D. LENNOX.

SHEET SHEARING MACHINE.

APPLICATION FILED MAY 12, 1909.

954,681.

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Fig. 1.

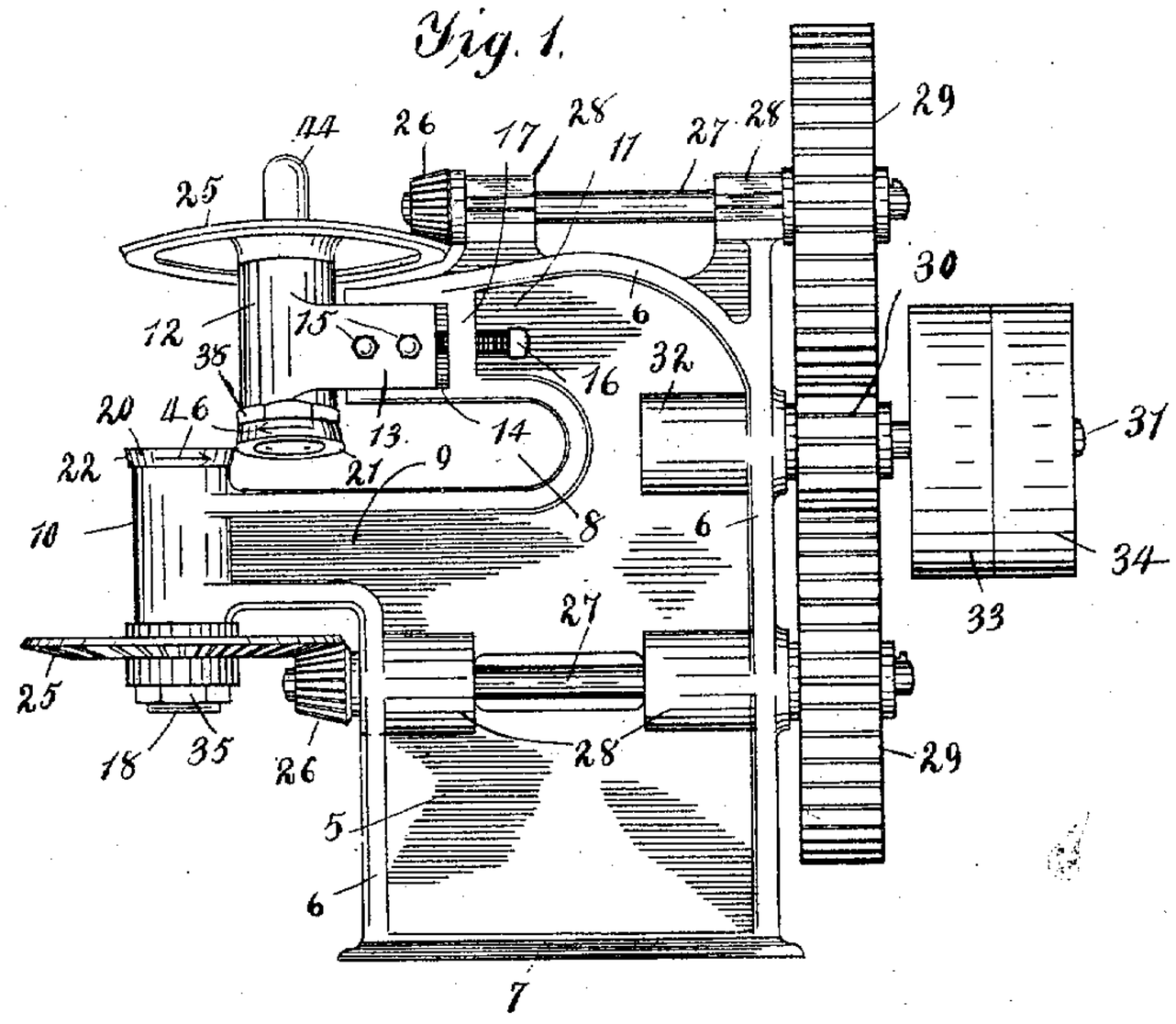


Fig. 2.

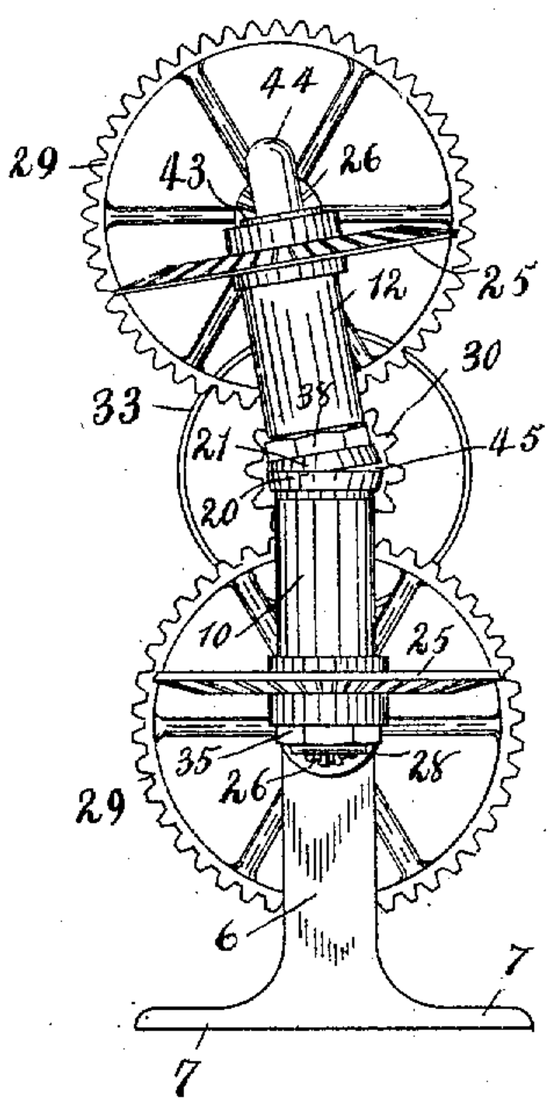
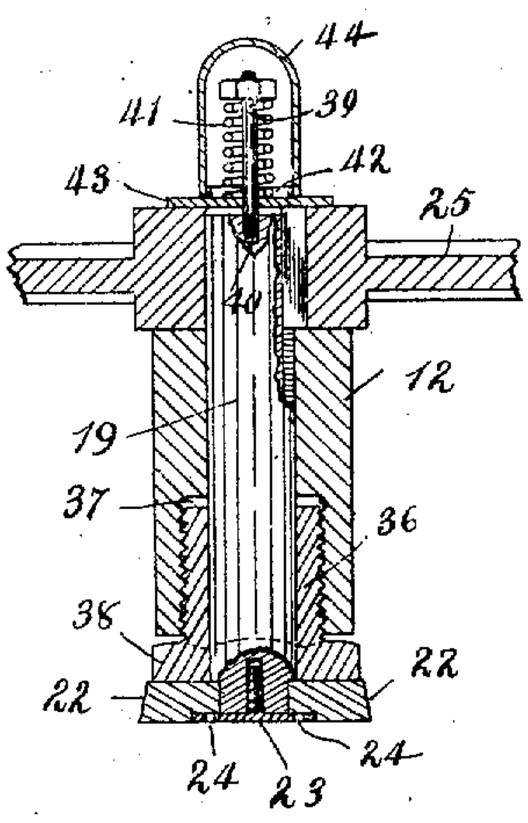


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

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SHEET-SHEARING MACHINE.

954,681. Specification of Letters Patent. Patented Apr. 12, 1910.

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To all whom it may concern:

Be it known that I, DAVID LENNOX, citizen of the United States, residing at Marshalltown, in the county of Marshall and State of Iowa, have invented certain new and useful Improvements in Sheet-Shearing Machines, of which the following is a specification.

My invention relates to shearing machines adapted to cut sheet metal or other material, and the chief objects of the improvements which form the subject matter of this application are:—to provide a simple, efficient and practical sheet shearing machine of novel construction that will be capable of cutting sheet material of varying gage either in straight lines or curves of different degrees; to produce a machine of the class specified that will cut in or out curves with equal facility; to furnish a shearing mechanism that will be rapid in its operation, and that can be applied to a wide range of work.

Other objects of this invention are to provide a shearing apparatus that will be strong and durable, having a mechanical construction requiring few parts that will not be liable to get out of order, and to furnish a machine of such design that it will be compact and may be manufactured and installed at a moderate outlay.

I accomplish the desired results by means of the apparatus illustrated in the accompanying drawing, which forms a part of this application, the important details of construction being disclosed in the following views.

Figure 1 is a side elevation of my improved shearing machine adapted to cut sheet material in curves, or straight lines; Fig. 2 is an end elevation, and Fig. 3 is an enlarged fragmentary view showing the upper cutter shaft, with its bearings in section.

Referring to the details of the drawing, the numeral 5 indicates a frame plate having marginal strengthening flanges 6, and base flanges 7, extending laterally to form a supporting foot plate. The said frame plate 5 is indented by a clearance slot 8 and the portion of the frame plate below said slot is provided with a lateral extension or arm 9, terminating in an integral cylindrical enlargement 10, arranged vertically, and bored longitudinally to form a shaft bearing or box in which is mounted a lower cutter shaft hereinafter described. The upper portion of the frame plate 5 is deviated or inclined laterally from the vertical, and upon the portion immediately above the slot 8, forming an upper frame arm 11, is mounted a cylindrical boxing 12, similar in dimensions to the box 10 but inclined at the same angle as the frame part to which it is attached. This box, or bearing, however, is not made integral, as in the case of the said lower box 10, but is attached to the said arm 11 by lugs 13, which slide in grooves 14 formed on the opposite sides of the supporting arm by the marginal flanges 6. The said lugs 13 are secured by bolts 15, which pass through slots in the arm 11. The box 12 is adjusted by screws 16, supported in ribs 17, arranged transversely on the said arm. In the said boxes 10 and 12 are mounted, respectively, a vertical lower cutter shaft 18 and an upper inclined cutter shaft 19. The upper arm 12 is shorter than the lower, and this brings the shafts out of alinement, the upper shaft lying nearer the main frame of the machine than the other.

The ends of the shafts project beyond their bearings and their approximated ends carry cutters in the form of disks 20, 21, having suitably beveled margins, as indicated at 22, and attached to the lower and upper shafts, respectively. The center of the upper cutter 21 coincides with the plane of the lower cutter 20, and the distance between the vertical plane coinciding with the axis of the upper inclined shaft 19, and the plane parallel thereto coinciding with the vertical shaft 18, is sufficient to permit the margins of the cutters to be in contact. The cutting disks are attached to their respective shafts by means of flat headed screws 23, which pass through central holes in the disks and engage threaded holes located axially in the shafts. The cutter disks are countersunk so that the heads of the screws will be flush with the surface and each screw head is furnished with holes 24 for the engagement of wrench points by means of which the screws are set. The ends of the shafts opposite the cutters carry beveled operating gears 25, meshing with pinions 26, mounted on shafts 27, journaled in bearings 28, the ends of the shafts opposite the pinions carrying gears 29. These gears are driven by a smaller gear 30, loosely mounted on a stud shaft 31, supported in a boss 32 on the main

frame and carrying a driving pulley 33, connected with the gear 30, and a loose pulley 34.

It will be noted that the manner of mounting and securing the cutter-shafts in their bearings differs in each case. The vertical shaft 18 has its lower end threaded to receive a suitable nut 35. The lower end of the inclined or upper shaft 19, is provided with an adjustable bearing, consisting of a threaded bushing 36, engaging a counterbore 37 in the box 12, and having its ends squared or angled to form a nut 38. The said shaft 19 is suspended in its bearings by means of a bolt screw 39 which engages a threaded hole 40 in the shaft axis. This bolt is prolonged beyond the box 12 and upon its body is mounted a strong coiled spring 41, bearing at its upper end against the head of the bolt, and at the other engaging a cup 42 on a bearing plate 43, supported upon the end of the box. The bolt 39 and spring 41 are covered by a suitable cap 44, which slips over the margin of said cup to form a protection for the bearings.

Since the upper shaft 19 is inclined to the horizon, its cutter blade 21 forms an angle with the coöperating blade 20, designated by the reference numeral 45, Fig. 2, and the advancing margin of the sheet to be sheared is introduced into the opening between the blades, the plane of the sheet being horizontal. As the said sheet (not shown) is pushed onward the cutting margins of the meeting disks, rotating in the direction of the arrows 46, will sever the material and at the same time tend to force the sheet onward in the proper direction, thus aiding the feeding process, and the efforts of the operator will be chiefly applied to the proper guiding of the sheet by deviating it laterally in order to produce shearing lines of desired direction. The manner of handling the sheet to produce the required results will be readily understood by one skilled in the art to which this apparatus belongs; thus when the sheet is advanced in a right line the result will be a straight cut and if the rear end of the sheet is swung to the right or left in the horizontal plane, the cut will be a curve or combination of curves, corresponding with the degree and uniformity of the deviations.

The cutters being subjected to more or less wear, the proper contact of the disk edges is maintained by necessary adjustment of the box 12 on the upper arm, and variations in the thickness of the material presented to the shearing elements are compensated for by the action of the coiled spring 41.

Having thus described my invention, what I claim as new, is:—

1. In a shearing apparatus, the combination with the main frame, of a pair of vertically arranged rotatable shafts having their axes inclined to each other, circular cutting elements mounted on the ends of said shafts, and having their margins approximated, means for adjusting one of said shafts laterally, means for adjusting the same shaft longitudinally, and means for rotating said shafts in opposite directions.

2. In a sheet shearing apparatus, the combination with the main frame, of a pair of shafts having their axes inclined to each other but not intersecting, circular cutting blades mounted on the said shafts and having their margins approximated, means for adjusting one of said shafts laterally, means for automatically adjusting the same shaft longitudinally, and means for operating said shafts.

3. In a shearing apparatus, the combination with a suitable frame, of a vertical shaft, a yielding inclined shaft, an adjustable bearing for said inclined shaft, cutting blades fixed on said shafts, said blades having approximated edges, and means for operating said shafts.

4. In a shearing apparatus, the combination with a suitable frame, of a vertical shaft, an inclined shaft, resilient means suspending said inclined shaft in its bearings, coöperating cutting blades on said shafts and means for operating the shafts.

5. In a shearing apparatus, the combination with a suitable frame, of a vertical shaft, an inclined shaft, a laterally adjustable bearing for said inclined shaft, means for yieldingly suspending said inclined shaft in its bearings, and coöperative cutting elements on said shaft.

6. In a shearing apparatus, the combination with a frame, a pair of shafts on said frame having axes inclined to each other but not intersecting, means for adjusting one of said shafts both laterally, and longitudinally, circular coöperating cutters on the shafts, and operative means for said shafts.

In testimony whereof I affix my signature in the presence of two witnesses.

DAVID LENNOX.

Witnesses:
E. W. WHINERY,
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