

(No Model.)

2 Sheets—Sheet 1.

A. J. DUNCAN.

MACHINE FOR SHEARING AND BENDING SHEET METAL.

No. 357,187.

Patented Feb. 8, 1887.

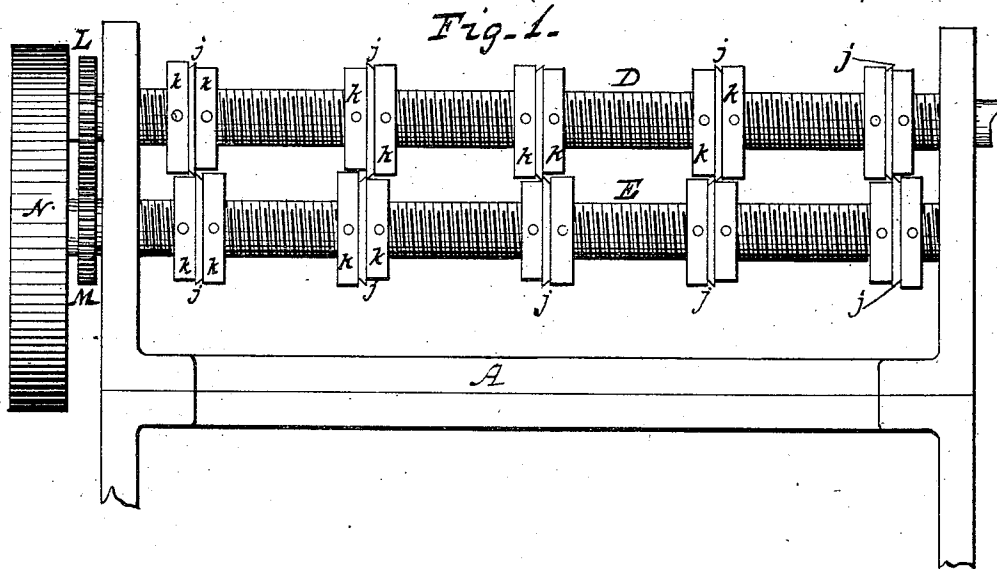
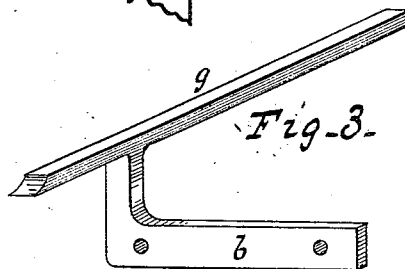
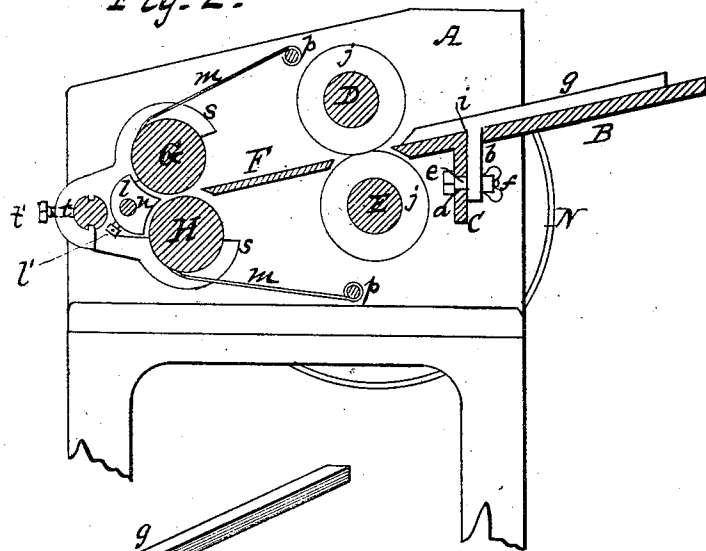


Fig. 2.



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(No Model.)

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Fig. 4.

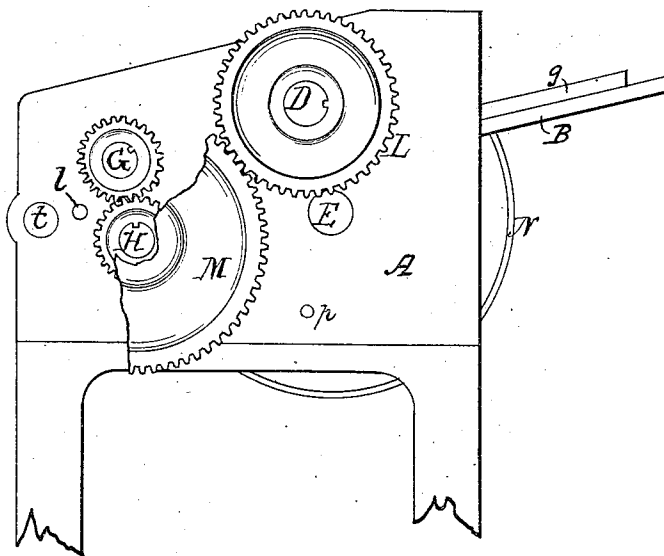


Fig. 5.

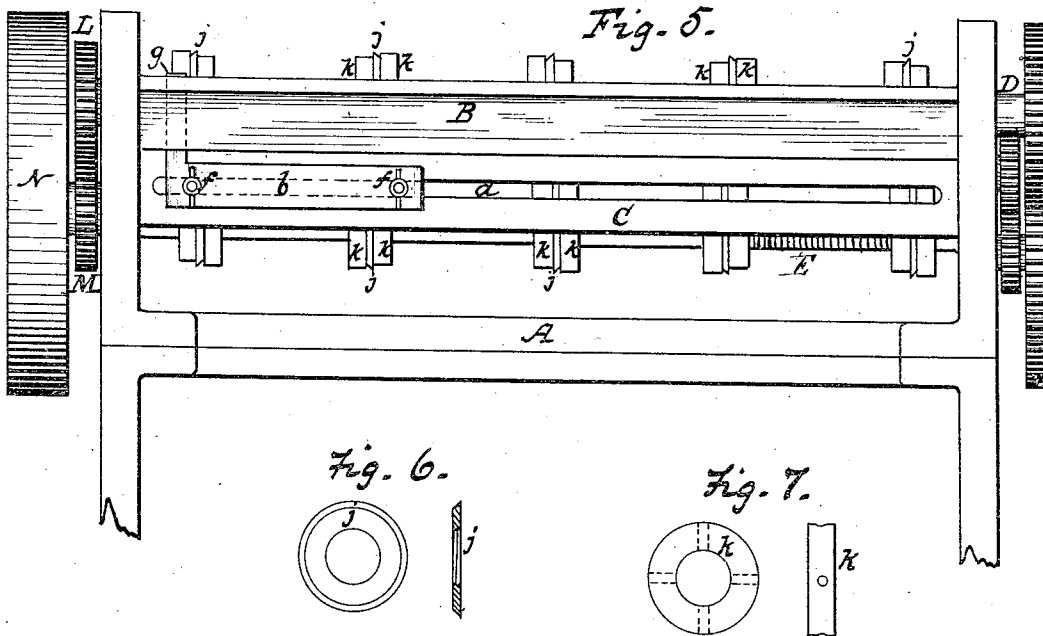


Fig. 6.

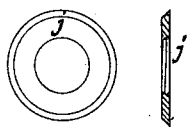
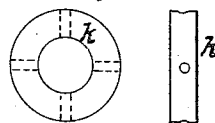


Fig. 7.



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UNITED STATES PATENT OFFICE.

ANDREW J. DUNCAN, OF PITTSBURG, PENNSYLVANIA.

MACHINE FOR SHEARING AND BENDING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 357,187, dated February 8, 1887.

Application filed December 4, 1884. Serial No. 119,516. (No model.)

To all whom it may concern:

Be it known that I, ANDREW J. DUNCAN, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and improved machine that by a single operation will cut, divide, and trim sheets of metal and bend the same into cylindrical form, of which the following is a specification.

The nature of my invention consists in such a construction, combination, and arrangement of parts comprised within a single machine as that by their conjoint action one or more sheets of metal may be rapidly cut and divided into suitably-sized pieces having parallel edges, and may be given a proper degree of cylindrical curvature as a preliminary step in the manufacture of various articles known to the art.

For the purpose of enabling others to fully understand, make, and construct a machine in accordance with my invention, I will proceed to describe it by reference to the accompanying drawings, wherein—

Figure 1 represents that portion of my improved machine wherein a number of bevel-edged circular knives or cutters are arranged and fixed on separate parallel shafts and each made adjustable by means of suitable collars; Fig. 2, a transverse vertical section of the entire machine; Fig. 3, a perspective view of a detached guide; Fig. 4, an outside end of the machine; Fig. 5, a front elevation of the same; Fig. 6, a plan and transverse section of one of the circular bevel-edged knives or cutters; Fig. 7, a front and edge view of one of the collars or nuts used in supporting and securing the knives or cutters on their respective shafts.

To put my invention into practice I erect a substantial frame, A, of suitable size and sufficiently strong to sustain itself without vibration against the action of the various moving parts combined therewith. Along the entire front of this frame A is placed and rigidly affixed thereto an inclined table, B, provided near its inner and lowermost edge with a longitudinal slot, *i*, running nearly its entire length, and having beneath a downwardly-extending broad flange or vertical rib, C, also containing another slot, *a*, corresponding with the former. Through the slot *i* in the table B the crooked arms *b* of the several guides *g* pass, each resting snugly against the face of

the broad flange beneath, where, by means of transverse bolts *e* and suitable thumb-screws, *f*, they are securely held in place, and may be adjusted along said slots, whereby the guides *g* can be separated or brought near together on top of the table B to suit different widths of sheet metal, always preserving a parallelism with each other in a direction corresponding with the line of feed.

Near the lower edge of the table B are a pair of horizontal shafts, D E, one above the other, each having a screw-thread cut thereon its entire length, and provided with a number of bevel-edged circular knives, *j*, arranged in pairs, or so that each knife, *j* of one shaft shall be in close contact with its companion knife on the other shaft, and in a condition to readily divide any thin sheet metal that may be directed between them. These several cutters or circular knives *j* are made adjustable on their respective shafts, and prevented from turning thereon each by means of a jam-nut, *k*, embracing them on opposite sides, whereby the cutters may be set or gaged within reasonable limits to or from each other, so that sheets of metal may be cut and divided into strips of uniform or different widths.

Just behind the array of circular cutters *j* is placed and arranged a downwardly-inclined platform, F, for receiving and conveying the freshly-cut sheets to and between a pair of long rolls, G H, of suitable diameter and proper distance apart, which are so geared together and to the aforesaid cutter-shafts D E, by means of connecting cog-wheels L M, as to rotate therewith and in a proper direction, power being applied through the instrumentality of a belt operating in conjunction with a large pulley, N, on the outer end of one of them. Back of these rolls G H, and lengthwise of the same, is a stout rod, *l*, rigidly secured to the sides of frame A, and provided with several deflectors, *n*, each consisting of a block of metal having receding curves that lead up and down, each corresponding to the approximate face of its nearest roll, and nearly in contact therewith. These several deflectors *n* are adjustable along the rod *l* by means of set-screws *l'*, and, if desirable, the said rod may, by suitable means, be adjustable outward from the rolls G H to suit the formation of different-sized articles. On a line between each pair of cutters and ex-

tending back over the rolls G H are arms *s*, that connect with a grooved bar, *t*, along the rear of the machine. These curved arms are designed to serve as guides for the strips of metal sheared from the sheet, and they are rigidly held against vibration by tongues formed on them entering grooves in the rigidly-fixed bar *l*. By means of set-screws *l'* the arms are made laterally adjustable on their bar, for the purpose of adapting them to the lateral adjustments given to the cutters *j*.

Attached to the main frame A are two aprons, *m*, one for each forming-roll, which aprons consist of a strong metallic sheet that extends from its fastened edge *p* to and rests upon the curved surface or periphery of its adjacent roll without being connected thereto.

The circular nuts *k*, that serve to hold and adjust each cutter *j*, are of different sizes, those on the bevel-edged side of the cutter being the largest and of equal diameter therewith, while those on the opposite side are smaller, whereby the blanks or sheets of metal undergoing the process of cutting, trimming, and dividing are prevented from clinging to the cutters or wedging between them.

The feed-table B, circular knives *j*, and forming-rolls G H are arranged on the same general incline, which may be of any degree best suited for the purpose; and, if desirable, the machine can be used as an ordinary slitting or trimming machine by simply detaching the forming-rolls, or as an ordinary forming-machine by a removal of the cutters or circular knives, the different parts being constructed to readily admit of such a change or removal. Having thus described my invention, I

1. In a machine for shearing and bending sheet metal, the combination, with the frame Δ and its inclined slotted table B, of the angular laterally-adjustable guides applied to said table, as described, the parallel rotative screw-threaded shafts bearing circular cutters, and clamping-nuts adjustable on said shafts, the inclined platform F, the rolls G H, the laterally-adjustable deflectors *l*, and the aprons *m*, fixed at their front ends and at their opposite ends impinging against the said rolls, all constructed and adapted to operate substantially in the manner and for the purposes described.

2. The combination, with the rotative screw-shafts and circular beveled-edge cutters, of clamping-nuts *k*, those on the beveled-edge sides of the cutters being of nearly equal diameter with the cutters and those on the opposite sides of the cutters being smaller, as shown and described, whereby the sheets of metal while being cut are prevented from wedging between or clinging to the cutters, as specified.

3. The combination, with the main frame, its inclined table and platform, and the circular laterally-adjustable cutters, of the rolls G H, the deflector *n*, aprons *m m*, and curved arms *s*, secured to the grooved bar *t*, and adapted to serve as guides for the strips of metal while being bent, substantially as described.

ANDREW J. DUNCAN.

Attest:

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