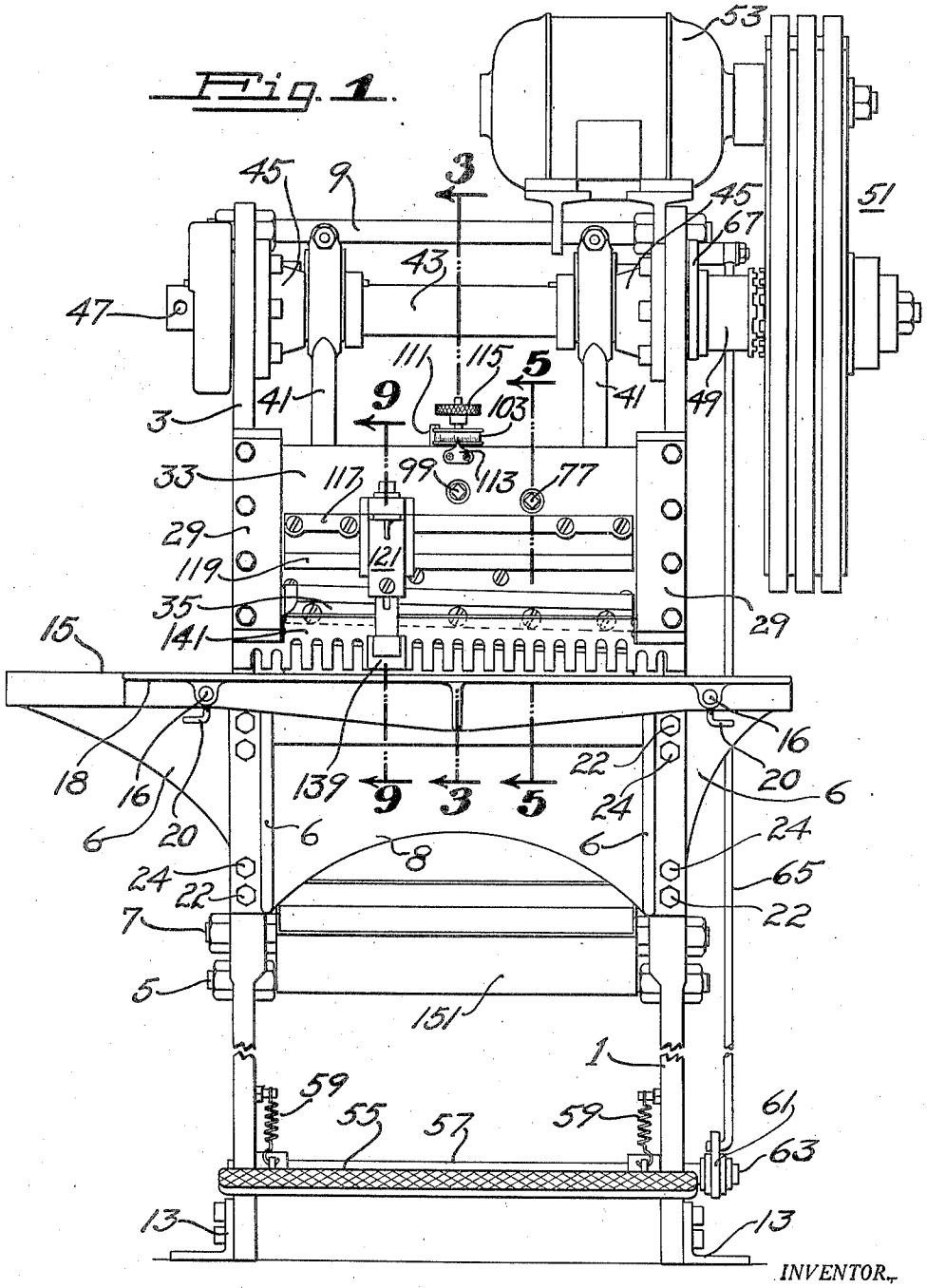
Nov. 19, 1940. C. A. VAN DUSEN 2,222,095

SHEAR MACHINE

Filed March 3, 1939 5 Sheets-Sheet 1

Fig. 1.



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SHEAR MACHINE

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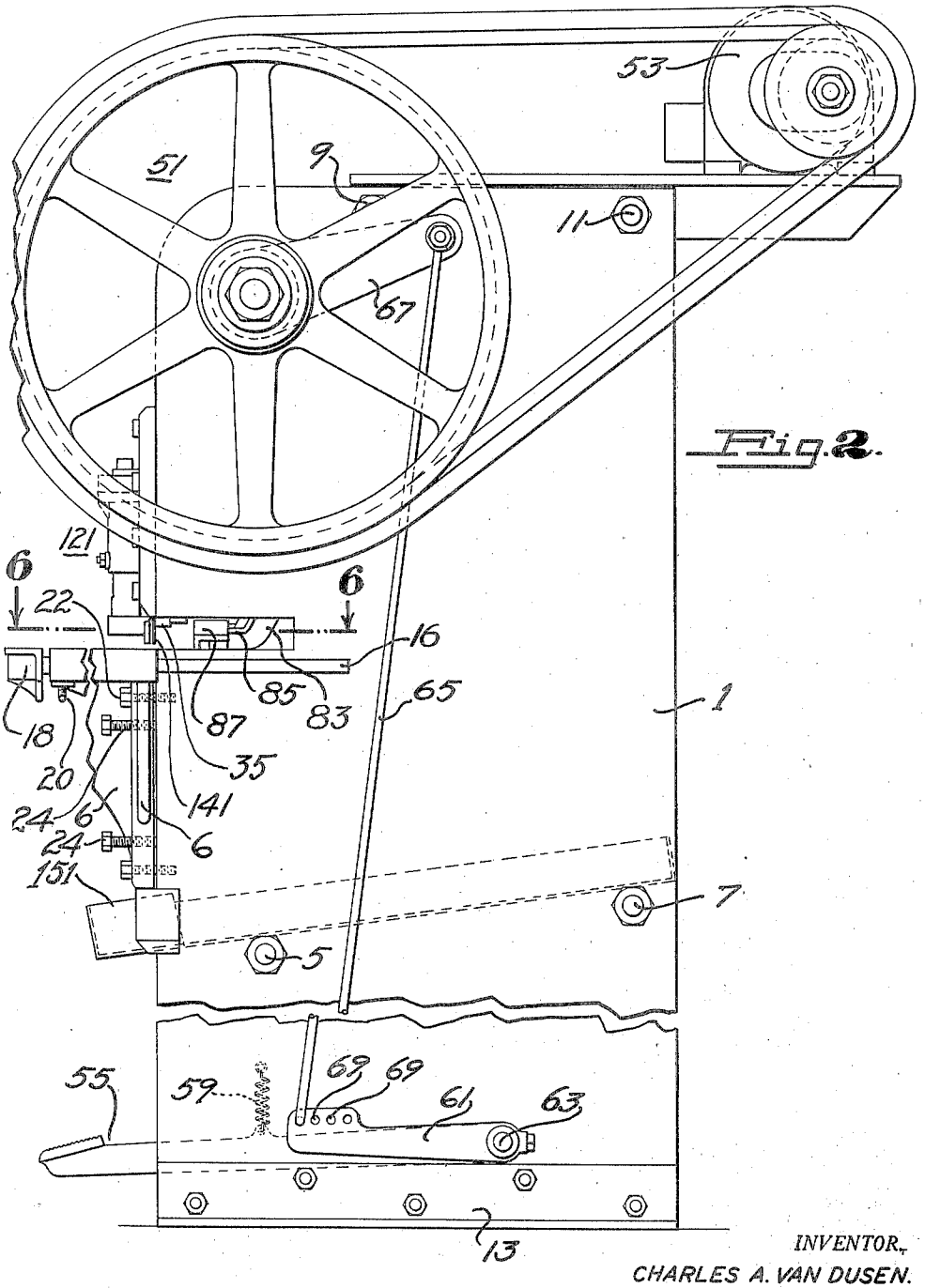


Fig. 2.

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Fig. 3.

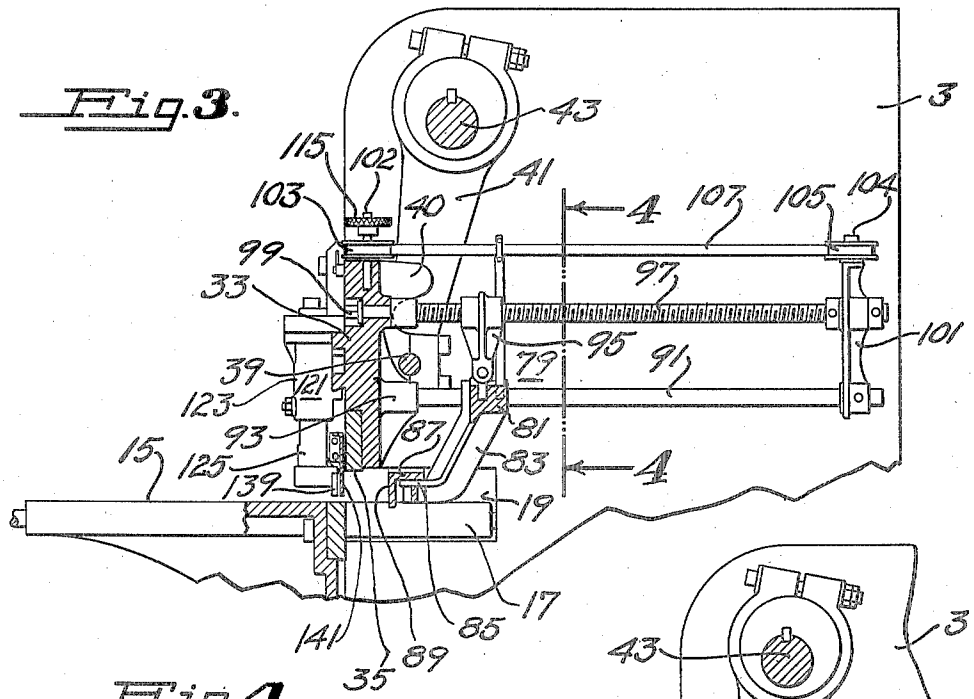
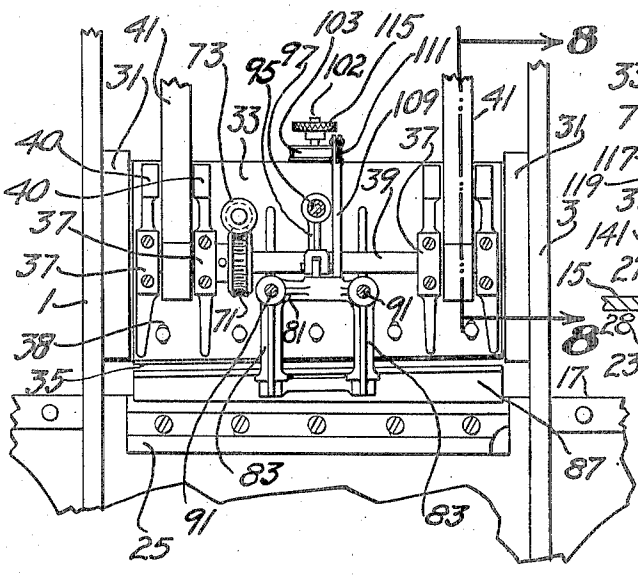


Fig. 4.



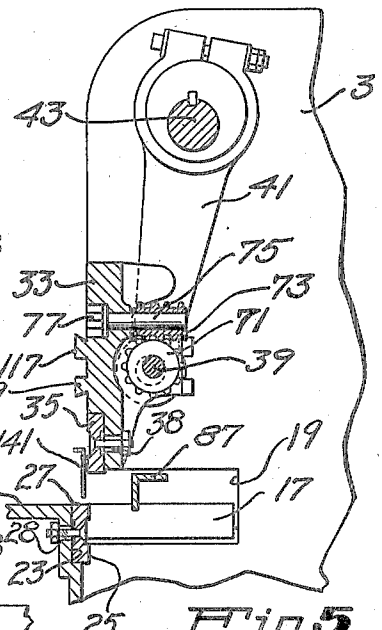


Fig. 5.

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SHEAR MACHINE

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Fig. 6.

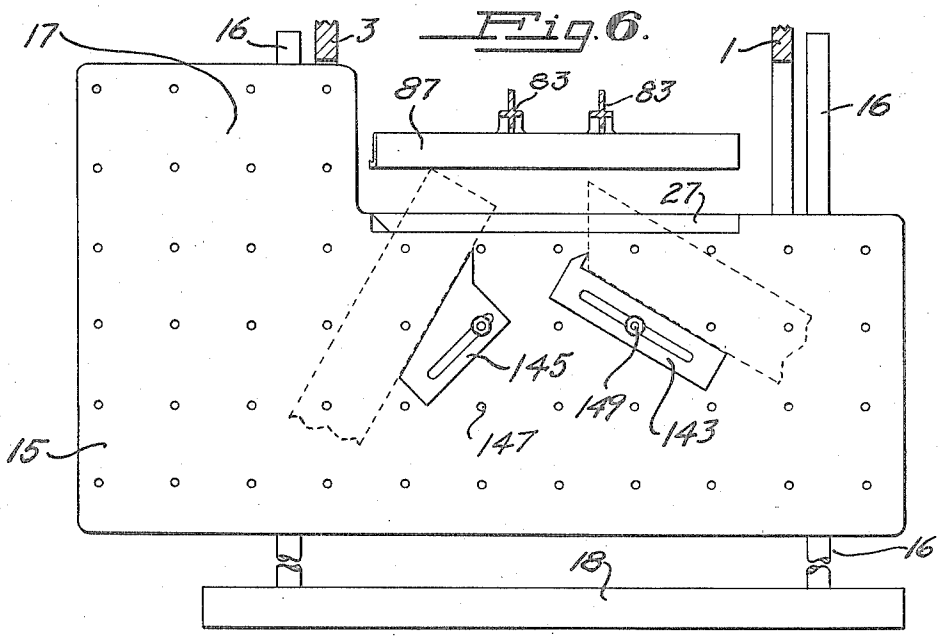


Fig. 7.

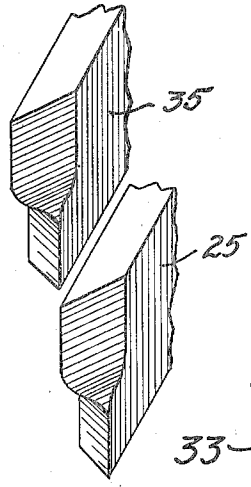


Fig. 8.

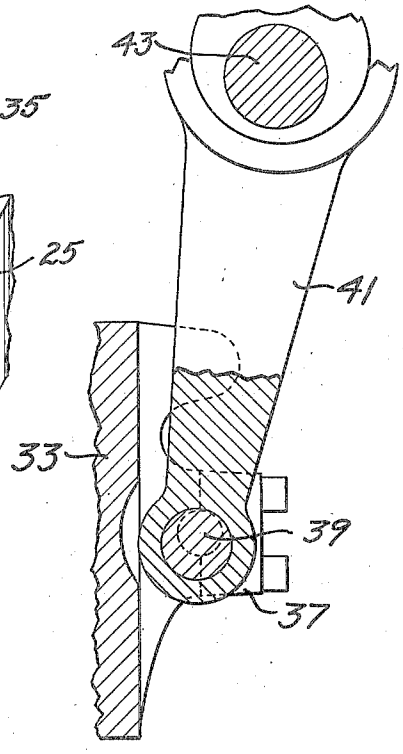
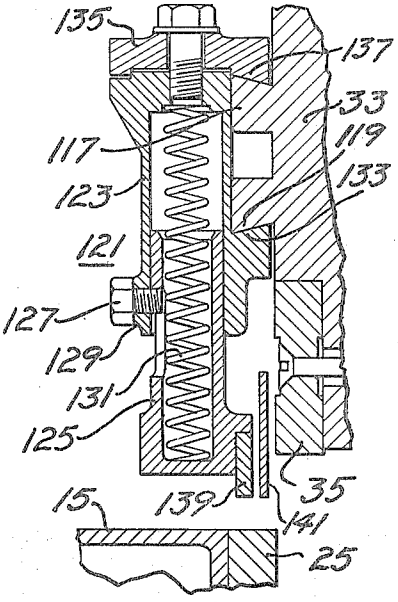


Fig. 9.



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Fig. 10.

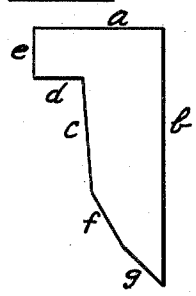


Fig. 11.

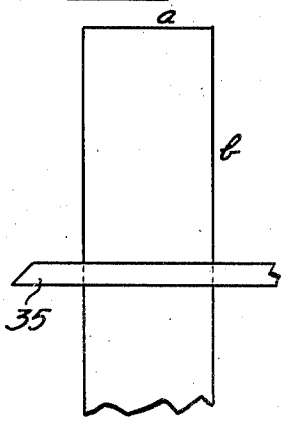


Fig. 12.

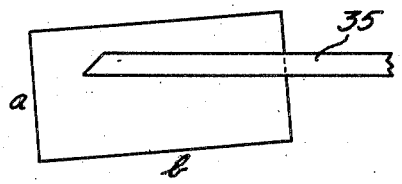


Fig. 13.

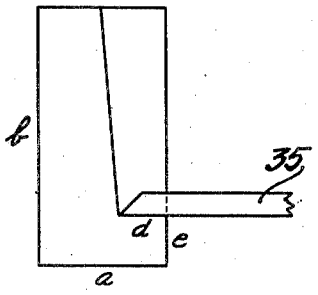


Fig. 14.

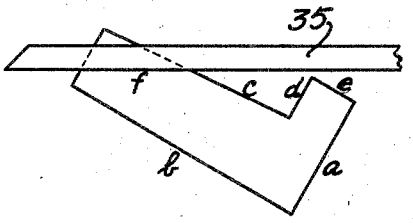
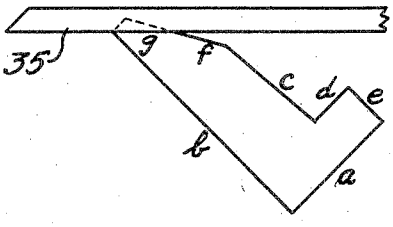


Fig. 15.



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Patented Nov. 19, 1940

2,222,095

UNITED STATES PATENT OFFICE

2,222,095

SHEAR MACHINE

Charles A. Van Dusen, San Diego, Calif.

Application March 3, 1939, Serial No. 259,621

11 Claims. (Cl. 164—47)

My invention relates to shearing machines and more particularly to machines for cutting odd shapes from sheet material.

Previous methods of cutting odd shapes from sheet material involved the use of dies in punch presses to punch out the desired shape from the sheet material. However, unless the job involved a large number of items of a particular shape, the expense incurred in the manufacture of dies would not justify the production of such items in this manner. Furthermore, the manufacture of suitable dies, in addition to the large expense incurred, necessarily involves considerable time which from the viewpoint of production may be looked upon as time wasted. Other methods heretofore attempted in the production of odd shapes from sheet material have proven inconvenient, slow and expensive.

It is an object of my invention to provide an improved machine of the shear type—

(1) Which shall enable the production of parts from sheet material that are economically impossible to make with other known shearing apparatus,

(2) Which shall be capable of economical use to equal advantage on limited quantity or long-production runs,

(3) Which shall enable cutoff and notching operations with a high degree of accuracy,

(4) Which shall not involve any additional investment in the matter of dies or analogous parts.

(5) Which shall be capable of use for production of all types of odd shaped parts from sheet material without necessitating any rearrangement of apparatus parts except for a few minor adjustments of guides or gauges, ordinarily requiring but a matter of a few minutes time on the part of an operator,

(6) Which shall produce sharp and clean cuts, leaving no burrs or bends at the edge of the cuts in the sheet material.

Additional objects of my invention will be brought out in the following description of the same taken in conjunction with the accompanying drawings wherein

Fig. 1 is a front elevational view of a shearing machine constituting a preferred embodiment of my invention.

Fig. 2 is a side elevational view of the machine of Fig. 1.

Fig. 3 is a view in section taken along the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary view of the machine taken along the line 4—4 of Fig. 3.

Fig. 5 is a view in section taken along the line 5—5 of Fig. 1.

Fig. 6 is a plan view of the table partly in section taken along the line 6—6 of Fig. 2.

Fig. 7 is a fragmentary view in perspective of the notching ends of the shearing blades.

Fig. 8 is a view in section taken along the line 8—8 of Fig. 4.

Fig. 9 is a view in section taken along the line 9—9 of Fig. 1.

Figs. 10 to 15 inclusive are illustrations representing the procedural steps involved in producing one of the many odd shaped parts of which my improved machine is capable of producing from sheet material.

The above views 1 to 9 inclusive are substantially to scale.

Now, proceeding with the description of the machine illustrated in the drawings, it comprises a pair of parallel spaced apart side plate frame members 1 and 3, held in spaced relationship by tie bolts 5, 7, 9 and 11 suitably located for the purpose. Each of the side plate members has attached thereto along its bottom edge an angle iron 13 for anchoring the machine to a suitable foundation.

Across the front edges of these spaced apart side members 1 and 3 and extending therebeyond, is a horizontal L shaped table 15. This table is formed with reinforcing brackets 6 and a reinforcing cross member 8, and is adjustably attached to the front edge of each of the side members by means of a pair of clamp screws 22 and adjusting screws 24. Associated with the table is an adjustable extension comprising a pair of slide rods 16 slidable in suitable guide channels formed edgewise through the table proper parallel to the front-to-rear axis of the machine, these slide rods carrying a cross-member 18 having a surface in the plane of the table surface. Lock bolts 20 extend into the under surface of the table proper and are capable of being rotated into locking engagement with the slide rods 16. The short section 17 of the L shaped table extends around to the side of the side plate member 3, which side plate member is provided with a notch 19 into which the short section 17 extends, this notch being sufficiently high to provide ample room or space above the table surface for the insertion of sheet material for operation thereupon.

The other side plate member 1 is also correspondingly notched, but this notch 21, since it does not receive any portion of the table therein, is merely of sufficient height to provide ample

sheet material receiving space above the table level corresponding to the space provided by the notch 19 in the first mentioned side plate member 3.

The table 15 is formed with an edge recess 23 at its attached end, extending substantially the distance between the side plate frame members 1 and 3, and a stationary cutting or shearing blade 25 is rigidly bolted to the table, in this edge recess 23, with its upper surface flush with the work surface 27 of the table, the bolt holes 28 in the table being elliptical to allow slight adjustments of the blade for this purpose.

On each forward edge of the side plate members and above the table level is bolted a slide block 29 which cooperates with an offset or rib 31 on the inner surface of each side plate to provide a vertical channel at either side of the machine. These channels receive a reciprocally mounted shearing head 33, which is inclined and recessed along its lower frontal edge to receive a complementary shearing blade 35 for cooperation with the stationary blade 25 previously described as being affixed along the attached end of the table 15. The blade 35 is rigidly bolted into position, the bolt holes 38 in the shear head also being elliptical to enable minor vertical adjustments of this blade. Parallelism and shearing contact between the blades 35 and 25 are obtainable through manipulation of the table adjusting screws 22 and 24.

At the rear of the shearing head 33 is provided a plurality of bearings 37 for receiving an eccentric shaft 39 to which is connected, for reciprocally driving the shearing head and attached blade 35, a pair of connecting rods 41 driven from an eccentric shaft 43 mounted in bearings 45 in the side plates 1 and 3, the shaft 43 being parallel to the shearing head 33 and blade 35 but at a position above the same and offset to the rear of the plane of the shearing head and blade. The eccentrics are ungrooved and the connecting rods are guided in alinement by the adjacent bearings 37 and guide ears 40 which are integral with the shear head 33.

The eccentric shaft 43 extends beyond the side plate members 1 and 3 at either side of the machine. At one end adjacent the side plate 3, the shaft extension is provided with an opening 47 therethrough allowing for insertion of a bar or tool to obtain manual adjustments of the vertical position of the reciprocable shearing head and blade while the machine is in its non-operating condition. At the other end, the eccentric shaft 43 terminates in the driven member 49 of a clutch mechanism, the driving member of which constitutes a portion of a fly wheel assembly 51 belted to an electric driving motor 53, supported atop the machine. The clutch and fly wheel arrangement constitutes standard apparatus known in the art by the trade name "Niagara," and its details of construction are not essential to an understanding of the present invention.

Operation of the clutch is controlled from a foot treadle 55 pivoted to a shaft 57 supported between the side plates, close to the floor, the treadle extending to the front of the machine within easy reach of an operator's foot. The treadle is spring supported at an intermediate point by a spring 59 at each side of the treadle and anchored to a side plate. Operation of the treadle serves to control movement of an outside lever 61 attached to an extension 63 of shaft 57, movement of the lever 61 being communicated to a connecting rod 65 and clutch control lever 67 to the clutch mechanism. The rod 65 is arbitrarily connectible to any one of a plurality of points, determined by openings 69 in the end of the lever 61 to provide a desired degree of clutch control sensitivity from the treadle 55. In the above manner, power from the driving motor 53 is transferred to the eccentric shaft 43 which upon rotation will produce reciprocal movement of the connecting rods 41 and consequent reciprocal motion of the shearing head 33 and blade 35.

The first mentioned eccentric shaft 39, previously described as being supported in the bearings 37 at the rear of the shearing head, is normally non-rotatable, but is angularly adjustable to control the extent of lift of the shearing head 33 above the table 15. This adjustment is accomplished by providing on the eccentric shaft 39 a worm gear 71 at a point somewhere intermediate to the connecting rods 41 and engaging this worm gear with a worm 73 whose shaft 75 extends through the shearing head to the front of the machine and terminates in a square end crank engageable terminal 77. The elevation of the shearing head above the table level and consequently above the fixed blade 25 is such that during reciprocating motion of the shearing head, as transmitted thereto by the connecting rods 41, the upper blade 35 will enter into shearing cooperation with the fixed or lower blade.

In cooperation with the shearing head 33 and associated blade 35, there is provided a back gauge 79 which enables rapid determination by the operator of the exact length of the cut which it is desired that the machine provide. This back gauge with the shearing head and blade constitutes a unitary assembly all the parts of which, are adapted to reciprocate in unison.

This back gauge involves a substantially rectangular bracket 81 having depending forwardly projecting side members 83, each terminating in a horizontal extension 85, across both of which is supported an angle beam 87 having a vertical surface 89 facing toward the front of the machine and serving as a back stop for such sheet material which is fed into the machine for operation thereon. One of the depending forwardly side members 83 is slightly shorter than the other to provide an inclination in the position of the angle beam 87 to correspond with the inclination in the lower edge of the shearing head 33 and consequently to conform with the inclination of the reciprocal blade 35.

At each of its upper corners the substantially rectangular bracket 81 is provided with guide openings to receive parallel cylindrical guide rails 91 which are suitably anchored in bosses 93 formed in the rear of the shearing head, and extending toward the rear of the machine.

At an intermediate point of the upper horizontal portion of the back gauge bracket 81, is mounted an upwardly directed extension 95 having a horizontally threaded bore therethrough for threadedly engaging a lead screw 97 having its forward end extending through the shearing head and terminating in a square end crank engaging terminal 99, and extending rearwardly of the shearing head toward the rear of the machine substantially parallel to the guide rails 91. At the rear ends of the guide rails and the lead screw, a back gauge yoke 101 serves to rigidly hold these members in their relative positions with respect to each other.

On the top edge of the shearing head at approximately the mid-point thereof, is rotatably

mounted about a spindle 102 a horizontal pulley 103, and a corresponding pulley 105, in approximately the plane of the first pulley, is rotatably supported on the back gauge yoke 101, a suitable spindle 104 being provided as a part of the yoke for mounting this pulley. A steel tape 107 extends about these two pulleys under tension, this tape being clamped at a point directly above the rectangular back gauge bracket 81 by means of a tape clamp 109 threaded into the upper horizontal member of the bracket, its free end 111 being split or grooved to receive the tape after which the split end is riveted into clamping engagement with the tape. The tape is graduated to indicate the exact distance between the shearing edges of the knives and the back stop or the vertical surface of the angle beam, and such distances can be determined from the operator's position at the front of the machine by a tape cooperating pointer or indicator 113 affixed to the front surface of the shearing head adjacent the tape.

A back guide lock nut 115, on the pulley spindle 102 is adapted to be threaded thereon into locking engagement with the pulley 103 and thereby hold any desired adjustment of the back gauge 79.

The front face of the shearing head has integrally formed thereon a pair of horizontal rails 117 and 119 extending across the shearing head from one side of the machine to the other. The upper rail 117 has an upper rail surface inclined upwardly away from the front face of the shearing head, while the undersurface of the lower rail 119 is inclined away from the front surface of the shearing head in a downward direction and constitutes the rail surface for this rail. These rails constitute means for adjustably positioning a work holder 121 at any point along the length of the shearing head, depending upon where the material upon which the machine is to operate, is to be held on the table.

The work holder comprises a pair of telescoping cylindrical sections 123 and 125, the telescoping section 125 being slotted to receive a machine screw 127 threaded through a boss 129 formed on the outer surface of the telescoped section 123. The two sections together constitute a housing for a spring 131 which when positioned in the housing, tends to maintain maximum separation between the two sections. The telescoped portion 123 has integrally formed therewith, a rail engaging boss 133 having a surface complementary to the undersurface of the lower rail 119 and with this boss in contact with the lower rail surface, the work holder is maintained in any of its adjustable positions by a cap 135 bolted to the upper end of the telescoped section 123 in engagement therewith, and having an extension 137 with a surface complementary to the rail surface of the upper rail and in engagement therewith.

At the rear of the lower end of the telescoping section 125 there is formed a flat spot to which is attached a rectangular work engaging piece of insulation 139 such as Bakelite, micarta or the like, of a length sufficient to extend a short distance below the lower end of the telescoping section.

Between this micarta element and the reciprocating blade 35, and extending across the full width of the machine but at a slight elevation above the table level, there is fixed a guard 141 to protect an operator of the machine from the reciprocating blade, which operates just behind this guard.

The upper and lower blades 35 and 25 are made identical, each being of rectangular cross section throughout its whole length except at one end which is mitered at both its upper and lower corners, the mitering at one corner being reversed from that at the other corner. Thus each blade has four cutting edges, enabling the blades to be reversed or interchanged, the mitered ends of the blades permitting such blades to be employed for notching purposes, it being noted that only the lower mitered corner of that blade which is reciprocally mounted actually does the notching, the remaining mitered portions being held in reserve, in the same manner as three of the cutting edges of each blade, until such time as the dulling of a notching end or a cutting edge should dictate the necessity for reversing or interchanging blades.

In the operating of the machine, sheet material is slid underneath the guard 141 and the reciprocal blade 35, whereupon pressure on the foot treadle 55 will bring about engagement of the clutch and convey power to the eccentric shaft 43 and produce a reciprocal motion of the upper blade 35 causing it to descend in shearing engagement with the lower fixed blade 25 and shear off a piece of the sheet material which has thus been inserted. In the event it is desired to cut a notch in such material, the material is slid through the notch 19 edgewise of the blade in the direction of the mitered end and sufficiently beyond to produce the desired extent of notch.

Before any such cutting or notching operations are performed however, the back gauge is adjusted to provide for proper cut-off length and this is readily accomplished by cranking the lead screw 97 until the indications on the tape indicate that the back stop 89 has reached proper distance from the shearing edges of the blades. This is very readily ascertained because the readings are so placed upon the tape that it will indicate zero when the back stop has been moved forward to the shearing edges of the knives. By accurately calibrating the tape to read distances from this point to any position to which the back stop may be adjusted, accurate cutoff lengths can be determined very quickly. When a desired adjustment has been arrived at, the back gauge may be locked in position by screwing down the cutoff adjustment lock nut 115 against the front tape pulley 103. With this adjustment made, an operator is ready to shear off from sheet material, accurately sized blanks from which to trim or notch out portions to obtain a desired shape or configuration.

Subsequent trimming operations, in most all cases require cutting the blanks at various angles with respect to the blades. Such operations are handled through the use of front gauges 143 and protractor guides 145, adapted to be clamped by clamping bolts 149, to any one of numerous locations on the table 15 which has a number of bolt openings 147 therethrough for the purpose. Each of such gauges or protractors is formed with a slot for the reception of a bolt, such slot permitting wide latitude in the adjustment of the gauge or protractor with reference to the shear blades.

Location of the proper positions for such gauges and guides is determined by templates temporarily held in position against the back stop in its zero reading position while the desired gauge or guide is placed in position.

Having located the approximate position of the gauge or protractor guide, the same is clamped to the table by a bolt or bolts 149 in-

serted into a convenient bolt opening in the table at that location. Similar gauges and guides may be employed in guiding the work for notching operations. Where the character of the work permits, a plurality of necessary gauges and guides may be clamped to the table at the same time, allowing for a rapid requence of shearing or notching operations with a minimum waste of effort between operations.

A receiving pan 151 is set at a forward sloping angle beneath the table 15 between the side plate members 1 and 3 of the machine in position to catch the pieces that are sheared off in the operation of the machine. The tie rods 5 and 7 interconnecting the side plates serve to support the pan in the desired sloping position, and by reason of this sloping position of the pan, all the material, as it is sheared off, will drop therein and be conveyed by gravity toward the front end of the pan within convenient reach of an operator. The reinforcing cross member 8 of the table is arched to provide an operator with convenient access to the pan.

Having described the construction of the preferred embodiment of my invention in the form of the machine illustrated in the drawings, it is desirable to emphasize a number of features which such construction entails and which might not on the surface be apparent.

As an important factor in enabling economical production with the above described machine, it will be noted that all the machine adjustments and all the operations on the part of the operator can be handled from the operator's position.

He can adjust the back gauge with a few cranks of the lead screw 97 and by reason of the rigid unitary assembly of the back gauge with the shearing head, the tape will indicate accurately the "length of cut" adjustment, without the necessity of the operator going to the rear of the machine to set the gauge, or resorting to the "cut and try" method to determine the proper "length of cut" adjustment. The crank control 77 provides the operator with conveniently accessible means for adjusting the degree of lift of the reciprocal blade 35 to properly adjust the same for work of different thicknesses. This adjustment usually requires, as a prerequisite, that the shearing head be lowered to the lowermost point of its stroke, which is made possible by inserting a bar or tool in the opening 47 in the shaft 43 and manually rotating the same as previously described.

The location of the eccentric shaft at a position above the shearing head and to the rear thereof, enables the use of long connecting rods, and what is quite important in the operation of this machine, introduces a counter-thrust against the shearing head during the shearing portion of a stroke, which counter-thrust serves to overcome the tendency of shearing blades to spread during the act of shearing, thus assuring sharp clean cuts without burrs or bent edges along the lines of shear.

Adjustment of the work holder to any position along the rails across the front of the shearing head is readily accomplished by an operator with the construction described. Such holder will reciprocate with the shearing head to engage the work just prior to engagement of the work by the reciprocating blade, to hold the work rigidly on the table during shearing.

On the return stroke of the shearing head, the work holder will be lifted from the work thus enabling the work to be shifted in position for another shearing operation.

All of the above features not only provide for convenience of operation but enable a rapid sequence of operations whether of the same type or of different character, resulting in the economical production of odd shaped sheet material parts.

To further demonstrate the simplicity of operation of the above described invention and the economies which might be derived therefrom, it will be shown in connection with Figs. 10 to 15 of the drawings, the various simple steps involved in the production of an odd shaped piece, and while such steps may offhand appear numerous when compared with the operation of punching out a similar piece with a suitable die or punch press, the time element involved in producing such parts with the machine of my invention is a relatively minor factor when considered with respect to the time required in the production of the necessary dies for punch press operation, particularly where the number of pieces desired would not justify the manufacture of dies. It will be apparent that the savings in expense and time are quite considerable, particularly so, since the many operations depicted by the illustrations in Figs. 10 to 15 may be performed quite rapidly, and without appreciable loss of time. When compared to shearing machines of the prior art, as known by me, the inherent advantages of my invention are even more pronounced.

The piece which it is desired to form is illustrated in Fig. 10. This is to be cut from a strip of sheet material having a width *a* equal to the dimension *a* of the desired item as shown in Fig. 10. A blank of a length equal to the dimension *b* is first sheared off (Fig. 11). This sheared off piece is then inserted under the end of the blade 35 (Fig. 12) for a notching operation to provide a cut giving an edge in line with the dimension *c* of the finished article. A subsequent notching operation (Fig. 13) will remove a section of the unfinished article giving the dimensions *d* and *e* of the finished article. The remaining operations are pure shearing operations as illustrated in Figs. 14 and 15, completing the dimensions *c*, *f* and *g* indicated on the finished item of Fig. 10.

The various angles and distances of cuts depicted in the steps of Figs. 11 to 15 are controlled by properly set back gauges and protractor guides of the type illustrated in Fig. 6. The proper positioning of these involves but a matter of a few minutes. Once a run has been completed and the desired number of pieces have been made, but a few rapidly accomplished adjustments are required to adapt the machine for the production of a differently shaped item.

It will therefore be apparent from the above description of my invention that it fulfills all the objects, for which it has been designed. While I have disclosed a preferred embodiment of my invention in great detail, it will be apparent that the invention is susceptible to modification without departing from the inventive features embodied therein, and I accordingly do not desire to be limited in my protection to the specific details described, except as may be necessitated by the prior art and the appended claims.

I claim:

1. A shear machine comprising a pair of cooperating blades, one of said blades being sta-

tionary and the other of said blades being reciprocally mounted with respect to said stationary blade in a plane parallel to said stationary blade, an eccentric shaft supported above and parallel to said reciprocally mounted blade but rearwardly offset with respect to the plane thereof, and connecting rod means operated from said shaft and in driving engagement with said reciprocally mounted blade through a second eccentric shaft, and means for angularly adjusting said second eccentric shaft to alter the lift of said reciprocally mounted blade with respect to the stationary blade.

2. A shear machine comprising a pair of cooperating blades, one of which is reciprocally mounted with respect to the other, and an adjustable back gauge supported in unitary assembly with said reciprocally mounted blade and reciprocable therewith comprising a back stop horizontally displaceable with respect to said blades, means for adjustably displacing said back stop to any desired position, and indicating means positioned above said cooperating blades and visible from an operator's station at the front of said machine, said indicating means being operable by said displacing means for indicating to an operator at his operating station at the front of said machine any desired position of said back stop.

3. In a machine of the shear type having a reciprocally mounted shearing head, a back gage carried on the rear of said shearing head and reciprocable therewith as a unit, and an indicator supported on said shearing head within direct view from an operator's station at the front end of said machine and responsive to adjustments of said back gage for indicating to an operator at such operator's station, the adjustments of said back gage.

4. In a machine of the shear type having a reciprocally mounted shearing head, a back gage carried on the rear of said shearing head and having an adjustment control extending through said shearing head and within reach of an operator from his station at the front of said machine, and an indicator supported on said shearing head within direct view from said operator's station at the front end of said machine and responsive to adjustments of said back gage for indicating to said operator the adjustments of said back gage which said operator makes such adjustments from said operator's station at the front of the machine.

5. In a machine of the shear type having a reciprocally mounted shear head carrying a blade in shearing alinement with a fixed blade, a back gage supported from the rear of said shearing head and comprising a pair of guide rails anchored in said shearing head and extending in paralled relationship to the rear of said machine, a bracket slidably mounted on said guide rails and carrying a backstop on approximately a level with the cutting edge of said fixed blade, an extension on said bracket in threaded engagement with a lead screw supported parallel to said guide rails and having a crank engaging end extending through said shearing head to within reach by an operator from an operator's station at the front of said machine, a rear bracket interconnecting said guide rails and lead screw at the rear ends thereof, a pulley mounted on said shearing head and said rear bracket and carrying an endless tape bearing indicia thereon, a rigid connection between said back stop carrying bracket and said tape whereby movement of said bracket will be communicated to said tape, and a pointer on said shearing head within the view of an operator at said operator's station, and cooperating with said indicia on said tape for indicating to such operator adjustments of said back gage as they are being made.

6. A shear machine comprising a frame, a stationary shear blade mounted on said frame, guideways attached to said frame, a shearing head reciprocally mounted in said guideways, a moving shear blade mounted on one edge of said shearing head in a position to slide over the rear surface of said stationary shear blade to make a shearing cut therewith when said shearing head is reciprocated, an eccentric shaft mounted above and to the rear of said shearing head and having an eccentric thereon, and a connecting rod mounted on said eccentric and pivotally attached to the rear portion of said shearing head, said eccentric shaft being sufficiently to the rear of said shearing head so that a line joining the axis of said eccentric and the axis of the pivotal connection of the connecting rod to said shearing head is at an acute angle in the same direction to the path of said shearing head at all times during the rotational cycle of said eccentric.

7. Apparatus in accordance with claim 21 wherein said connecting rod is pivoted to the rear of said shearing head at a point substantially midway between the shear blade edge and the opposite edge.

8. A shear machine comprising a frame, a stationary shear blade mounted on said frame, guideways attached to said frame, a shearing head reciprocally mounted in said guideways, a moving shear blade mounted on one edge of said shearing head in a position to slide over the rear surface of said stationary shear blade to make a shearing cut therewith when said shearing head is reciprocated, an eccentric shaft mounted above and to the rear of said shearing head and having an eccentric thereon, and a connecting rod mounted on said eccentric and pivotally attached to the rear portion of said shearing head, said eccentric shaft being sufficiently to the rear of said shearing head so that a line joining the axis of said eccentric and the axis of the pivotal connection of the connecting rod to said shearing head at all times during the shearing cycle can be projected to cross the shear plane below the junction of the shearing blades.

9. A shear machine comprising a frame, a stationary shear blade mounted on said frame, guideways attached to said frame, a shearing head reciprocally mounted in said guideways, a moving shear blade mounted on one edge of said shearing head in a position to slide over the rear surface of said stationary shear blade to make a shearing cut therewith when said shearing head is reciprocated, a pivotal bearing extended from the rear of said shearing head, an eccentric shaft mounted above said shearing head and in a plane to the rear of the plane parallel to the path of said shearing head in which the axis of said pivotal bearing is located, an eccentric mounted on said shaft, and a connecting rod mounted on said eccentric at one end thereof and on said pivotal bearing at the other end thereof.

10. A shear machine comprising a frame, a stationary shear blade mounted on said frame, guideways attached to said frame, a shearing head reciprocally mounted in said guideways, a moving shear blade mounted on one edge of said shearing head in a position to slide over the rear surface of said stationary shear blade to make a

shearing cut therewith when said shearing head is reciprocated, a pivotal bearing extended from the rear of said shearing head, an eccentric shaft mounted above said shearing head and sufficiently to the rear of said pivotal bearing so that a line passing through the axes of said pivotal bearing and said eccentric shaft will intersect the shear plane, an eccentric mounted on said shaft, and a connecting rod mounted on said eccentric at one end thereof and on said pivotal bearing at the other end thereof.

11. A shear machine comprising a frame, a stationary shear blade mounted on said frame, guideways attached to said frame, a shearing head reciprocally mounted in said guideways, a moving shear blade mounted on one edge of said shearing head in a position to slide over the rear surface of said stationary shear blade to make a shearing cut therewith when said shearing head is reciprocated, a pivotal bearing extended from the rear of said shearing head, an eccentric shaft mounted above said shearing head and sufficiently to the rear of said pivotal bearing so that a line passing through the axes of said pivotal bearing and said eccentric shaft will intersect the shear plane below the shear line, an eccentric mounted on said shaft and a connecting rod mounted on said eccentric at one end thereof and on said pivotal bearing at the other end thereof.

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