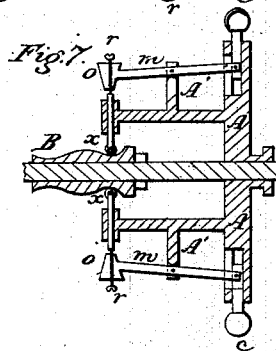
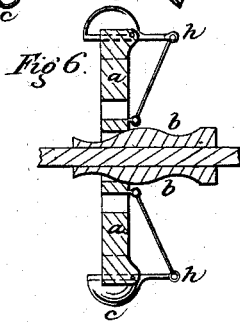
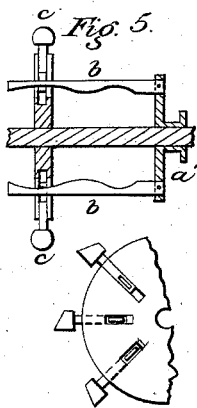
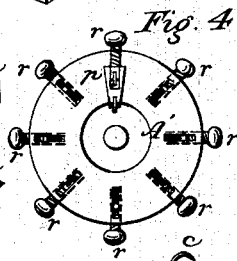
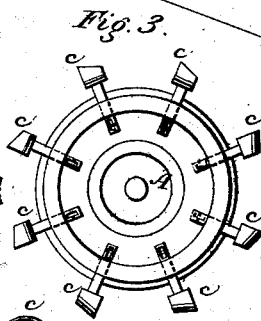
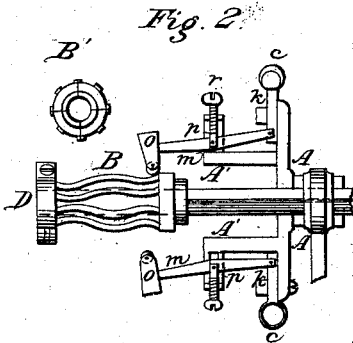
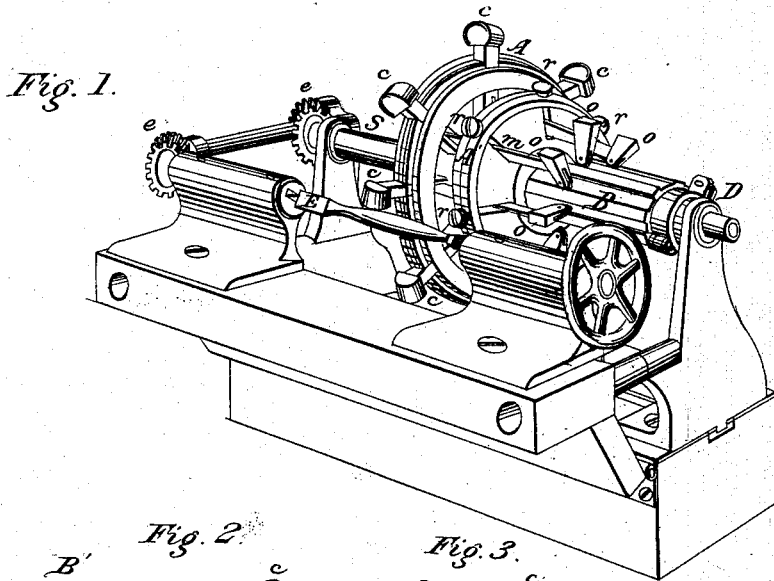


L. B. MILLER.  
CUTTING IRREGULAR FORMS.

No. 26,567.

Patented Dec. 27, 1859.



Witnesses:  
L. O. Miller  
Daniel F. Thompson

Inventor:  
L. B. Miller

# UNITED STATES PATENT OFFICE.

LEBBEUS B. MILLER, OF NEWARK, NEW JERSEY, ASSIGNOR TO AARON D. CRANE, D. F. TOMPKINS, L. B. MILLER, C. T. TOMPKINS, AND DANL. HOLSMAN.

## MACHINE FOR TURNING IRREGULAR FORMS.

Specification of Letters Patent No. 26,567, dated December 27, 1859.

*To all whom it may concern:*

Be it known that I, **LEBBEUS B. MILLER**, of the city of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Machines for Cutting Irregular Forms, known as the "Crane" lathe, invented by Aaron D. Crane, of the said city of Newark, and for which said invention Letters Patent of the United States were granted him, bearing date the 15th day of August, 1854; and I do hereby declare that the following is a full, clear, and exact description of all my said improvements, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the essential parts of the said Crane irregular form machine exhibiting my improvements in the cutter head thereon, and Fig. 2 is a perpendicular section of the cutter wheel of the said improved machine, together with a perspective view of the consolidated cams or former B, together with a transverse section B' of said consolidated cams or former. Fig. 3 is a view of the main or cutter disk of the cutter wheel showing the knife thereon, and Fig. 4 is a view of the smaller or fulcrum disk of the cutter wheel showing the arrangement of the sliding fulcrum or rest of the knife levers as invented by me and the screws by which said knife levers are adjusted. Figs. 1, 2, 3, and 4 are all that appertain directly to my invention. The remaining Figs. 5, 6, and 7 are introduced for the purpose of more clearly indicating and describing my invention, and also serve to show the successive stages of modification of the knives thereof adopted and used by said Aaron D. Crane in and about his said lathe, subsequent to the granting to him of said Letters Patent and prior to my improvements as herein described.

The same letters indicate like parts in all the drawings.

In Fig. 1, A, A', is the cutter head, arranged with any required number of knives, (in this case 8 knives only are introduced, but ordinarily from 28 to 30 knives are employed.) E, is the material to be cut, and is held in center and revolved at precisely the same rate of speed as the cutter head, the two being connected together by the gearing e, e, (Fig. 1,) and driven by means of a belt running on a pulley adjusted on

the cutter shaft at S, the principle upon which the Crane's lathe operates being such that each one of the knives cuts its own peculiar section, returning at each revolution to meet the wood at precisely the same longitudinal line on its circumference. It becomes necessary in order to produce an irregular form (the circumference of which shall be divided longitudinally into plane sections as above) that the knives c, c, c, (Fig. 1,) should be moved longitudinally from left to right or from right to left, along and in contact with the said wood as the cutter head and said wood revolves, and that said knives should also respectively be moved in toward or out from the center of said cutter head as may be necessary from the nature of the work to be done. To accomplish the first, the cutter head is moved longitudinally to and fro on the shaft S by means of appropriate attachments, but which however are not shown in the drawing Fig. 1, as said attachments are not essential to illustrate the improvements made by me, and the cutters c, c, c, are moved out and in from the center of A, as required by means of their centrifugal force, and the use of the consolidated cams or former B, (Figs. 1, and 2,) which is slowly moved from left to right, or from right to left, and into or out of the cutter head, as the work progresses. The shaft S, the cutter head A, and the consolidated cams or former B all revolve together, A and B being subjected while revolving to the lateral movements respectively above described.

The consolidated cams or former B is made in four or more sections as represented at B', Fig. 2, of metal or wood and is held onto the cylinder to which it is attached by means of the strap seen at D, Figs. 1 and 2. B is moved to the right or left by means of appropriate attachments which do not appear in the drawing, as such movements may be accomplished in any desired or approved way, and is not essential to my improvements. The cutters c, c, c, with the knife stocks attached thereto are adjusted to slide freely in and out, to and from the center of the cutter head A, A', and into the central ends of said knife stocks are fitted the knife levers m, m, m, (Figs. 1 and 2,) and attached to the other end of the levers m, m, m, are the counterbalances o, o, o. The levers m, m, m, are pivoted at their centers

in the disk A', as represented, and are attached by means of a crotch and pin to the sliding fulcrum or rest seen at *p, p*, (Figs. 2 and 4,) and adjusted in the fulcrum disk A' of the cutter head A, A'. These fulcrums or rests *p, p* are adjusted at suitable distances from the center of motion by means of the screws *r, r*, (Figs. 2 and 4) thereby giving the required set to the knives *c, c, c*.

The weight of each of the cutters *c*, together with its knife stock *k*, is somewhat greater than the weight of the counter balance O at the other end of the levers *m*, so that when the machine is in motion the centrifugal force of *c* being somewhat greater than the centrifugal force of O, the effect is to keep O pressed down and in constant contact with the consolidated cams or former B. The small rollers seen on the ends of O, O and resting on B are for the purpose of lessening the friction occasioned by the movements of B, in contact with O, when the machine is in operation.

The operation of the improved machine is as follows: The cutting head A, A' and material E being set to revolving at a high rate of speed, the centrifugal force will throw the cutters *c, c, c* as far out as they can go, and until the small rollers in O, O are brought in firm contact with the consolidated cams or former B. The material E is then thrown up into contact with the said cutters *c, c, c*, (the machine being so constructed as to permit this) and the cutter head is then brought to move along the shaft S in a direction longitudinal to the work, and the consolidated cams or former B is also brought to move along the said shaft S in a longitudinal direction and at the proper speed, and into or out from the said cutter head by means of the contact of the rollers in O as aforesaid, causing the said cutters *c, c, c* to assume and change their position as the work progresses, corresponding exactly with the conformation of the different sections of said consolidated cams or former.

In Fig. 5 is shown substantially one of the first methods employed by said Crane to control the cutting knives by means of the

cams *b, b* referred to by him in the specification of his said patent. No counter balances were employed and the cams *b, b* were separate and apart from each other, and separately attached to the disk *a'*.

In Fig. 6 is shown another method employed by him, in which the knives are counter balanced at *h* and the cams *b, b* are still separate and apart and are attached substantially as in Fig. 5.

In Fig. 7 is shown the improvements claimed by me, viz., a fulcrum disk A', the lever *m*, and counter balance O, attached to said levers, and the consolidated cams or former B. The difference between the cutter heads of Fig. 7 and Fig. 1 being found essentially in the removing in Fig. 7 of all the cutter head projecting to the left of A', and by bringing O down into contact with B, and thus dispensing with considerable weight in the fitting and use of the sliding pieces *x, x*, with the rollers attached thereto.

Having thus (in order that there may exist no misapprehension) clearly and freely described the said Crane's lathe with my improvements, together with the material steps made by him and myself leading to such improvements, I will proceed to point out and to claim specifically the improvements invented by me as aforesaid.

What I claim therefore as my invention and desire to secure by Letters Patent of the United States, is—

1. The double disk cutter head A, A', constructed substantially in the manner and for the purposes described.

2. I claim the consolidation of the separate cams *b, b*, Figs. 5 and 6, into a solid former or consolidated cams B, Figs. 1, 2, and 7, and the use of such consolidated cams or former in combination with the said Crane's lathe.

3. I claim the use of the levers *m, m*, Figs. 1 and 2, formed and adjusted in the cutter's head substantially as described.

LEBBEUS B. MILLER.

Witnesses:

S. W. MILLER,  
JAMES M. HULME.