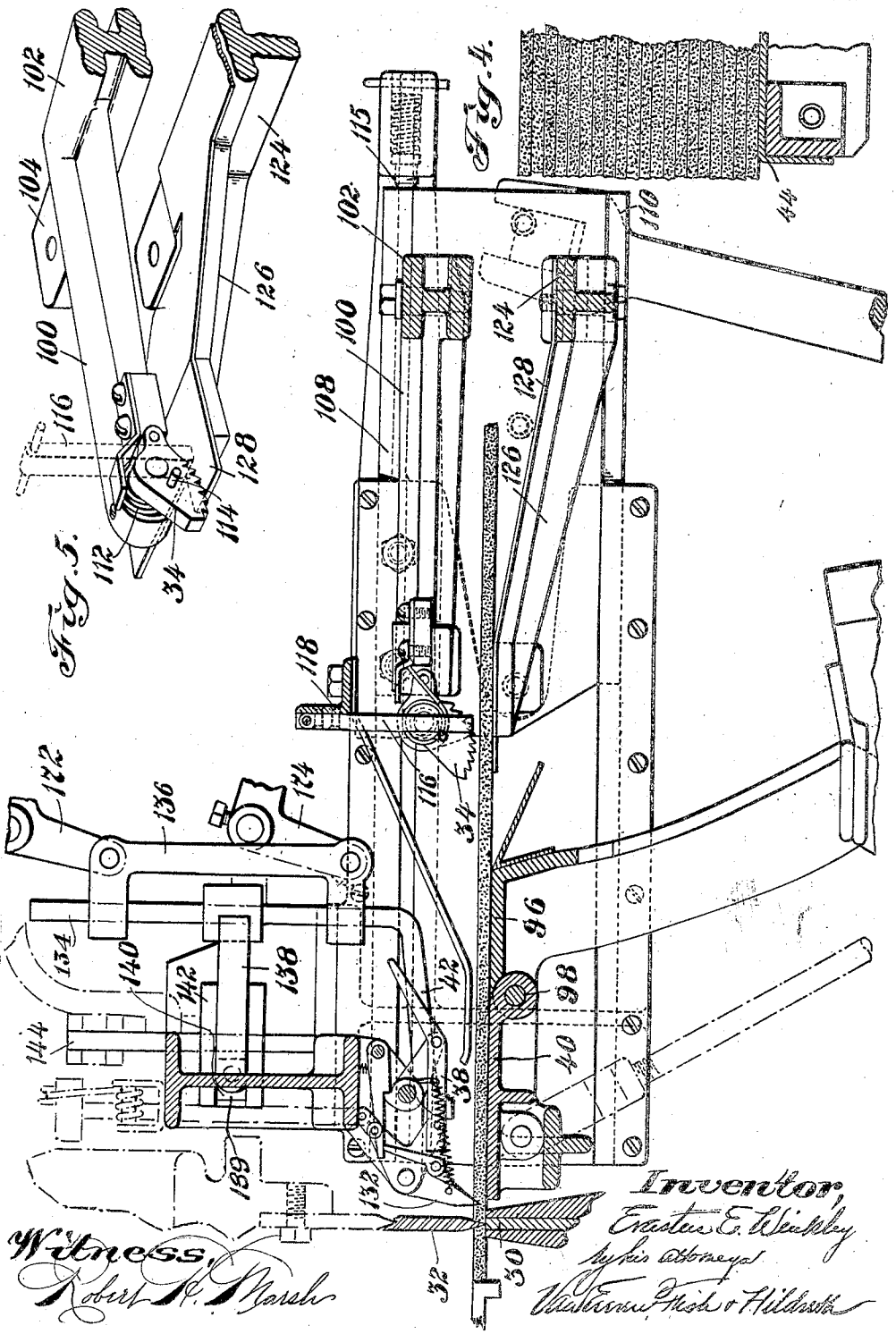
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E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919.

17 SHEETS—SHEET 4.



Jan. 16, 1923.

E. E. WINKLEY.

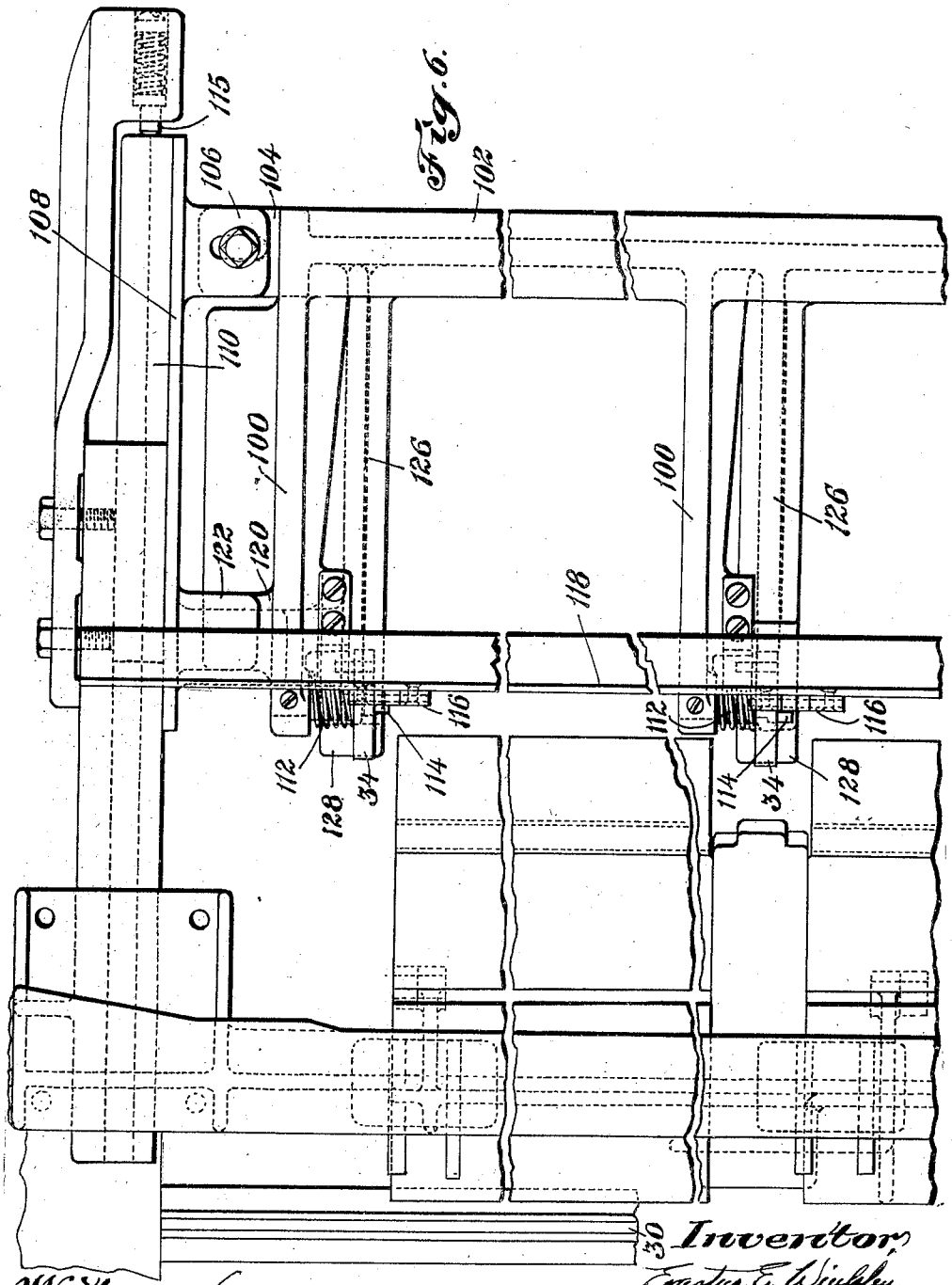
STRIPPING MACHINE.

FILED DEC. 31, 1919.

1,442,205.

17 SHEETS—SHEET 5.

Fig. 6.



Witness,
Robert V. Marsh.

Inventor,
Erastus E. Winkley
by his attorneys
Church, Flint & Hildreth

Jan. 16, 1923.

1,442,205.

E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919.

17 SHEETS—SHEET 6.

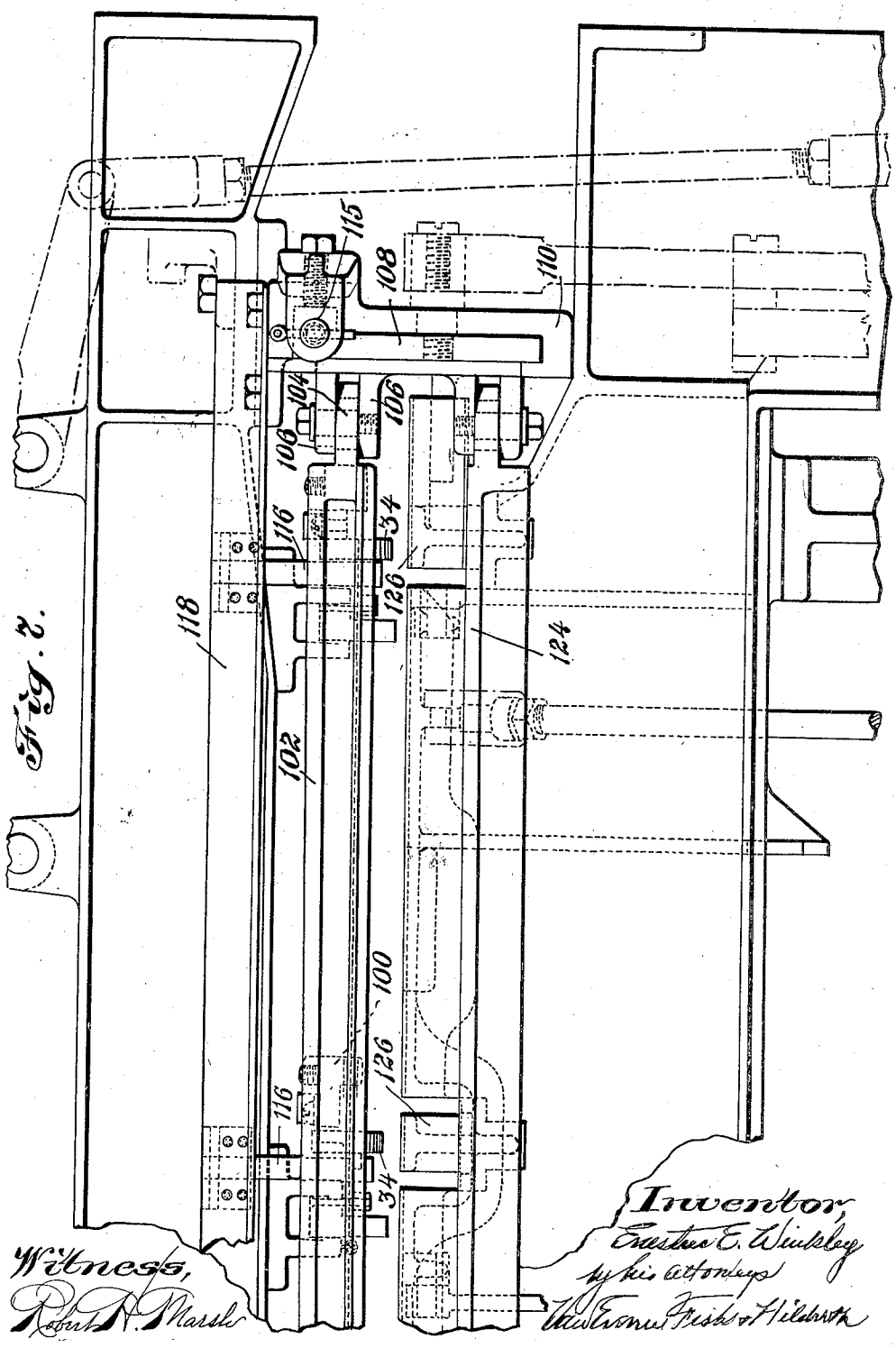


Fig. 2.

Witness,
Robert N. Marsh

Inventor,
Ernest E. Winkley
by his attorneys
Wilkinson Fisher & Wilkinson

Jan. 16, 1923.

1,442,205.

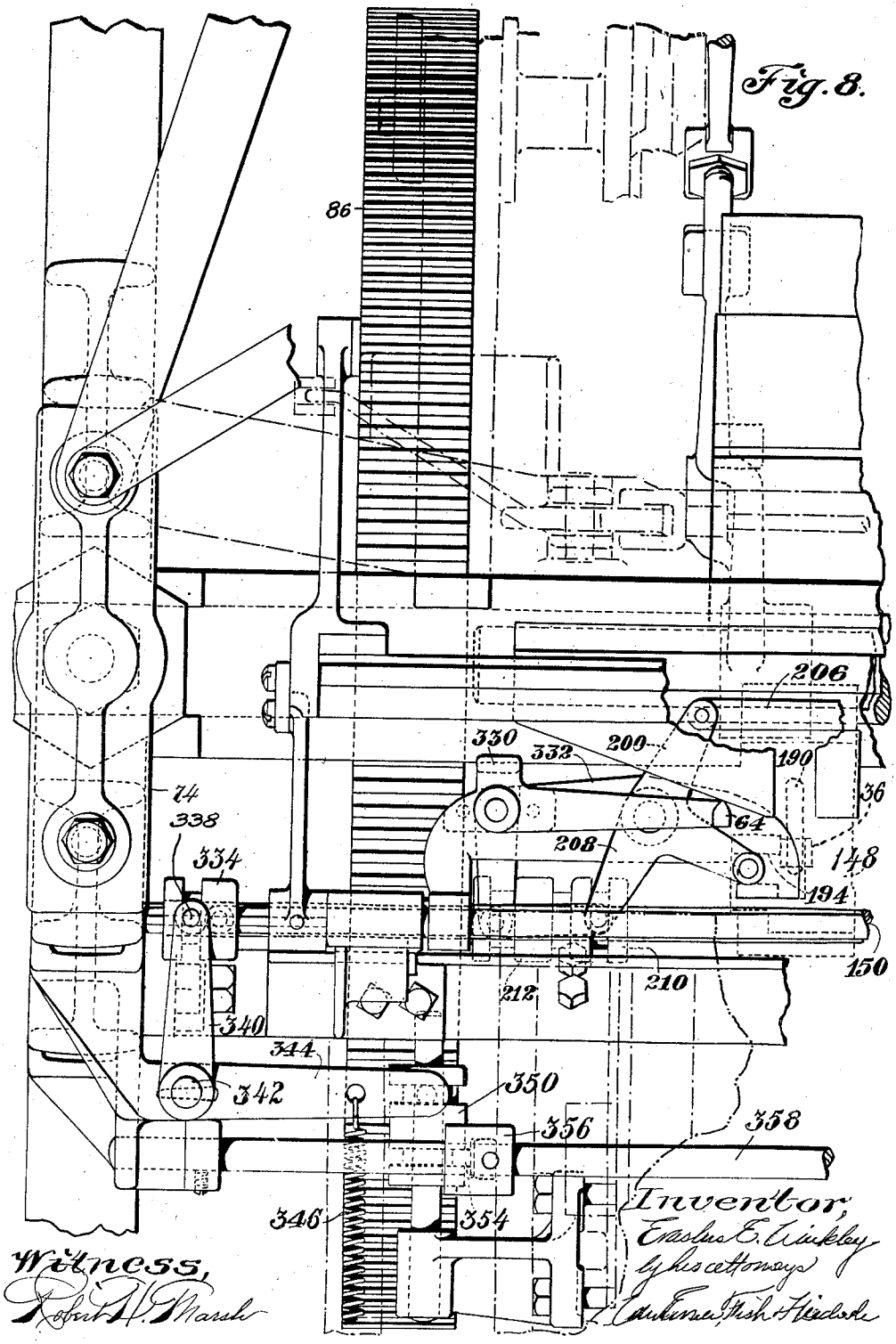
E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919.

17 SHEETS—SHEET 7.

Fig. 8.



Witness,
Robert H. Mark

Inventor,
Easlus E. Winkley
by his attorneys
Cushman, Darby & Cushman

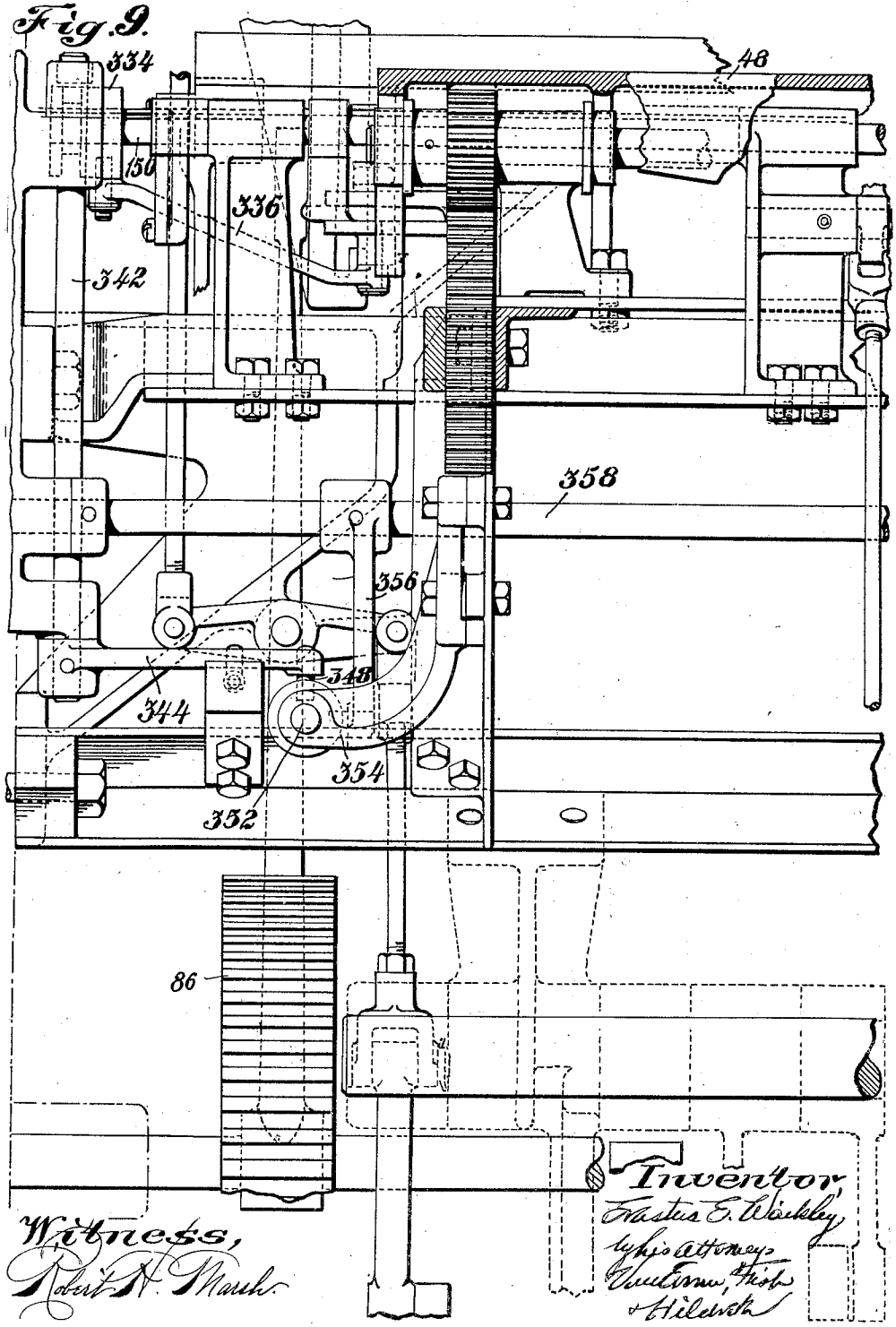
Jan. 16, 1923. 1,442,205.

E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919. 17 SHEETS—SHEET 8.

Fig. 9.



Witness,
Robert N. Marsh

Inventor,
Erastus E. Winkley
by his attorneys
Cushman, Darby & Cushman
Hildreth

Jan. 16, 1923.

1,442,205.

E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919.

17 SHEETS—SHEET 9.

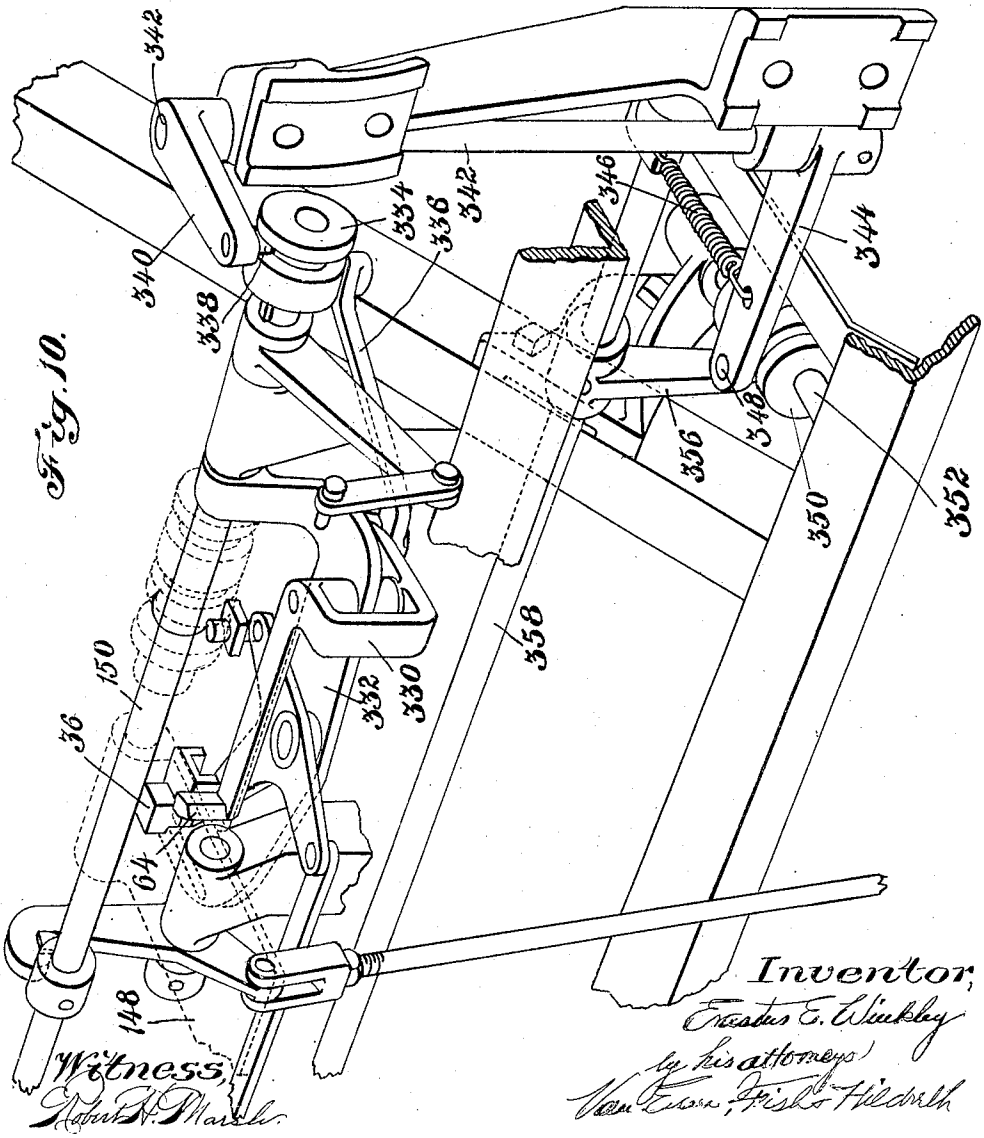


Fig. 10.

Witness,

Inventor,
Ernestus E. Winkley
by his attorneys
Van Etten, Fish & Hildreth

Jan. 16, 1923.

1,442,205.

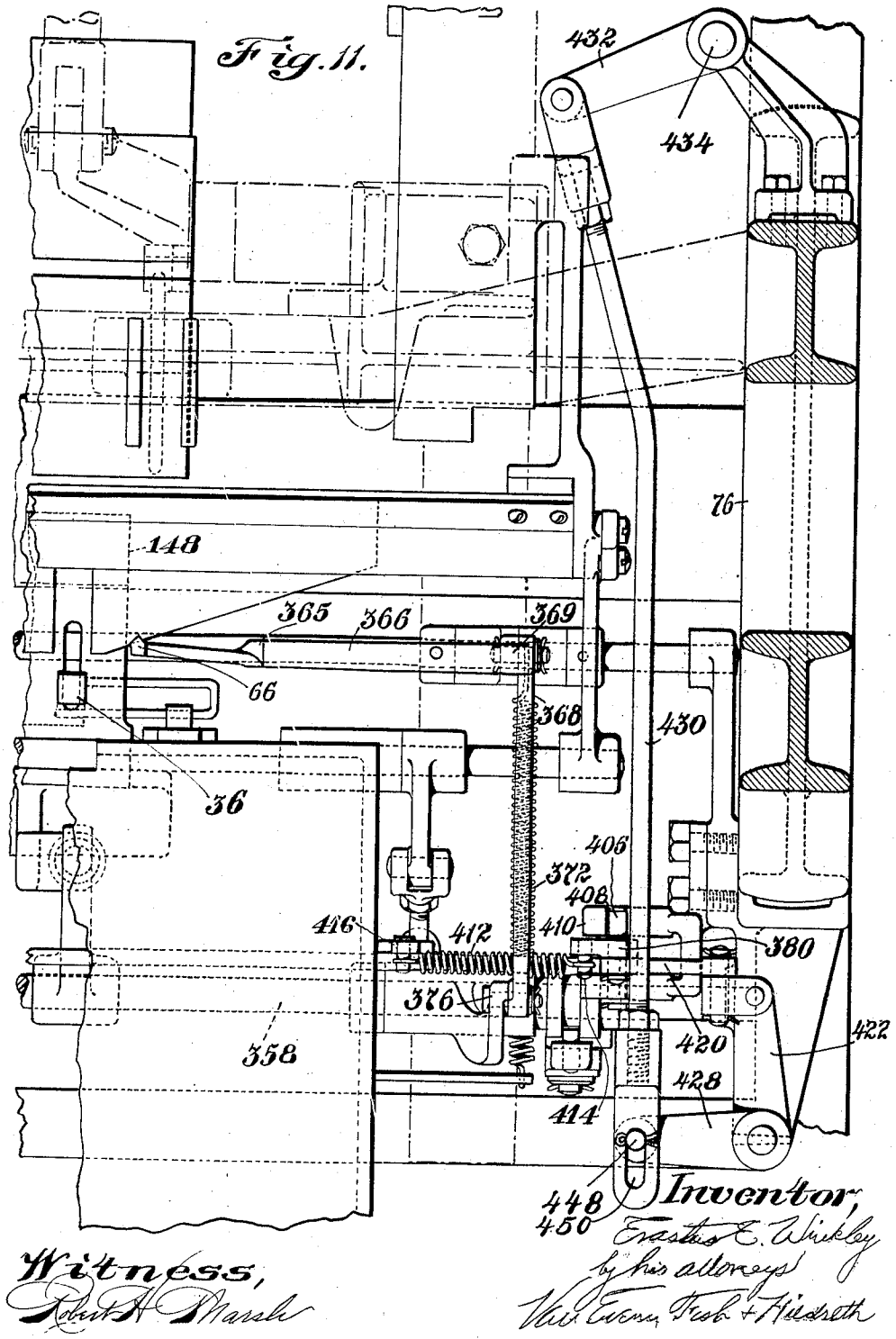
E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919.

17 SHEETS—SHEET 10.

Fig. 11.



Witness,
Robert H. Marsh

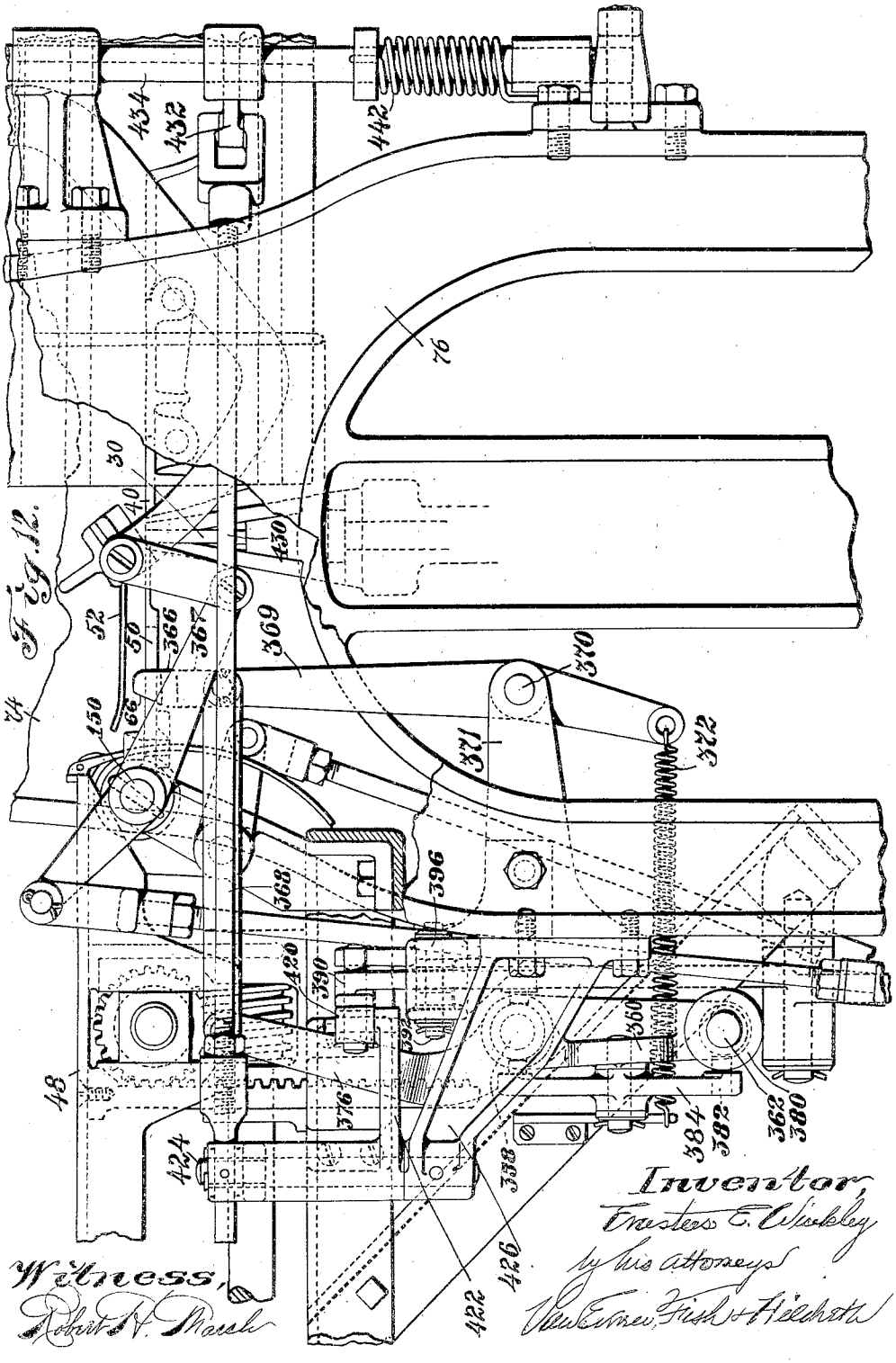
Inventor,
Erastus E. Winkley
by his attorneys
Van Everen, Fish & Hildreth

Jan. 16, 1923. 1,442,205.

E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919. 17 SHEETS—SHEET 11.



Witness,
Robert F. Marsh

Inventor,
Trustees E. Winkley
by his attorneys
Pennie Edmonds, Fish & Heckrotte

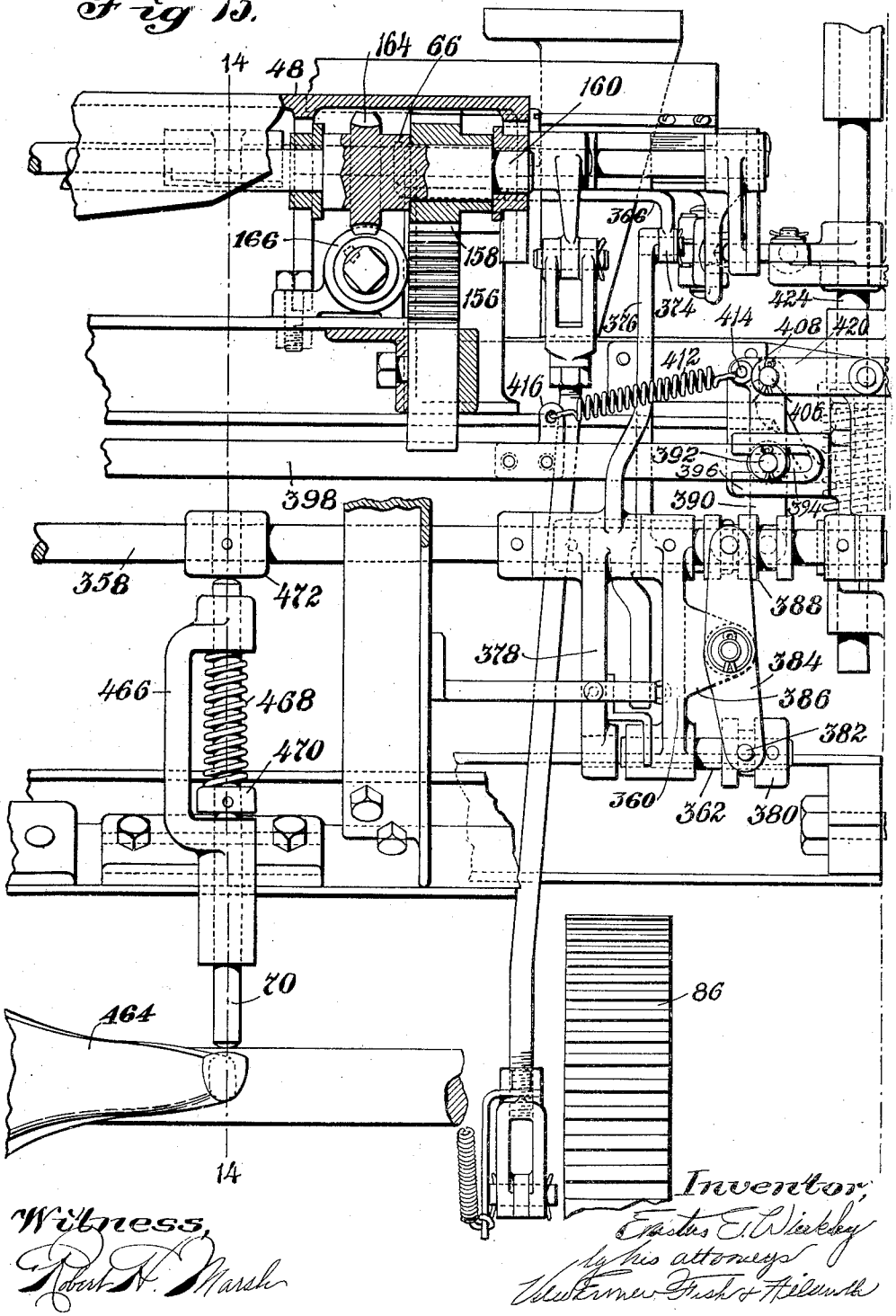
Jan. 16, 1923. 1,442,205.

E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919. 17 SHEETS—SHEET 12.

Fig 13.



Witness,
Robert R. Marsh

Inventor,
Ernest E. Winkley
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Van Fremen Fish & Hillenbrand

Jan. 16, 1923. 1,442,205.

E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919. 17 SHEETS—SHEET 13.

Fig. 14.

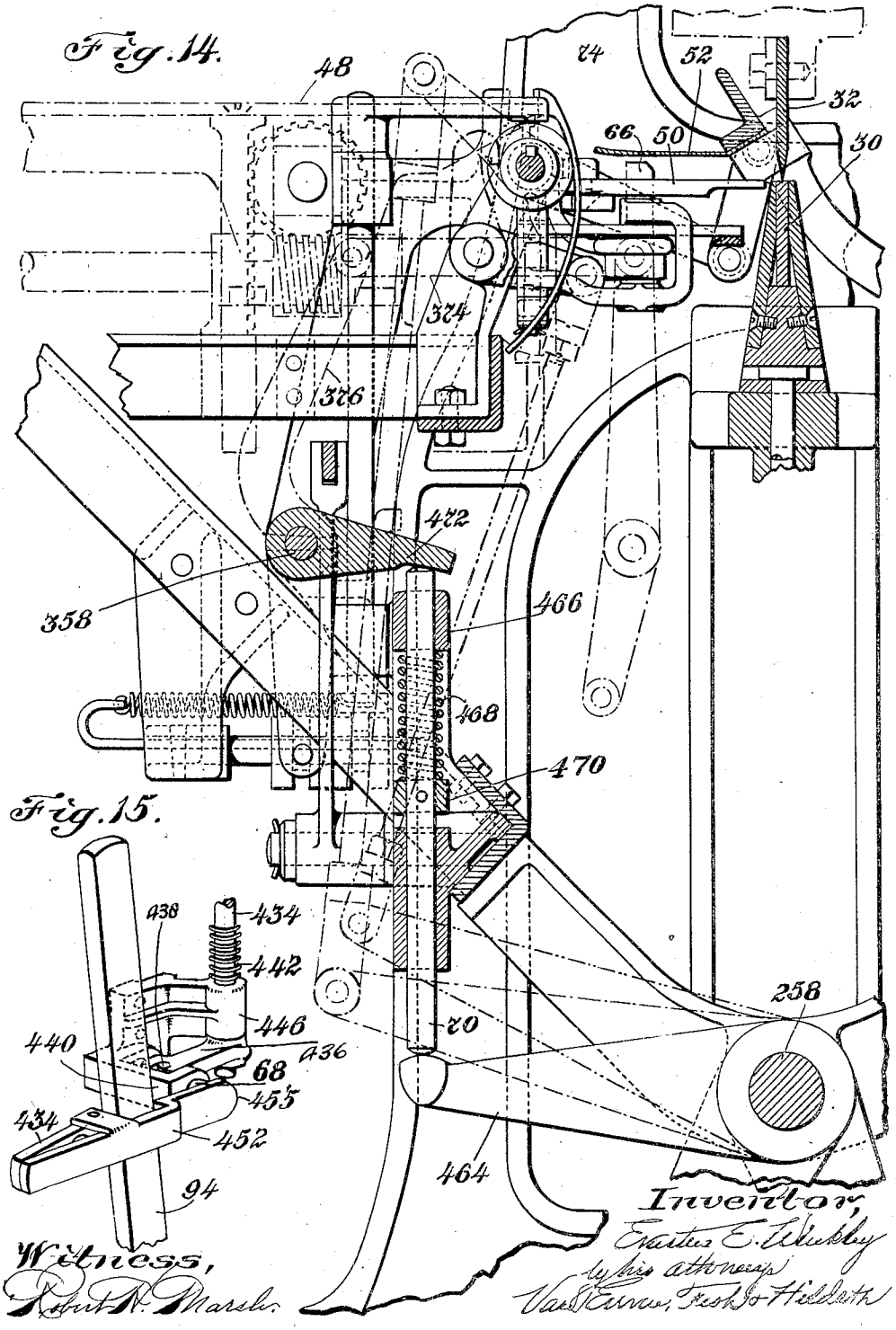


Fig. 15.

Witness,
Robert N. Marsh.

Inventor,
Erastus E. Winkley
by his attorneys
Van Fleet, Frost & Hildreth

Jan. 16, 1923. 1,442,205.

E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919. 17 SHEETS—SHEET 14.

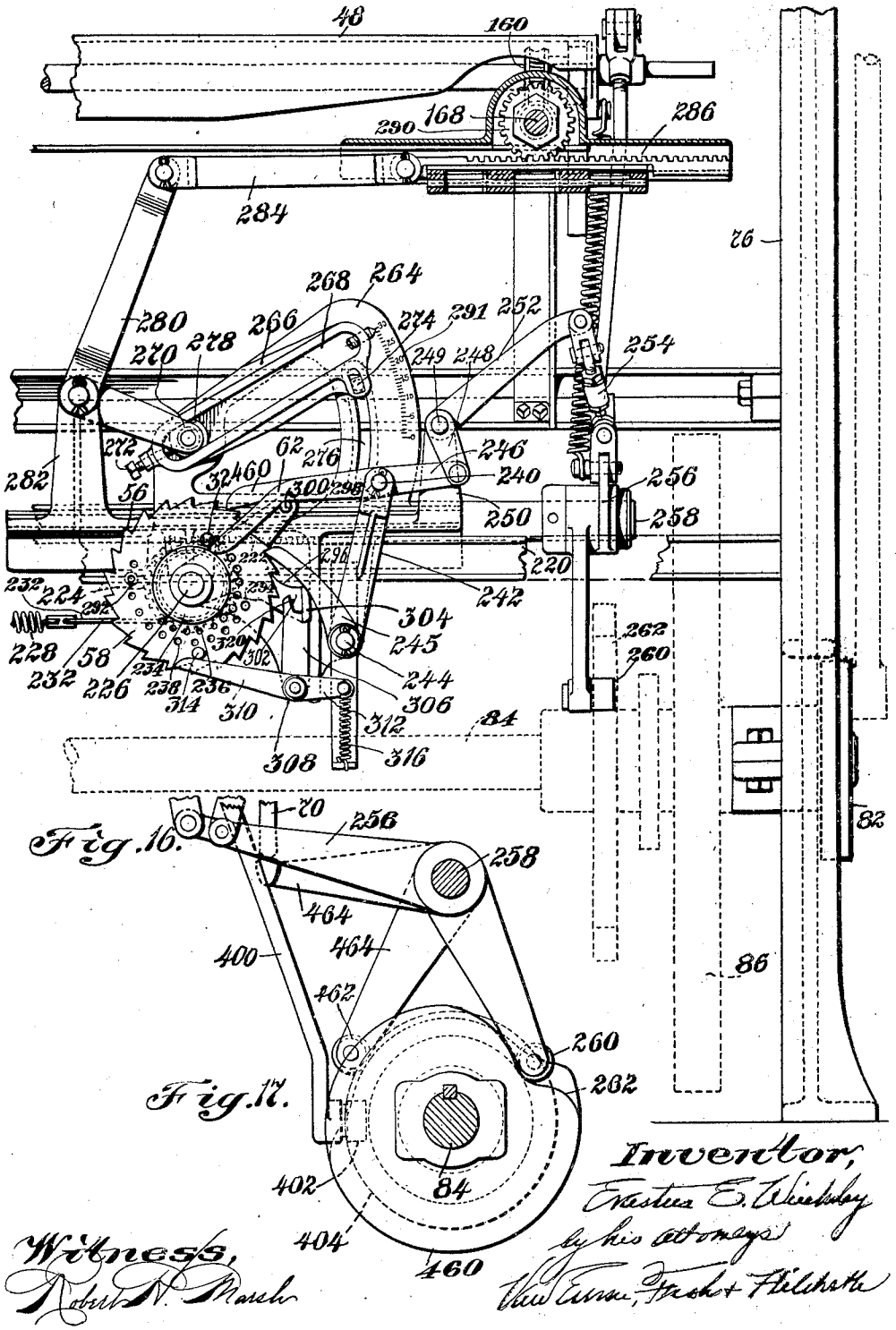


Fig. 16.

Fig. 17.

Witness,
Robert N. Marsh

Inventor,
Ernestus E. Winkley
by his attorneys
Van Etten, Frost & Fillebrown

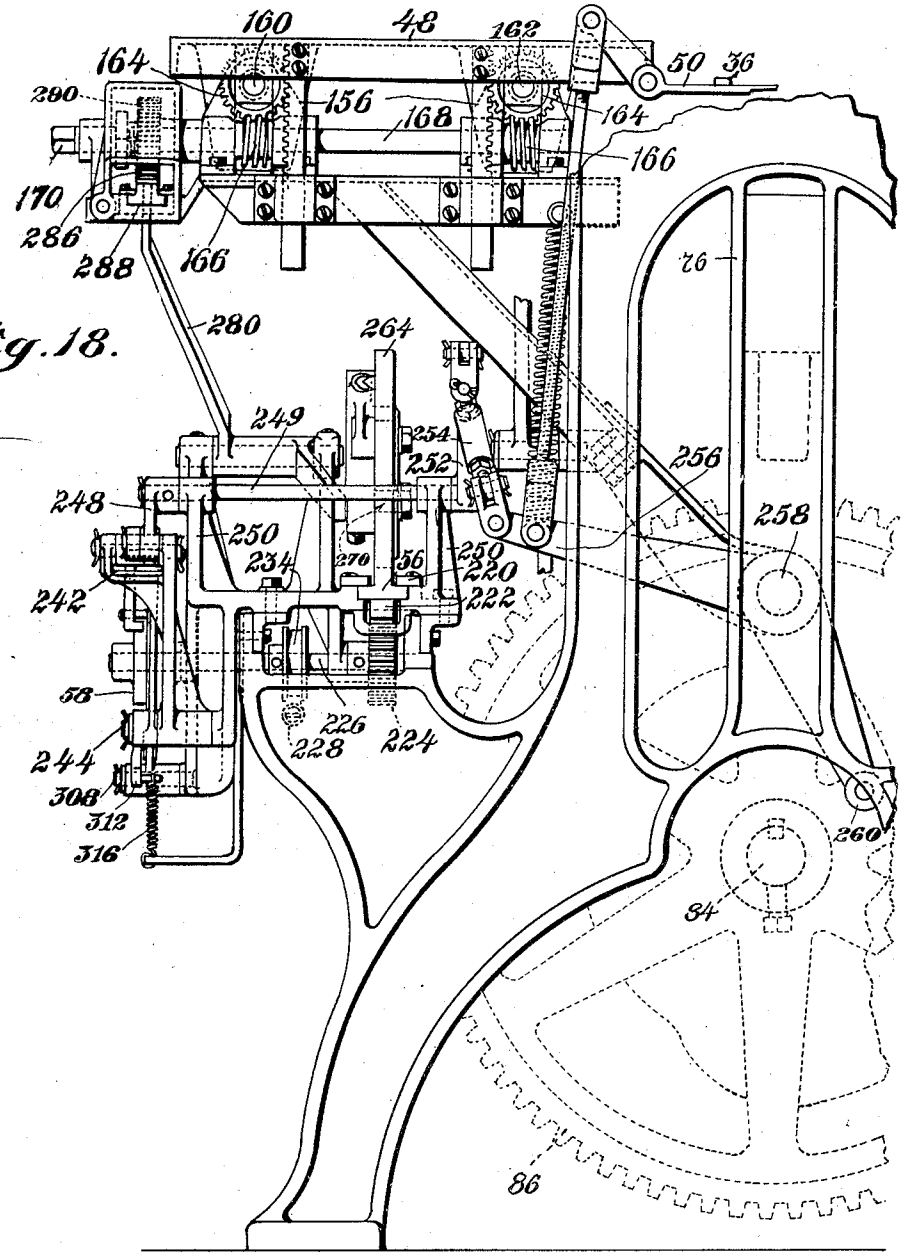
Jan. 16, 1923. 1,442,205.

E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919. 17 SHEETS—SHEET 15.

Fig. 18.



Witness,
Robert F. Marsh.

Inventor,
Easton E. Winkley
by his attorneys
Lowe Evans, Fish & Hildreth

Jan. 16, 1923.

1,442,205.

E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919.

17 SHEETS—SHEET 16.

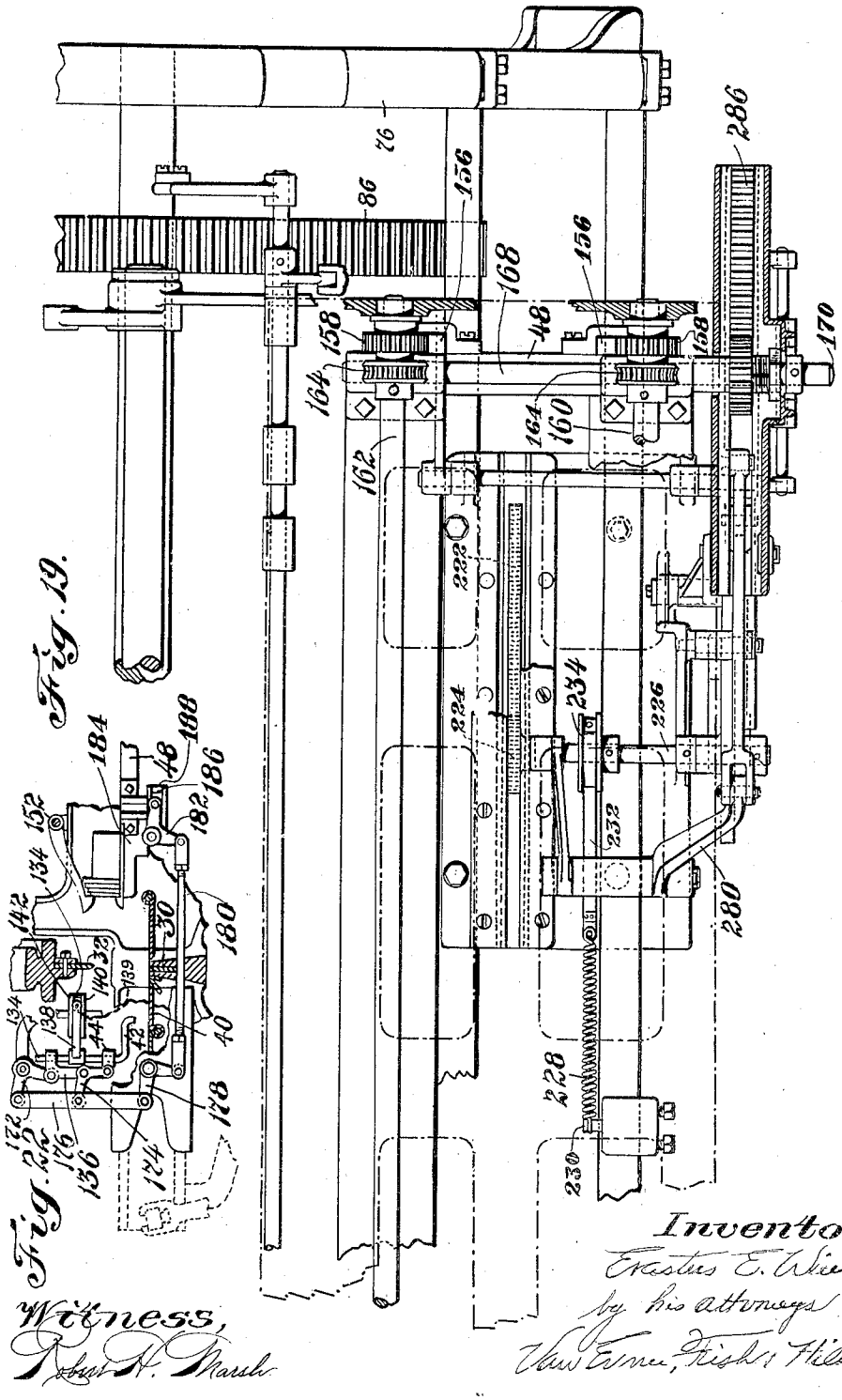


Fig. 19.

Fig. 20.

Witness,
Robert H. Marsh

Inventor,
Erastus E. Winkley
by his attorneys
Van Etten, Fisher & Hildreth

Jan. 16, 1923. 1,442,205.

E. E. WINKLEY.

STRIPPING MACHINE.

FILED DEC. 31, 1919. 17 SHEETS—SHEET 17.

Fig. 20.

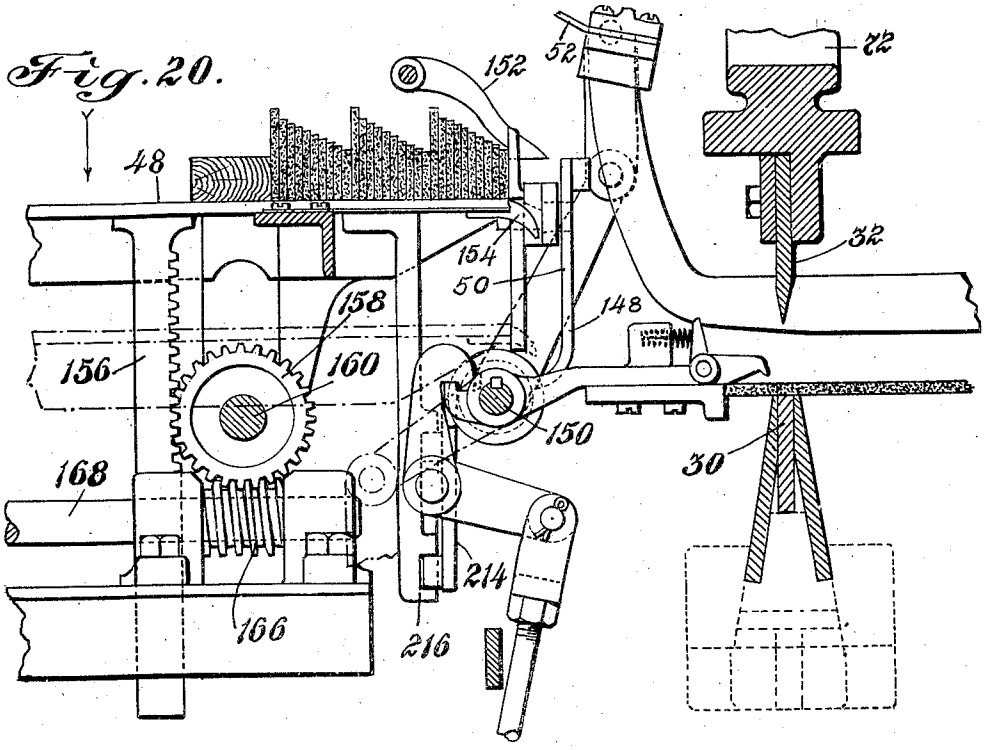
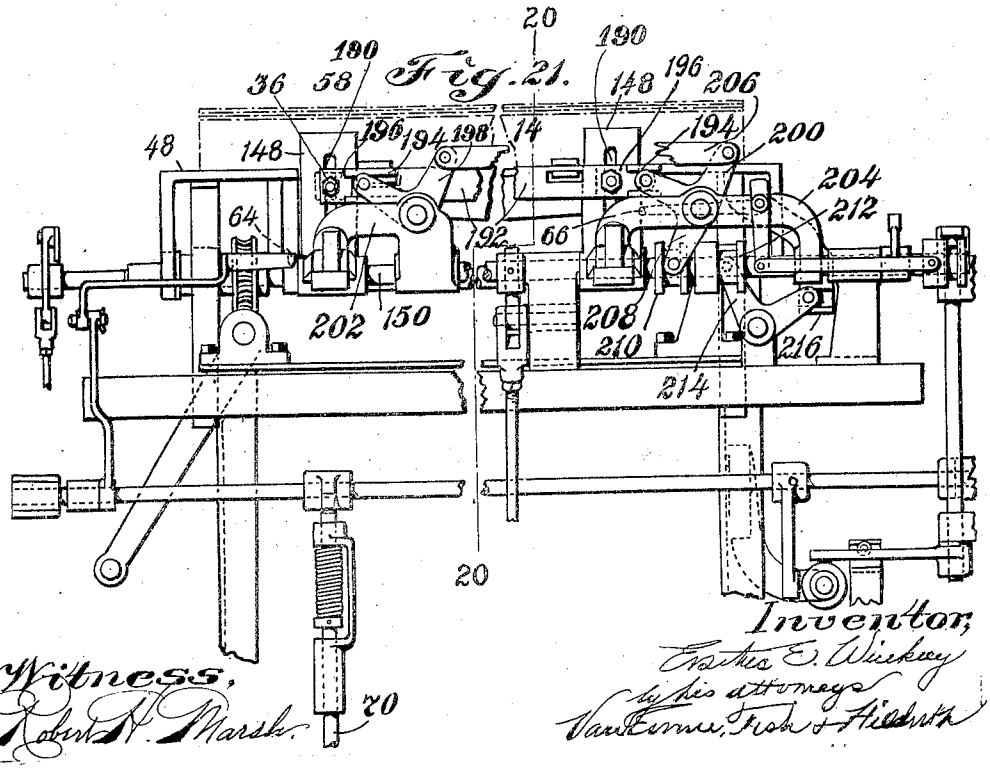


Fig. 21.



Witness,
Robert F. Marsh.

Inventor,
Charles E. Winkley
by his attorneys
VanSanten, Frost & Fiedler

Patented Jan. 16, 1923. 1,442,205

UNITED STATES PATENT OFFICE.

ERASTUS E. WINKLEY, OF LYNN, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

STRIPPING MACHINE.

Application filed December 31, 1919. Serial No. 348,561.

To all whom it may concern:

Be it known that I, ERASTUS E. WINKLEY, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Stripping Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a machine for cutting sheets of material into pieces or strips by the repeated operation of its cutting instrumentalities, and is designed primarily as an improvement of the stock-cutting machine disclosed and claimed in applicant's copending application Serial No. 125,977, filed October 16, 1916, (Patent No. 1,412,225, Apr. 11, 1922) although the several features of the invention are also applicable to other machines of this general class.

In Letters Patent No. 1,285,531, granted November 19, 1918, to the present applicant, a method of making polygonal heels is disclosed which involves building up a multiple heel block by superposing on each other in stepped relation a plurality of pasted strips of heel material of graded widths, the blocks thus formed being subsequently cut off into single heel blocks.

The machine of the above mentioned Patent No. 1,412,225 is intended for use in carrying out in part the method above referred to, the machine being adapted to progressively cut a series of strips or pieces of uniform width from a sheet of heel material and to deliver said pieces in stacked relation in convenient form for subsequent handling during the multiple heel block assembling operation. In order to build a stepped heel block comprising graded widths of strips or, in other words, strips which vary in width according to a predetermined plan, it is contemplated to provide a machine to cut the requisite number of series of uniform strips of the required graded widths, from which the component graded strips are selected and assembled. The machine is also provided with means to enable the operator to manually adjust or set it periodically to cut several series of strips of different uniform widths as may be desired.

One of the objects of the present invention is to provide an improved type of machine of this general class which may be utilized to material advantage in practicing the method set forth in Letters Patent No. 1,285,531 already referred to, and which will obviate the necessity of frequent manual adjustments and consequent non-productive periods, incident to the use of the prior machine, and moreover which shall be particularly adapted to easily and expeditiously produce a successive like series of strips of the desired graded sizes or widths with reliability and economy of time and expense.

Accordingly, one feature of the invention resides in the provision in a machine of the above indicated character of automatic means which may be preliminarily set in accordance with the specifications of the work to be done, and which shall function after each operation of the cutting instrumentalities to automatically readjust certain parts of the machine so as to cause it to cut and deliver in stacked relation successive like series of strips of the desired graded sizes or widths.

Another object of the invention is to provide means for eliminating waste and preventing the cutting of defective strips that might result from improper feeding and positioning of the sheets prior to each cutting operation.

To this end, another feature of the invention contemplates the use of a mechanism embodying a plurality of detectors for engaging the forward edge of the sheet as it is fed and detecting any angularity between it and the cutting knife, under which condition the operation of the machine is discontinued through the action of an automatic tripping mechanism before the cutting action occurs and a defective strip is produced.

These and other objects of the invention and features by which they are obtained will become apparent to those skilled in the art from the following description of the preferred embodiment of the invention illustrated in the accompanying drawings, in which:—

Figure 1 is a view in front elevation of a

machine constructed in accordance with the present invention; Fig. 2 is a similar view in rear elevation, with a portion of the machine removed; Fig. 3 is a view in side elevation of the machine, looking from right to left in Fig. 1; Fig. 4 is an enlarged view partially in section and partially in elevation, of a portion of the feeding mechanisms of the machine; Fig. 5 is a view in perspective of a portion of the main feeding mechanism; Fig. 6 is an enlarged plan view of a portion of said main feeding mechanism; Fig. 7 is a view in front elevation of a portion of said main feeding mechanism; Fig. 8 is an enlarged plan view of a portion of the left-hand end of the machine, showing particularly the left detector mechanism for detecting the angularity of a sheet fed to the cutting instrumentalities, said mechanism being illustrated in an intermediate position; Fig. 9 is a view in front elevation of the mechanism shown in Fig. 8; Fig. 10 is a perspective view of said detector mechanism, looking from the rear of the machine; Fig. 11 is a plan view of a portion of the right-hand end of the machine, with a portion of the machine removed, and showing particularly the right detector mechanism for detecting the angularity of a sheet fed to the cutting instrumentalities, and also a part of the tripping mechanism, the detecting mechanism being illustrated in an intermediate position; Fig. 12 is a view, partially in section and partially in side elevation, of the mechanisms shown in Fig. 11; Fig. 13 is a view in front elevation of said mechanisms; Fig. 14 is a view, partially in section and partially in side elevation, taken on the section line 14—14 of Fig. 13; Fig. 15 is a perspective view of a portion of the tripping mechanism for the main driving clutch of the machine, said mechanism being illustrated in its released position; Fig. 16 is an enlarged view in front elevation of the right-hand end of the machine, showing particularly the automatic mechanism for adjusting the machine to cut successive like series of strips of graded widths, a portion of the machine being shown in section for the sake of clearness; Fig. 17 is an enlarged view, partially in side elevation and partially in section, on the line 17—17 of Fig. 1, showing certain of the main operating cams and cooperating levers; Fig. 18 is a view in side elevation looking from right to left in Fig. 1, and showing particularly the automatic adjusting mechanism; Fig. 19 is a plan view, partially in section, of the mechanism shown in Figs. 16 and 18, a portion thereof being removed for the sake of clearness; Fig. 20 is a view, partially in section and partially in side elevation, on the line 20—20 of Fig. 21, and showing the transferring rocker in its raised position and delivering a strip to the receiving table; Fig. 21 is a view in rear elevation of the transferring rocker in its raised position and showing the mechanism for adjusting the positions of the end stops or gages, the detecting mechanisms being illustrated in their retracted positions; and Fig. 22 is a view in reduced scale, partially in side elevation and partially in section, showing the connections for adjusting the positions of the feelers.

Referring to the drawings, the stock cutting machine shown comprises the following main parts which, with the exception of the main feeding mechanism, are substantially similar to the corresponding elements of the prior machine, and which include a stationary cutting bed 30 for supporting the stock during the cutting operation; a reciprocable cutting knife 32 for cooperating therewith to sever strips of the desired width from the sheet of material operated upon; a main feeding mechanism embodying a plurality of feed dogs 34 for engaging the stock at a plurality of points and feeding it step-by-step to the cutting instrumentalities; a plurality of end stops 36 for determining the width of the strip to be cut and against which the stock is fed; a plurality of supplemental feed devices or pushers 38 which are automatically thrown into operation to engage the rear edge of the stock and effect its actuation after the stock has become reduced in length to such an extent that the main feeding mechanism is unable to advance it; a pivotally mounted discharge table 40 disposed adjacent the cutting bed and on the advance side thereof for discharging the remnant end of a sheet of stock; a plurality of feelers 42 disposed on the advance side of the cutting instrumentalities and adapted to periodically feel of the stock to determine whether or not it is of sufficient width to enable a full sized strip to be cut therefrom and for controlling the operation of the machine in accordance therewith; a supply table 44 disposed at the rear of the machine for supporting and progressively raising a stack of sheets of material; a plurality of supply dogs 46 rendered operative upon the exhaustion of a piece of stock being operated upon to engage and advance the uppermost sheet on the supply table into the region of operation of the main feeding mechanism; a receiving table 48 disposed at the front of the machine and beyond and above the cutting instrumentalities for receiving the successive cut strips in stacked relation; a transferring rocker 50 normally disposed in a horizontal plane for supporting the successive strips as they are cut and which is periodically rocked or rotated upwardly into a vertical position to transfer said strips successively and deliver them to the receiving table; an edge guide 52 normally resting upon the upper ends of the

end stops 36 for guiding the forward edge of the sheet of stock into engagement therewith; and mechanism interconnecting the several end stops and feelers with the receiving table in such manner that said table, end stops and feelers may be concurrently and proportionately adjusted in adjusting or setting the machine to cut strips of different widths.

The machine also comprises the following new parts, which have been incorporated into the earlier machine for the purpose of accomplishing the results hereinbefore stated, and which include an automatic adjusting mechanism embodying a travelling carriage 56, a ratchet 58 and a plurality of operating pawls 60 and 62 for the purpose of automatically and progressively adjusting the height of the receiving table 48 and consequently of the connected end stops 36 and feelers 42 after each cutting operation in order to vary the width of the next succeeding strip cut, and to produce a series of strips of predetermined graduated widths; a detecting mechanism embodying a plurality of detectors 64 and 66 positioned slightly in advance of the outermost end stops to be engaged by the forward edge of the stock as it is fed in order to determine whether the forward edge of the stock is in parallelism with the cutting knife or whether there exists an angularlity between them; a tripping mechanism including a release plunger 68 for automatically releasing the main clutch of the machine and thereby disconnecting it from the source of power whenever said detectors determine an existing angularity; and a detector retracting mechanism embodying an actuating rod 70 for temporarily retracting the detectors from engagement with the forward end of the stock and thereby preventing any possible back throw or rebound thereof prior to the cutting operation.

Inasmuch as the component elements, with the exception of the main feeding mechanism, of the main body of the machine correspond substantially to similar parts of the prior machine and form no direct part of the present invention, except as they perform certain necessary functions in the operation of the machine as a whole, only a brief and general description of these common features of the machine will be given, reference being had to the copending application, above referred to, for a full and detailed description thereof if desired. The main feeding mechanism, however, of the present invention is a modification and improvement of the feeding mechanism of the earlier machine and therefore will be fully described.

Referring to the drawings, the sheet material or stock is cut by means of the co-operative action of the stationary cutting bed 30 and reciprocating cutting knife 32. The knife is mounted on a horizontal cutting beam 72 (Figs. 1, 2, 3 and 20) which is guided at its ends by the side frames 74 and 76 of the machine in a well-known manner, and which is reciprocated by means of rods 78 that connect its ends with crank pins 80 that are associated with crank disks 82 on the ends of a main cam shaft 84 of the machine. This cam shaft is provided with gears 86 which mesh with pinions 88 on a main power shaft 90 to which a pulley 92 is secured, by means of which the machine may be connected with any suitable source of power. The pulley 92 is connected with the power shaft by means of a clutch (not shown) of any ordinary or suitable form, thus clutch being controlled by a hand lever 94 (Figs. 2 and 15) so that the machine may be conveniently started and stopped.

The bed plate 30 is stationarily supported in the path of the reciprocating cutting knife 32 and is relatively narrow in width to permit the waste or remnant pieces at the forward and rear ends of the sheet of stock to be discharged downwardly on either side thereof either by gravity or by means provided for the purpose.

The sheet of stock is fed horizontally between the cooperating cutting instrumentalities, and the width of the strip which is severed is determined by the engagement of its forward edge with the end stops 36. During the feeding movement, the stock is supported (Fig. 4) partly upon a stationary horizontal table 96 and partly upon the discharge table 40 which normally forms a horizontal extension thereof, and which is pivoted to the latter on a transverse rod 98 so that it may be swung downwardly at proper times to discharge the waste rear end of the sheet.

The mechanism for feeding the sheets of stock, although performing a function similar to that of the corresponding mechanism in the prior machine, differs somewhat in construction and mode of operation and therefore it will be described in detail. This feed mechanism comprises a plurality of spaced and toothed feed dogs 34 (Figs. 4, 5, 6 and 7) that are pivotally mounted at the inner ends of a plurality of forwardly extending arms 100 that constitute integral parts of a cross-beam 102, the ends of which are provided with lugs 104 by means of which it is pivotally connected to projecting lugs 106 extending inwardly from a plurality of slides 108 that are adapted to travel in a horizontal plane in guideways 110 constituting a part of the side frames of the machine. The respective endmost feed-dogs 34 are spaced inwardly from the slides a material distance in order to avoid engagement with the ragged edges of the

stock being fed. A plurality of springs 112 are provided to severally cooperate with the feed dogs 34 to urge them downwardly into their operative positions, and said feed dogs are also provided with laterally extending pins 114 which are adapted to be engaged, when the feeding mechanism is retracted to its invariable rearmost position against a plurality of spring buffers 115, by means of a plurality of pivotally mounted stop bars 116 depending from a supporting bracket 118 extending transversely of the machine. These stop bars 116 are so constructed and arranged as to permit a swinging movement only in the direction of feed, and therefore upon engagement with the pins 114 during the retracting movement of the dogs 34 and feeding mechanism, they serve to rotate the feed dogs upwardly against the action of the springs 112, and thus release the sheet of stock and prevent its rebound and displacement from proper position that might be caused by the engagement of the beam 102 with the spring buffers 115. The forward ends of the two end forwardly projecting arms 100 are provided with laterally extending flanges 120, each having a sliding fit between pairs of spaced lugs 122 extending inwardly from the respective slides 108. Thus, the upper frame comprising the cross-beam 102 and integral arms 100 is firmly and substantially rigidly supported against vertical movement while the sliding engagement of the cooperating flanges 120 and lugs 122, as well as the pivotal mounting of the frame to the respective slides, permits the frame to have a relative skewing or self-accommodating movement in a horizontal plane.

In order to properly support a sheet of stock transferred by the supply dogs 46 from the supply table 44, and to cooperate with the feed dogs 34 during the feeding movements, a lower frame is provided which comprises a cross-beam 124 and a plurality of forwardly and upwardly projecting supporting arms 126 corresponding in number and in position to those of the upper frame. A piece of sheet material 128 of suitable configuration is carried upon the upper surface of the cross-beam 124 and arms 126 of the lower frame and serves to evenly support the sheet of stock and to cooperate with the feed dogs 34 to grip the same during the feeding operation. The lower frame is pivotally supported to the respective slides 108 in a manner similar to that in which the upper frame is mounted, and the outermost arms thereof have a similar sliding supporting engagement with suitable inwardly projecting portions of said slides, so that both upper and lower cooperating parts of the feeding mechanism are supported and operate in a substantially like manner.

Advantage is taken of this type of construction and capability of self-accommodating skewing movement of the feeding mechanism to insure so far as possible that the forward edge of the sheet of stock is fed into proper position against the several end stops 36, and this is accomplished by the utilization of separate and independent actuating mechanisms that are associated with the respective slides 108, and each of which embodies a yielding coupling 130 (Fig. 3) adapted to effect the interruption of the feeding movement, when the corresponding side of the forward edge of the stock is brought into engagement to the correspondingly located end stop. No description of these actuating mechanisms and yielding couplings will be given herein inasmuch as they pertain indirectly to the present invention and are fully disclosed in the copending application Ser. No. 125,977, above referred to. It will be understood, however, that the feeding mechanism of the present invention is adapted to support the stock being fed at a sufficient number of points to hold the stock substantially even and prevent it from sagging, while the feed dogs engage the stock at corresponding positions, and reliably and effectively cause the step-by-step feeding movement thereof.

While the main feed mechanism just described operates to intermittently feed the sheet of stock throughout the greater part of its extent, it is incapable of feeding the last portion of the sheet in which enough of the material may still remain to produce another useful strip. Accordingly, a supplemental feed mechanism, similar to that of the prior machine and embodying a plurality of pushers 38 (Fig. 4) is provided for advancing the relatively short end of the stock. These pushers 38 are normally restrained in their inoperative positions, as shown in Fig. 4, and the operation thereof is governed by means of a plurality of pawls 132. These pawls have sharpened lower ends and normally rest against the upper surface of the sheet being fed to prevent retrograde movement thereof during the return movement of the feed dogs 34. These pawls also perform the further function of acting as automatic means to throw into operation the supplemental feeding pushers 38 whenever the stock becomes so short as to be incapable of being fed by the main feeding mechanism. Without describing the construction and operation of the pawls 132 and pushers 38, it should be understood that the pushers are retained in their inoperative positions so long as there is sufficient stock to maintain the pawls in their raised positions, as shown in Fig. 4. When, however, the stock is sufficiently reduced that the rear end thereof is fed beyond the pawls 132, said pawls, being unsupported by the stock, are allowed to drop,

and this action is utilized to release the pushers which are swung downwardly and forwardly to engage the rear edge of the sheet and advance it into engagement with the end stops 36.

After the last possible strip has been severed from the sheet, it is necessary to discharge, separately from the cut strips, the the last piece or remnant end remaining at the end of the sheet. The discharge of this waste end of the stock is effected by lowering the discharge table 40 at the proper time through the agency of suitable mechanism, which need not be described and the actuation of which is controlled through the agency of the pair of feelers 42. These feelers are disposed in spaced relation across the machine in such positions as to periodically engage the sheet of stock after each feeding movement thereof. In case the sheet has been so far consumed as to pass beyond the point of operation of the feelers, the feelers detect that fact and thereupon set into operation not only the discharge table 40 for discarding the waste end but also the supply dogs 46 and mechanism associated therewith for supplying a fresh sheet of material from the stack upon the supply table 44. In order to determine whether there is sufficient stock to enable another full-sized strip to be cut, the feelers 42 are located a distance in advance of the cutting instrumentalities which correspond to the distance between the end stops 36 and said instrumentalities. Therefore, if during the periodic detecting movements of the feelers, said feelers engage the stock, it is clear that there is sufficient stock to produce another strip of the desired width corresponding to the distance between the end stops 36 and the cutting knife 32. Under these conditions, the operation of the machine continues uninterruptedly. If, however, no stock is engaged by the feelers during their detecting movements, there is insufficient stock to produce a strip of the desired width, and therefore the mechanism, associated with the feelers and controlled and actuated thereby, is thrown into operation to drop the discharge table 40 and cause the supply dogs 46 to supply a fresh sheet of material to operate upon.

Briefly, each of the feelers 42 comprises a rod 134 (Figs. 4 and 22) which is slidable vertically in the upper and lower arms of a yoked-shaped frame 136, and the lower end of the rod is bent forwardly and downwardly to constitute the working portion thereof. Each of the feeler rods 134 is provided with a horizontal forwardly extending arm 138 which is fixed thereto and which is pivoted to a block 139 (Fig. 4) that is slidably mounted in a horizontal guideway 140 formed in the side of a head 142. Each head 142 is secured to a vertical rod 144 that is mounted for sliding vertical movement in suitable bearings of the frame, and these rods 144 are interconnected by a suitable equalizing mechanism 146 (Fig. 2) which is actuated when either one or both of the feelers 42 fail to engage the stock, to set into operation the actuating mechanism for operating the discharge table 40 and the supply dogs 46.

The supply of material is supported in the form of a stack upon the supply table 44 (Fig. 3) which is automatically controlled and actuated in such manner and by means which need not be set forth to maintain the uppermost sheet in the stack at a level corresponding substantially to that of the table 96. The sheets are successively transferred from the top of the stack to the inclined supporting plate 128 carried by the inclined arms 126 of the lower feed frame into position to be operated upon by the main feeding mechanism through the agency of the supply dogs 46 which are automatically thrown into operation at the proper time.

In order that the strips cut by the machine may be collected in stacked formation for convenience in subsequent handling, the transferring rocker 50 is provided for periodically transferring the successive strips, as they are cut, from a horizontal position in which they lie at the time of being severed, to a vertical position on the receiving table 48 upon which they are progressively delivered, resting on their edges in the form of a stack, as shown in Fig. 20. The transferring rocker 50 comprises a plurality of parallel arms 148 (Figs. 8, 10, 20 and 21) which are fixed to a shaft 150 that is periodically oscillated by suitable mechanism to cause the rocker arms to be swung from a horizontal position to a vertical position. Upon the arms 148 of the transferring rocker 50, the end stops 36 are adjustably mounted, and these end stops serve not only to gage the width of the strips cut but also to support and position the cut strips as they are rotatably transferred to the receiving table 48 by the upward swinging of the transferring rocker.

Proper engagement of the forward edge of the sheet of stock with the end stops 36 is insured by means of the edge guide 52 which is normally arranged to substantially rest upon the tops of the end stops, as shown in Fig. 14, where it positively guides the sheet into position. The edge guide 52 is mechanically connected to the mechanism for periodically actuating the transferring rocker 50 in such manner that the edge guide is withdrawn upwardly out of the path of movement of the rocker arms 148 as soon as the upswinging movement of the rocker is initiated.

The successive cut strips that are trans-

ferred to the receiving table 48 by the transferring rocker 50 are received on the upper surface of the table and held in stacked relation by means of a plurality of cooperating latches 152 and 154 (Fig. 20) which permit the introduction of the strips and subsequently engage and retain them in position, as will be understood.

From the foregoing description, it will be understood that the machine so far described is adapted for automatic operation to intermittently feed a sheet of stock through steps of predetermined length to the cutting instrumentalities which serve to cut a succession of strips of predetermined uniform width therefrom, and these strips are successively transferred to the receiving table 48 where they are maintained in stacked relation.

In addition to the various mechanisms which are actuated during the automatic operation of the machine, and which have hereinbefore been described, the machine is also provided with certain mechanisms and connections to facilitate its adjustment for the production of strips of different widths. In producing strips for the manufacture of heel blocks or heels, such as disclosed in Letters Patent No. 1,285,531, it is necessary to provide for a considerable variety of widths, since strips of graded widths are employed in the production thereof in order that the heels may approximate the finished form of a heel and avoid unnecessary waste of material in subsequent shaping and trimming operations. The necessary adjustments for the purposes just referred to involve the adjustment of the position of the end stops 36 in order to regulate the amount of material which is fed prior to each operation of the cutting knife; the adjustment of the height of the receiving table 48 to conform to the radial distance of the end stops 36 from the rock shaft 150 of the transferring rocker 50; and the adjustment of the feelers 42 towards and from the cutting knife in order that they may determine accurately whether the stock remaining under the control of the feed mechanism is sufficient for the production of another strip of the particular width for which the machine is adjusted.

Referring particularly to Figs. 13, 14, 18, 19 and 20, the receiving table 48 is supported by a plurality of downwardly extending racks 156 which severally cooperatively engage a plurality of pinions 158 that are mounted in pairs upon shafts 160 and 162. Each of these shafts is provided with a worm wheel 164 which cooperatively meshes with a worm 166 that is fixed upon a transverse shaft 168, the forward end 170 of which is adapted to receive a suitable crank which may be utilized for turning the shaft and adjusting the height of the table.

The adjustment of the several feelers 42 towards and from the cutting knife 32 in accordance with the width of the strips to be cut is accomplished by suitably moving the yoke-shaped supporting frames 136 (Figs. 3, 4 and 22) by which the feelers are supported. Each of these supporting frames is pivotally mounted at its upper and lower ends to a plurality of bell cranks 172 and 174 which are interconnected by a rod 176 to form a parallel-motion linkage which serves to swing the bell cranks in unison and therefore to adjust the position of the feelers towards and from the cutting knife, while maintaining the vertical position of the supporting frames 136 and feelers 42 throughout all of the adjustments.

In the present machine, provision is made whereby the adjustment of the feelers is performed coincidentally with and proportionately to the adjustment of the height of the receiving table 48. For this purpose the connecting rod 176 is extended downwardly and is connected through a bell crank 178 (Fig. 22) to a connecting rod 180 the other end of which is associated with one arm of a bell crank 182 that is pivotally mounted upon a stationary portion 184 of the supporting frame of the machine and the other arm of which carries a slide block 186 which travels in a horizontal guideway 188 that is fixed to one side of the receiving table 48. Owing to this arrangement, any vertical movement of the table is transmitted to the feeler supporting frames 136, and the parts of the connecting mechanism are so proportioned that the adjusting movements of the table and the feelers are equal in extent.

In order that the end stops 36 may be adjusted in accordance with the width of the strips of material to be produced, these stops are in the form of studs which are movably mounted in slots 190 (Figs. 8, 10 and 21) extending longitudinally of the rocker arms 148, as shown particularly in Fig. 21, in which the rocker arms are illustrated in their upright or strip-delivering position. The width of the strips to be cut is determined by the position of the stops 36 with respect to the cutting knife 32 and this adjustment is produced coincidentally with the adjustment of the receiving table 48 and the feelers 42 by means of mechanism which connects the stops to said table.

For this purpose, the stops 36 are fixed to a bar 192 (Fig. 21) which extends transversely beneath the rocker arms 148. At its ends this bar is provided with pairs of flanges 194 which embrace slide blocks 196 pivoted to the arms of two bell crank levers 198 and 200 which are respectively pivotally mounted on yoked-shaped members 202 and 204 that are fixed to the rock shaft 150. These bell cranks are connected by a rod

206 and the bell crank 200 is provided with a third arm 208 that carries a stud which engages a spool 210 that is adapted to slide longitudinally on the rock shaft 150. Another spool 212 is adjustably secured to the first spool and receives a stud on one arm of a bell crank 214 that is pivotally mounted on the stationary frame of the machine, the other arm thereof carrying a slide block which travels in a horizontally disposed guideway 216 that is mounted on the receiving table 48. The arrangement just described is such that the movements of the bell crank 214 may be transmitted through the spools 212 and 210 to the bell crank 200 and consequently to the end stops 36, without interfering with the rocking movements of the parts about the axis of the rock shaft 150. Moreover, any vertical adjustments of the receiving table 48, effect, through the mechanism just described, corresponding equal movements or adjustments of the end stops 36 along the rocker arms 148, that is, radially with respect to the rock shaft 150.

Thus, it is evident that the machine may be adjusted to cut a series of uniform strips of any desired width by suitably adjusting the positions of the receiving table 48, the feelers 42 and the end stops 36, all of which are interconnected in such manner as to be concurrently and proportionately adjusted whenever the height of the receiving table is varied.

With the exception of the construction and operation of the main feeding mechanism, the construction of that portion of the machine hereinbefore described is similar to that of the corresponding parts of the machine disclosed in the copending application hereinbefore referred to, and the various component mechanisms thereof function in a like manner to produce like results.

Having thus described in greater or less detail the general construction and operation of those fundamental portions of the machine by means of which a series of strips of uniform width are automatically cut from a sheet of stock and delivered in stacked formation, which portions are, with the exception of the main feeding mechanism, substantially similar to the corresponding elements in the prior machine, the novel features of the present invention through the agency of which successive like series of strips of graduated widths are produced, and any angularity between the stock and the cutting knife is detected and the operation of the machine interrupted, will now be fully set forth.

The present invention contemplates the provision of automatic means for adjusting the height of the receiving table 48 and also the positions of the end stops 36 and feelers 42 after each cutting operation, and moreover, to cause these adjustments to be made in a series of graduated uniform steps in order that each full set of cycles of operation of the machine shall produce and deliver in stacked formation a series of strips of uniformly graded widths. To this end, an adjustable pawl-and-ratchet mechanism is provided for the purpose of effecting an intermittent rotative adjustment of predetermined amount of the operating shaft 168 of the receiving table 48 after each cutting operation. Thus, the height of the table is adjusted in successive steps and this adjustment is transmitted concurrently to the end stops 36 and feelers 42 through the agency of the mechanism, already described, which mechanically connect them to said table and cause them to be concurrently and proportionately adjusted therewith.

This automatic pawl-and-ratchet adjusting mechanism (Figs. 1, 16, 18 and 19) comprises the carriage or slide 56 which is adapted to be actuated step-by-step in a horizontal guideway 220 which is suitably mounted on the frame of the machine and which is actuated by means of the ratchet 58 and the pair of operating pawls 60 and 62, the one or the other of which is adapted to advance the ratchet a step during each cycle of operation of the machine. The lower portion of the carriage 56 is provided with a horizontally extending rack 222 that is cooperatively engaged by a pinion 224 which is mounted upon a shaft 226 that is normally biased or urged in one direction by means of a resetting spring 228, one end of which is secured to a lug 230 on a portion of the frame and the other end of which is fastened to a flexible member 232 that is wrapped around a resetting drum 234 secured to said shaft. The ratchet 58 is fixed to the forward end of the shaft 226 and is provided with a plurality of teeth located upon its periphery, and also with a plurality of concentric rows of holes or openings 236 and 238, the inner row being located one half the distance between the axis of the ratchet and base of the teeth thereof.

Under normal conditions, the ratchet is actuated through successive steps corresponding to the teeth thereof by means of the pawl 60 which is adapted to engage the teeth and which is pivotally mounted upon a pin 240 carried by a yoked-shaped lever 242 that is pivotally mounted upon a pin 244 supported in suitable brackets upon the frame of the machine. The pin 244 also serves as a pivot for a latching pawl 245 that engages the ratchet teeth and prevents retrograde movement. The operating pawl 60 and its supporting yoke 242 are oscillated periodically by means of a link 246 that serves to connect the pivot pin 240 to an arm 248 that is fixedly mounted to a rotatable shaft 249 carried by stationary brackets 250.

Another arm 252 that is fixed to the shaft 249 is connected through a universal connection 254 with one end of a bell crank lever 256 (Figs. 16 and 17) which is pivotally mounted upon the main cam lever shaft 258, and which carries at its other opposite end a roll 260 that cooperates with a cam 262 on the main cam shaft 84. This cam lever 256 and cooperating cam 262 correspond to similar elements in the prior machine which serve in conjunction with other suitable mechanism to periodically actuate the transferring rocker 50 for delivering the cut strips to the receiving table 48.

The pawl-and-ratchet actuating mechanism just described serves, during the normal operation of the machine, to cause the pawl 60 to engage the successive teeth of the ratchet 58 and to advance it in a series of equal steps, each step following each cutting operation of the machine. This step-by-step movement of the ratchet 58 is transmitted through the shaft 226, pinion 224, and rack 222 to the carriage 56, and the intermittent movement of the carriage thus effected is utilized, in a manner now to be described, to effect successive graded adjustments of the receiving table 48 and the end stops 36 and feelers 42.

For this purpose, the carriage 56 is provided with an upwardly extending plate 264 to the forward side of which is mounted for limited angular adjustments, a member 266 having an elongated slot 268 therein. This member is supported for pivotal movement upon an integral pin 270 projecting rearwardly from said member and through the plate to which it is suitably secured. The slotted member 266 is adapted to be held in any adjusted position by means of a bolt 274 that projects through an arcuate slot 276 in the plate 264.

Cooperating with the sides of the slot 268 of the member 266 is a block 278 pivotally carried at the outer end of an arm of the bell crank 280 which is mounted for pivotal movement upon a bracket 282 projecting upwardly from the carriage 56. The other end of the bell crank 280 is connected by means of a link 284 to one end of a rack 286 that is slidable horizontally in a guideway 288 that is secured to the receiving table 48. This rack cooperates with a pinion 290 which is secured to the adjusting shaft 168 of said table. An adjustable set screw 272 is provided on the member 266 and projects into one end of the slot 268 to serve as a limiting stop to determine the extreme position of the slide block 278 in the slot.

As already stated, the slotted member 266 is angularly adjustable within the limits about the pivot pin 270, and these adjustments may be varied at will from a horizontal position, indicated by "0" on a scale 291 of degrees on the plate 264, to a position in which the slotted member is inclined 30° to the horizontal, and indicated by the numeral "30" on the scale. Obviously, the amount of adjustment and the scope and character of the scale may be varied as desired.

The amount of adjustment of the receiving table 48 and associated end stops 36 and feelers 42 depends entirely upon the inclination of the slotted member 266. When said slotted member is set in its horizontal or zero position, it is clear that the step-by-step travelling movement of the carriage 56 is ineffective in producing any movements or adjustments of the bell crank 280, while if the slotted member 266 be adjusted to any positive degree of inclination, each stepping movement of the carriage produces a proportionate movement of the bell crank 280, and, consequently, similar adjustments of the receiving table 48, end stops 36 and feelers 42, the gradations or increments of adjustment of these parts depending entirely upon the preliminary adjustment of inclination of the slotted member 266, as will be understood. To produce a series of graded strips of any predetermined uniform gradation in width, it is therefore only necessary to properly adjust the position of the slotted member 266 upon the carriage plate 264.

Provision is also made for automatically causing the machine to produce repeated like series of graded strips, each series comprising any predetermined number of strips. In other words, the machine cuts a series of strips of predetermined number and of predetermined graded widths, and then resets, and repeats the operation to produce any number of similar series. To this end, the following mechanism is provided: The outer row of holes or openings 238 in the ratchet 58 is utilized to determine the number of strips to be cut before the resetting operation is effected and a pin 292 is provided for insertion in the proper opening to designate the number of strips to be cut in the series, as indicated by the position of the pin in Fig. 16. During the step-by-step movement of the ratchet 58, which serves to wind up the resetting spring 228, the pin 292 is finally brought into engagement with a cam surface 294 on a trip lever 296. This trip lever is pivotally mounted upon the shaft 226 and is provided with an upwardly inclined arm 298 carrying a pin 300 and a substantially horizontally disposed arm 302, the outer end of which is provided with a laterally extending lug 304. The trip lever 296 is normally urged by gravity into the position, shown in Fig. 16, in which the tripping lug 304, against which the latching pawl 245 rests, is supported in a shoulder provided at the upper end of a retaining stop 306. This retaining stop is pivotally mounted upon a pin 308

carried by a suitable bracket on the frame, and has integrally associated therewith arms 310 and 312, the former of which constitutes a resetting lever adapted to be engaged by a so-called "zero" pin 314 suitably positioned on the ratchet 58, and the latter of which is acted upon by a spring 316, tending to hold the resetting lever 310 in the path of movement of the zero pin and the retaining stop 306 in its operative retaining position, as shown in Fig. 16.

When, during the intermittent actuation of the ratchet 58, the pin 292 is brought into engagement with the cam surface 294 of the tripping lever 296, said lever is rotated upwardly about the shaft 226 to cause the pin 300 at the upper end of its inclined arm 298 to raise the pawl 60 out of operative relation with the ratchet teeth. At the same time, it also causes the tripping lug 304 to release the latching pawl 245 so that the ratchet is free to be reset to its normal position by means of the resetting spring 228 which, augmented by the action of gravity, supplies sufficient power to return the movable carriage 56, the receiving table 48, end stops 36, and feelers 42 to their initial positions. As soon as the tripping lever 296 is raised, for the purposes just mentioned, the retaining stop 306 is rotated in a clockwise direction by the spring 316 to cause its shoulder 320 to engage and support the tripping lug 304 of said tripping lever in such position as to hold the operating pawl 60 and latching pawl 245 in their inoperative positions during the resetting operation. The resetting lever 310, moreover, is thrown into the path of movement of the zero pin 314 so that, during the resetting operation, said pin is brought into engagement with said lever to rotate the retaining stop 306 in a counter-clockwise direction to release the tripping lug 304 of the tripping lever 296, whereupon the mechanism is restored to its initial operative position, and, therefore, is in readiness to repeat the cycle of operations and to cause the machine to produce another like series of strips of graduated widths.

It is sometimes desirable in building up heel blocks of the character hereinbefore mentioned, to utilize one or more wedge-shaped strips in one or more specified positions in the block, in lieu of flat or even strips, thus producing a tapering block from which wedge heels may be cut. In utilizing the machine of the present invention, to produce a graded series of even strips into which one or more wedged strips are to be subsequently interposed in particular locations to produce a wedge heel block, it is necessary to modify the action of the machine in such manner as to cause the production of any strip or strips of a selected grade of width to be omitted or skipped, whereby an interruption or hiatus in the graded sequence or series is effected. This hiatus, it will be understood, is to be subsequently filled during the heel block building operation by means of a wedge strip of that particular grade of width which has been omitted.

These results are accomplished through the agency of the auxiliary pawl 62 which is pivotally mounted upon the pivot pin 240 which supports the main operating pawl 60 and which is reciprocated periodically therewith. The free end of this pawl is disposed angularly downwards and the extremity thereof is adapted to cooperatively engage a pin 324 that is inserted in one of the openings 236, which is selected in accordance with the particular location or numerical position in the series which the hiatus or interruption of the sequence is to occupy in order to accommodate the subsequent introduction of a wedge strip.

As shown in Fig. 16, the openings 236 of the inner row are disposed in alternate or staggered relation with respect to those of the outer row 238, and each opening represents or corresponds to the space between adjacent strips, the strips themselves being represented by, or corresponding to, the openings 238 in the outer row. The inner row of openings, moreover, extend to the right materially beyond the outer row, so that the pin 324 when inserted in the first opening 236, will be in position to cooperate with the auxiliary pawl 62. An inspection of Fig. 16 shows that the pin 324 is inserted in the first opening of the inner row, which therefore corresponds to the space between the first and second even strips to be produced. The pin 324, therefore, is so located as to produce a hiatus in the graded sequence of strips immediately after the first strip, as shown in Fig. 20.

The operation of the apparatus for performing this function is as follows: Having properly located the pin 324 in the selected opening of the inner row, in the present instance, in the first opening, the operation of the machine is started and a strip of the greatest width is cut, this strip corresponding to the first opening of the outer row 238. As this strip is delivered to the receiving table 48 by the transferring rocker 50, the pawl 62 is actuated, and being located directly behind the pin 324, the ratchet is advanced through a distance equal to two teeth, instead of the distance of one tooth as is normally effected by means of the main operating pawl 60. The increased length of feed of the ratchet, just referred to, results from the location of the inner row of openings 236 in a position midway between the axis of the ratchet and the base of the peripheral teeth thereof, as has been already explained. Obviously, if the ratchet is ad-

vanced two teeth instead of one, all of the adjustments are doubled in amount and, therefore, a hiatus in the graded sequence of strips produced is effected. Immediately after the pin 324 has passed beyond the range of operation of the auxiliary pawl 62, the main pawl 60 resumes its normal function to advance the ratchet one tooth at a time, and accordingly adjust the machine through successive equal steps until the next pin 324, if there be one, is brought into engagement with and effects the elevation of the auxiliary pawl 62. As soon as the second pin, if there be one, travels beyond the pawl 62, this pawl is allowed to drop directly ahead of said pin, and on the next reciprocation of the pawl lever 242, the extremity of the pawl 62 operates against the pin to advance the ratchet two teeth, whereby an interruption or hiatus in the graded series of strips is produced.

Thus, by properly positioning the desired number of pins 324, the normal sequence of uniformly graded strips may be interrupted at the proper times to create the requisite hiatuses in the series to accommodate the wedge strips to be subsequently introduced during the building operation.

Another feature of the invention contemplates the prevention of cutting tapering or otherwise defective strips and the insurance of the production of strips of the proper configuration. In this connection, it is necessary that the forward edge of the sheet of stock being operated upon should always be in exact parallelism with the cutting knife at the time of the cutting operation, and, therefore, means is provided for periodically feeling of the forward edge of the strip to detect any angularity between it and the cuttitng knife before each cutting operation and to automatically disconnect the machine from the source of power in the event that any angularity is detected.

For this purpose a detecting mechanism embodying a pair of detectors 64 and 66 is provided, and said detectors are respectively located beyond or outside of the respective outermost end stops 36, as shown in Figs. 8, 10, 11 and 21. For convenience of description, the detector 64, which is located at the left hand end of the machine, as viewed from its front, will be designated as the "left detector", and the detector at the right hand end of the machine as the "right detector".

Both of these detectors are yieldingly held in their normal operative positions slightly in front of the end stops 36 to be engaged by the forward edge of the stock as it is fed and to be actuated thereby towards the end stops 36 during the feeding movements. If both of the detectors, originally positioned like distances from the cutting knife and consequently from the end stops, are actuated through like distances, it is evident that no angularity exists between the edge of the stock and the cutting knife, which must necessarily be in parallelism. In this event the normal operation of the machine is allowed to continue and the cutting knife is permitted to sever a strip from the stock. If, however, one of the detectors is actuated a greater distance than the other, it is clear that the front edge of the stock occupies an angular relation to the cutting knife, and under these conditions, the mechanism connected to and operated by the detectors is caused to control the automatic tripping of the main clutch of the machine to discontinue its operation before a defective strip is severed by the cutting knife.

Referring particularly to Figs. 8, 9 and 10, the left detector 64 constitutes an upturned end of one arm of a bell crank 330 that is pivotally mounted upon a yoke 332 that is fixed to and is rotated with the rock shaft 150 that supports the rocker arms 148 of the transferring rocker 50 which delivers the cut strips upwardly to the receiving table 48. The other arm of said bell crank is connected by means of a link 336, to a spool 334 that is slidably mounted although keyed to the rock shaft 150. The groove of the spool 334 is adapted to receive a projecting pin 338 mounted on the end of an arm 340 which is secured to the upper end of a vertical shaft 342. With this construction the movements of the detector 64 that is carried by the swinging yoke 332 are transmitted to the vertical shaft 342, irrespective of the rotating movements of the rock shaft 150 and transferring rocker 50, since the spool 334 is mounted upon and coaxially with the rock shaft 150. The lower end of the vertical shaft 342 is provided with another arm 344 disposed at right angles to the arm 340 and to which a spring 346 is attached for the purpose of normally maintaining and urging the detector 64 in a direction towards the cutting knife. The end of the last mentioned arm is provided with a pin 348 that projects into a groove of a double spool 350 which is adapted to slide longitudinally on a rod 352 that is suitably supported by the frame of the machine. Another groove of this spool receives a pin 354 carried by the lower end of an arm 356 that is fixed to a rock shaft 358 extending transversely across the machine and suitably mounted in the side frames thereof.

To the right hand end of the rock shaft 358, a depending arm 360 (Fig. 12) is fixedly secured, and the lower end of this arm is provided with a horizontal recess in which is slidably mounted a plunger 362 that is periodically reciprocated and adapted to cooperate with suitable mechanism associated with and positioned by the right detector 66 in such manner as to determine

whether or not the detectors have been actuated through like distances, or whether they have not and an angularity therefore exists between the forward edge of the stock and the cutting knife. Before describing the operation of this plunger, a description of the right detector 66 will be given.

Referring particularly to Figs. 11 and 12, the right detector 66 comprises an upwardly projecting end of a horizontally and transversely disposed portion 365 of an angular lever 366 having a downwardly extending portion 367 and a forwardly extending portion 368. The angular lever 366 is pivotally mounted at its lower elbow to the upper end of a lever 369 which is pivotally supported upon a pin 370 carried by a bracket 371 upon the frame of the machine. The lower end of the lever 369 below the pivot pin 370 is acted upon by a spring 372 which serves to urge the detector 66 towards the cutting knife.

In order to maintain the right detector in operative position and to transmit the movements thereof to a position where they may be compared to those of the left detector 64 by means of the plunger 362, the front end of the forwardly extending portion 368 of the right detector is pivotally connected to the upper end of an arm 376 of a lever that is rotatably mounted upon the rock shaft 358, the dimensions of the parts being so chosen as to provide a parallel-motion linkage. The lever, last mentioned, is also provided with a downwardly projecting arm 378, (Figure 13) the lower end of which is provided with a recess similar to that in the lower end of the adjacent arm 360 which carries the plunger 362, these recesses being so located that they may be placed in positions of registry to permit the plunger 362 carried by the arm 360 to be inserted into the recess of the arm 378 when said recesses register one another.

Under these conditions, it is evident that both detectors 64 and 66 have been actuated through like distances and that the forward edge of the stock is in parallelism with the cutting knife. Therefore, the normal operation of the machine is allowed to continue.

If, however, these recesses do not register, and therefore the plunger 362 is prevented from entering the recess of the arm 378, this fact indicates that an angularity exists between the forward edge of the stock and the cutting knife, under which conditions the operation of the machine should be interrupted to prevent cutting a tapering or defective strip.

These determinations of the relative position of the stock with respect to the cutting knife are utilized to control the operation of the machine by governing the action of the automatic tripping mechanism which is adapted to trip the main clutch whenever any angularity is detected.

The mechanism for periodically reciprocating the plunger 362 constitutes a part of and plays an important function in the operation of the tripping mechanism and will now be described. The plunger 362 is provided at its outer end with a spool 380 (Fig. 13) into the groove of which projects a pin 382 carried by the lower end of a lever 384 which is pivotally mounted upon an ear 386 forming a part of the arm 360. The upper end of said lever has a pin-and-groove connection with one half of a double spool 388 that is slidably mounted upon the rock shaft 358. The other half of the double spool 388 has a pin-and-groove connection to the lower end of a lever 390 which carries midway between its ends a pin 392 that is adapted to slide in a horizontally disposed slot 394 in a bracket 396 that is secured to the frame of the machine. The pin 392 also serves as a pivotal connection to one end of a horizontally and transversely disposed rod 398 (Figs 1 and 13), the other end of which is pivotally connected to the upper end of a lever 400 (Figs. 1, 2 and 16) that is rotatably mounted upon a shaft 401 and the lower end of which carries a roll 402 which transverses a path in a cam 404 mounted on the main cam shaft 84 of the machine. This cam is designed in such manner as to periodically oscillate the lever 400 and, therefore, the actuating rod 398 which is pivotally connected to the mid-point of the lever 390. The upper end of the lever 390 is free to move and carries a pin 406 which projects rearwardly therefrom and which is normally maintained in engagement with a vertical shoulder 408 (Figs. 11 and 13) upon a stationary bracket 410 by means of a spring 412 which is suitably attached to a pin 414 upon the upper end of said lever and also to an ear 416 upon the horizontal actuating rod 398.

From the construction just described, it will be understood that as the actuating rod 398 is moved to the right, it serves to swing the lever 390 about its uppermost pin 406, which is maintained in engagement with the shoulder 408 by the spring 412, provided the plunger recesses in the arms 360 and 378 are in registry, thereby permitting the plunger 362 to be actuated to the left through the agency of the lever 384 and the double spool 388. Under these conditions, which result from equal movements of the detectors 64 and 66, thereby indicating parallelism between the forward edge of the sheet and the cutting knife, the plunger is actuated and the normal cycle of operation of the machine continues without interruption.

If, however, there exists an angularity between the edge of the stock and the cutting knife, the recess in the arm 378 will not

register with that of the arm 360 and, therefore, the plunger 362 is prevented from being actuated to the left. Therefore, as the actuating rod 398 is moved to the right, the lower end of the lever 390 is held stationary and the upper end thereof is swung away from the stop shoulder 408 towards the right in opposition to the action of the spring 412.

This peculiarity of operation of the lever 390 is utilized to effect the disconnection of the machine from the source of power by means of the tripping mechanism and in the manner now to be described.

The tripping mechanism comprises a link 420 (Figs. 11, 12 and 13) which is pivotally associated with the upper pin 406 of the lever 390 and the other end of which has a universal connection to an arm 422 of a bell crank which is rotatably mounted upon a vertical shaft 424 that is carried by a bracket 426 of the frame. The other arm 428 of the bell crank has a pin-and-slot connection to the forward end of a connecting rod 430, the rear end of which is pivoted to an arm 432 which is fixed to the upper end of a vertical shaft 434. This shaft is rotatably mounted in suitable bearings on the machine frame and its lower end (Figs. 12 and 15) is provided with an arm 436, the bifurcated end of which straddles a pin 438 that projects upwardly from the release plunger 68 which is horizontally slidable in a suitable bracket 440. A coiled spring 442 is disposed around the lower end of the shaft 434 and one end is secured thereto while the other end is restrained by the stationary bearing bracket 446, the arrangement being such that the spring serves normally to maintain the releasing plunger 68 in its outer operative position and also to urge the horizontal connecting rod 430 forwardly to maintain the pin 448 in engagement with the rearward end of the slot 450.

Under normal conditions of operation, when the release plunger 68 occupies its operative position, the lever 94 (Fig. 15) for actuating the main clutch (not shown) of the machine is held in its operative inclined position, as indicated in dotted lines in Fig. 15, by means of a latch 452 which is pivotally mounted upon a rigid arm 454 of said lever and the forward end 455 of which engages the side of the release pin 68.

When the actuating lever 94 of the clutch is thus held in operative position, said clutch performs its normal function of connecting the machine to the source of power. When, however, an angularity is detected between the stock and the cutting knife and the upper end of the lever 390 is swung to the right, as viewed in Fig. 13, in the manner hereinbefore described. This movement, through the component elements of the tripping mechanism, already set forth, serves to withdraw the release plunger 68 inwardly from the end of the latch 452 and permit the actuating lever 94 to be automatically thrown to its inoperative position, as indicated in Fig. 15. In this position, the main clutch of the machine is thrown out and the machine is disconnected from the source of power, the interruption of operation taking place prior to the cutting stroke of the cutting knife, thereby preventing the production of a defective strip.

Explanation has already been made of the fact that right and left detectors 66 and 64 are yieldingly mounted in such manner as to cause them, when engaged by the forward edge of the stock being fed, to tend to urge the stock backwardly in a direction towards the cutting knife. Such an action would of course tend to displace the cut strip and cause an improper operation of the transferring rocker in delivering the strip to the receiving table.

Therefore, means is provided for temporarily retracting both of said detectors after the detecting operation has been consummated and after the forward edge of the stock is brought into engagement with the end stops 36. This means comprises a cam 460 (Figs. 1, 2 and 17) which cooperates with a roll 462 carried on one arm of a bell crank lever 464 that is rotatably mounted on the cam lever shaft 258. The other arm of the lever 464 is disposed directly beneath the vertical detector retracting rod 70 (Figs. 13 and 14) which is slidably mounted in a yoked-shaped bracket 466 carried by the frame of the machine and which is normally held in its lowermost position by means of a coiled spring 468 that surrounds the rod between the upper arm of the yoke and a collar 470 which is pinned to said rod. Directly above the upper end of the actuating rod 70, an arm 472 is located and this arm is fixed to the rock shaft 358 which is mechanically associated with the left detector 64 by the connections already described and which is also mechanically connected to the right detector 66 whenever the plunger 362 is inserted in the recess of the arm 378 which constitutes a part of the lever having the upper arm 376 that is associated with the right detector 66 by means of the connecting link 374.

The cam 460 is so designed as to cause the vertical actuating rod 70 to be raised just subsequent to the time when the forward edge of the sheet is brought into engagement with the end stops, and this rod, acting upon the arm 472 secured to the rock shaft 358, effects a rotative movement of said rock shaft, which movement temporarily retracts both the right and left detectors 66 and 64 at the moment when the measuring arms 360 and 378 occupy registering positions and the plunger 362 is inserted into the recess of the arm 378 thus rigidly con-

necting said arms together. Having retracted the detectors to the positions shown in Fig. 21, the cam 460 holds them in their retracted positions until the cutting and strip-delivering operations are completed. Of course, if the detecting mechanism determines that an angularity exists between the stock and the cutting knife, the tripping mechanism is automatically thrown into operation to disconnect the machine from the source of power prior to the next cutting operation, and, therefore, there is no necessity for retracting the detectors under these conditions.

Although the invention has been shown and described for illustrative purposes as embodying a more or less specific construction and arrangement and location of parts, it will be understood that many modifications may be made therein without departing from the spirit and scope of the invention, and, therefore, only such limitations should be imposed as are indicated in the appended claims.

Having illustrated and described the preferred embodiment of the invention, that which is claimed as new is:—

1. A stock cutting machine having, in combination, periodically operative cutting means constructed and arranged to cut a sheet of stock into pieces, means for feeding the stock thereto, and automatic means operable at each operation of the cutting means for adjusting the length of feed in equal increments to produce in succession pieces of graded widths from the same piece of stock.

2. A stock cutting machine having, in combination, periodically operative cutting means, constructed and arranged to cut a sheet of stock into pieces, means for intermittently feeding the stock thereto, and automatic means for gaging the successive feeding movements of the stock to cause the cutting means to produce a series of pieces of graded widths from the same piece of stock.

3. A stock cutting machine having, in combination, periodically operative cutting means constructed and arranged to cut a sheet of stock into pieces, means for intermittently feeding the stock thereto, means for gaging the successive feeding movements of the stock to cause the cutting means to produce a series of pieces of graded widths, and means for automatically adjusting said gaging means to vary the graduations in width of the pieces of stock so produced.

4. A stock cutting machine having, in combination, periodically operative cutting means constructed and arranged to cut a sheet of stock into pieces, means for intermittently feeding the stock thereto, and automatic means for gaging the successive feeding movements of the stock to cause the cutting means to produce a predetermined number of pieces of predetermined graded widths.

5. A stock cutting machine having, in combination, cutting means constructed and arranged to cut a sheet of stock into pieces, and means automatically operative for causing said cutting means to cut a series of pieces of graded widths therefrom.

6. A stock cutting machine having, in combination, periodically operative cutting means constructed and arranged to cut a sheet of stock into pieces, means for feeding the stock intermittently thereto, and pawl-and-ratchet mechanism automatically operative for gaging the successive feeding movements of the stock to cause the cutting means to produce a series of pieces of uniformly graded widths.

7. A stock cutting machine having, in combination, periodically operative cutting means, means for feeding the stock intermittently thereto, automatic pawl-and-ratchet mechanism for gaging the successive feeding movements of the stock to cause the cutting means to produce a series of pieces of uniformly graded widths, and means operable to determine the number of pieces in the series and to cause said pawl-and-ratchet mechanism to reset in preparation for another like series of graded pieces.

8. A stock cutting machine having, in combination, periodically operated cutting means for successively cutting pieces from the end of the stock, a delivery table located beyond the cutting means, a rocking member for supporting the successive cut pieces and transferring them to the delivery table, an end stop on said rocking member and against which the stock is fed prior to each cutting operation, and means for automatically varying the position of said end stop prior to each cutting operation.

9. A stock cutting machine having, in combination, cutting means for operating on the stock, means for feeding the stock thereto, a plurality of feelers arranged to engage the stock at different points for automatically controlling the operation of the machine, and means for automatically and concurrently adjusting all of said feelers in the direction of feed prior to each feeding operation.

10. A stock cutting machine having, in combination, cutting means for operating on the stock, means for feeding the stock thereto, a feeler for engaging the stock in advance of the cutting means for automatically controlling the operation of the machine, and means for adjusting the feeler in the direction of feed prior to each feeding operation.

11. A stock cutting machine having, in combination, means for cutting successive

pieces from the end of the stock, means for supporting the stock in horizontal position during the operation of the means, a horizontal receiving table, means for transferring the cut pieces to said table and stacking them on edge thereon, and means for automatically adjusting the height of the table prior to each cutting operation.

12. A stock cutting machine having, in combination, means for successively cutting from the stock a series of pieces of uniformly graded widths, means for supporting the stock in horizontal position during the cutting operation, a horizontal receiving table, means for successively transferring the cut pieces to said table and stacking them on edge thereon, and means for automatically adjusting the height of the table prior to each cutting operation to adapt it to receive the series of pieces of graded widths.

13. A stock cutting machine having, in combination, means for cutting pieces from the end of the stock, means for gaging the sizes of the pieces so cut, receiving means for the pieces, means for delivering the successive pieces to said receiving means and stacking them thereon, and automatic means operable prior to each cutting operation for concurrently adjusting said gaging means and said receiving means to adapt the machine for the production of pieces of different sizes.

14. A stock cutting machine having, in combination, means for cutting successive pieces from the end of the stock, means for intermittently feeding the stock to the cutting means, a table located beyond the cutting means to receive the cut pieces, a rocking member for successively transferring the cut pieces to the table and stacking them on edge thereon, an end stop mounted on the rocking member for arresting the feeding movements of the stop to gage the width of the cut pieces, and means for automatically and concurrently varying the height of the table and the position of the end stop prior to each cutting operation to adapt the machine to cut a series of pieces of different widths.

15. A stock cutting machine having, in combination, means for cutting successive pieces from the end of the stock, means for feeding the stock intermittently to the cutting means through predetermined distances, a feeler engaging the stock for controlling the operation of the machine, and means for automatically and concurrently varying the lengths of feed of the stock and the position of operation of the feeler on the stock prior to each cutting operation.

16. A stock cutting machine having, in combination, cutting means, means for feeding the stock intermittently past the cutting means, an end stop located beyond the cutting means in the direction of feed to determine the length of feed of the stock, a feeler engaging the stock in advance of the cutting means for controlling the operation of the machine and automatic means operable prior to each cutting operation for concurrently and equally adjusting the end stop and the feeler with respect to the cutting means to adapt the machine for the production of pieces of graded widths.

17. A stock cutting machine having, in combination, means for cutting successive pieces from the end of the stock, a receiver for the cut pieces, a rocking member for transferring the cut pieces to the receiver, an end stop carried by the rocking member for gaging the width of the cut pieces, and means periodically operable regardless of the movement of the rocking member to automatically vary the position of the end stop with respect to the cutting means to vary the widths of the cut pieces.

18. A stock cutting machine having, in combination, means for cutting successive pieces from the stock, a stop for fixing the position of the stock beneath the cutting means, feeding means for advancing the stock against the stop, a feeler for engaging the stock to determine the width thereof, and means operable prior to each feeding movement for automatically adjusting the positions of said stop and said feeler.

19. A stock cutting machine having, in combination, means for cutting successive pieces from the stock, a stop beyond the cutting means for fixing the width of each piece to be cut, feeding means for advancing the stock against the stop, a feeler located in advance of the cutting means a distance equal to that of the stop beyond it and adapted to engage the stock to determine the width thereof, and means operable prior to each cutting operation for automatically and concurrently adjusting said stop and said feeler through like distances with respect to the cutting means.

20. A stock cutting machine having, in combination, means for cutting successive pieces from the stock, a stop for fixing the width of the pieces to be cut, feeding means for advancing the stock against the stop, a feeler for operating upon the stock to determine the width thereof, and automatic means periodically operable to adjust the position of said feeler.

21. A machine having, in combination, means for operating upon a sheet of stock, means for feeding the sheet to the operating means, a feeler engaging the stock for automatically controlling the operation of the machine, and means operable prior to each operation of the operating means for automatically adjusting the position of said feeler with respect thereto.

22. A stock cutting machine having, in

combination, periodically operating cutting means, means for intermittently feeding the stock thereto, automatic means for gaging the successive feeding movements of the stock to cause the cutting means to produce a series of pieces of uniformly graded widths, and means associated with said gaging means for modifying its action to cause the production of any selected grade of width to be omitted.

23. A stock cutting machine having, in combination, periodically operating cutting means, means for intermittently feeding the stock thereto, automatic means for causing the cutting means to cut a predetermined number of pieces of graded widths from the stock fed thereto, and means associated with said automatic means for skipping any selected grade.

24. A stock cutting machine comprising cutting means constructed and arranged to cut a sheet of stock into pieces, and automatic means constructed and arranged to cause said cutting means to cut an interrupted sequence of pieces of graded widths from the stock.

25. A stock cutting machine comprising cutting means constructed and arranged to cut a sheet of stock into pieces, automatic means for causing said cutting means to cut from the stock a sequence of pieces of uniformly graded widths, and means associated therewith for producing a hiatus in said graded sequence.

26. A stock cutting machine having, in combination, periodically operating cutting means, constructed and arranged to cut a sheet of stock into pieces, means for intermittently feeding the stock thereto in a series of steps, and means automatically operative for varying the length of any selected feeding step.

27. A stock cutting machine having, in combination, periodically operative cutting means, means for feeding the stock step-by-step thereto, automatic pawl-and-ratchet mechanism for gaging the successive feeding movements of the stock in equal increments to cause the production of a series of pieces of graded widths, and means cooperating with said pawl-and-ratchet mechanism to increase the length of feed of any selected feeding movement to produce a hiatus in the graded series of pieces cut from the stock.

28. A stock cutting machine having, in combination, means for cutting a sheet of stock into pieces, means for feeding the stock thereto, and means for detecting the angular position of the stock with respect to the cutting means and for controlling the cutting means in accordance with the determinations of the detecting operations.

29. A stock cutting machine having, in combination, means for cutting a sheet of stock into pieces, means for feeding the stock thereto, means comprising two members for detecting the angular position of the stock with respect to the cutting means, and a single means responsive to differential movement of said detecting members for discontinuing the operation of the machine.

30. A stock cutting machine having, in combination, means for cutting a sheet of stock into pieces, means for feeding the stock thereto, means for detecting the angular position of the stock with respect to the cutting means, said feeding means being operative to correct the angular position of the stock if such should occur, and automatic means for preventing the operation of said cutting means when said detecting means detects an angularity of the stock.

31. A stock cutting machine having, in combination, means for cutting a sheet of stock into pieces, means for feeding the stock to the cutting means, a plurality of detectors for engaging the forward edge of the stock to detect the angular position thereof relative to the cutting means, and means including the feeding means for automatically correcting the angular position of the stock should such occur.

32. A stock cutting machine having, in combination, means for cutting the stock, means for feeding the stock thereto, a plurality of detectors disposed beyond the cutting means for engagement with and actuation by the forward edge of the stock, and means cooperating with said detectors to prevent the operation of said cutting means if said detectors are actuated through unlike distances by the feeding of the stock.

33. A stock cutting machine having, in combination, periodically operated cutting means, means for engaging the opposite edges of a piece of stock and yieldingly feeding it to the cutting means, a plurality of rigid stops located beyond the cutting means against which the forward edge of the stock is fed, a plurality of yieldable detectors disposed ahead of said stops to be engaged and actuated by the stock as it is fed and adapted to detect any angularity of position of the forward edge of the stock relative to the cutting means, and automatic means responsive to said detectors for preventing the operation of said cutting means if any angularity of position of the stock is detected.

34. A stock cutting machine having, in combination, means for cutting the stock, means for feeding the stock thereto, yieldable detecting means disposed beyond the cutting means for engagement with and actuation by the forward edge of the stock during its feeding movement to detect any angularity between the forward edge of the stock and the cutting means, and means for

retracting said detecting means from yielding engagement with the stock prior to the cutting operation.

35. A stock cutting machine having, in combination, means for cutting the stock, means for feeding the stock thereto, yieldable detecting means disposed beyond the cutting means for engagement with and actuation by the forward edge of the stock during its feeding movement to detect any angularity between the forward edge of the stock and the cutting means, means responsive to said detecting means for preventing the operation of said cutting means if any angularity of position of the stock is detected, and means operative only when angularity is detected for retracting said detecting means from engagement with the stock prior to the cutting operation.

36. A stock cutting machine having, in combination, means for cutting the stock, reciprocating means embodying a plurality of spring-pressed feed-dogs for engaging the stock and feeding it intermittently to said cutting means during their forward movement, spring-pressed buffers for cushioning the retrograde movement of said feeding means, and stop means for engaging and releasing said feed-dogs from the stock prior to the operation of said buffers upon said feeding means.

37. A stock cutting machine having, in combination, cutting means constructed and arranged to cut a sheet of stock into pieces, and automatic means for causing said cutting means to cut said sheet into repeated like series of pieces of graded sizes.

38. A stock cutting machine having, in combination, cutting means constructed and arranged to cut a sheet of stock into pieces, means for causing said cutting means to cut said sheet into repeated like series of pieces of graded sizes, a receiver for the cut pieces, and means for transferring the cut pieces from the cutting means to the receiver.

39. A stock cutting machine having, in combination, periodically operating cutting means constructed and arranged to cut a sheet of stock into pieces, means for feeding the sheet of stock intermittently to the cutting means, means for automatically varying the extent of the feed movements so that repeated like series of pieces of graded sizes will be produced from said sheet of stock.

40. A machine for producing a loosely assembled stepped heel block having, in combination, means for cutting pieces of graded widths from a single sheet of stock, a support for the cut pieces, and means for removing said pieces from the cutting means and assembling them in stepped relation upon the support.

41. A machine for producing loosely assembled stepped heel blocks having, in combination, means for cutting a plurality of like series of graded pieces from a single sheet of stock, means for receiving the cut pieces, and means for transferring said pieces from the cutting means to the receiving means.

42. A machine for producing loosely assembled stepped heel blocks having, in combination, intermittently operative cutting means constructed and arranged to cut a single sheet of stock into a plurality of like series of graded pieces, a support for said pieces, and means for stacking said pieces on the support in the order in which they are cut.

43. A stock cutting machine having, in combination, means for cutting a sheet of stock transversely into pieces, means for feeding the stock to the cutting means, and means arranged to engage the forward edge of the sheet of stock for detecting any angularity between the advance edge of the stock and the cutting means and for controlling the cutting means so that no defective piece can be cut.

44. A stock cutting machine having, in combination, means for severing a strip transversely into pieces, means for feeding the strip intermittently to the severing means, and a plurality of detectors for engaging the severed edge of the strip after each feed movement to detect any angularity of said edge with respect to the severing means and to prevent operation of the severing means if the described angularity should occur.

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