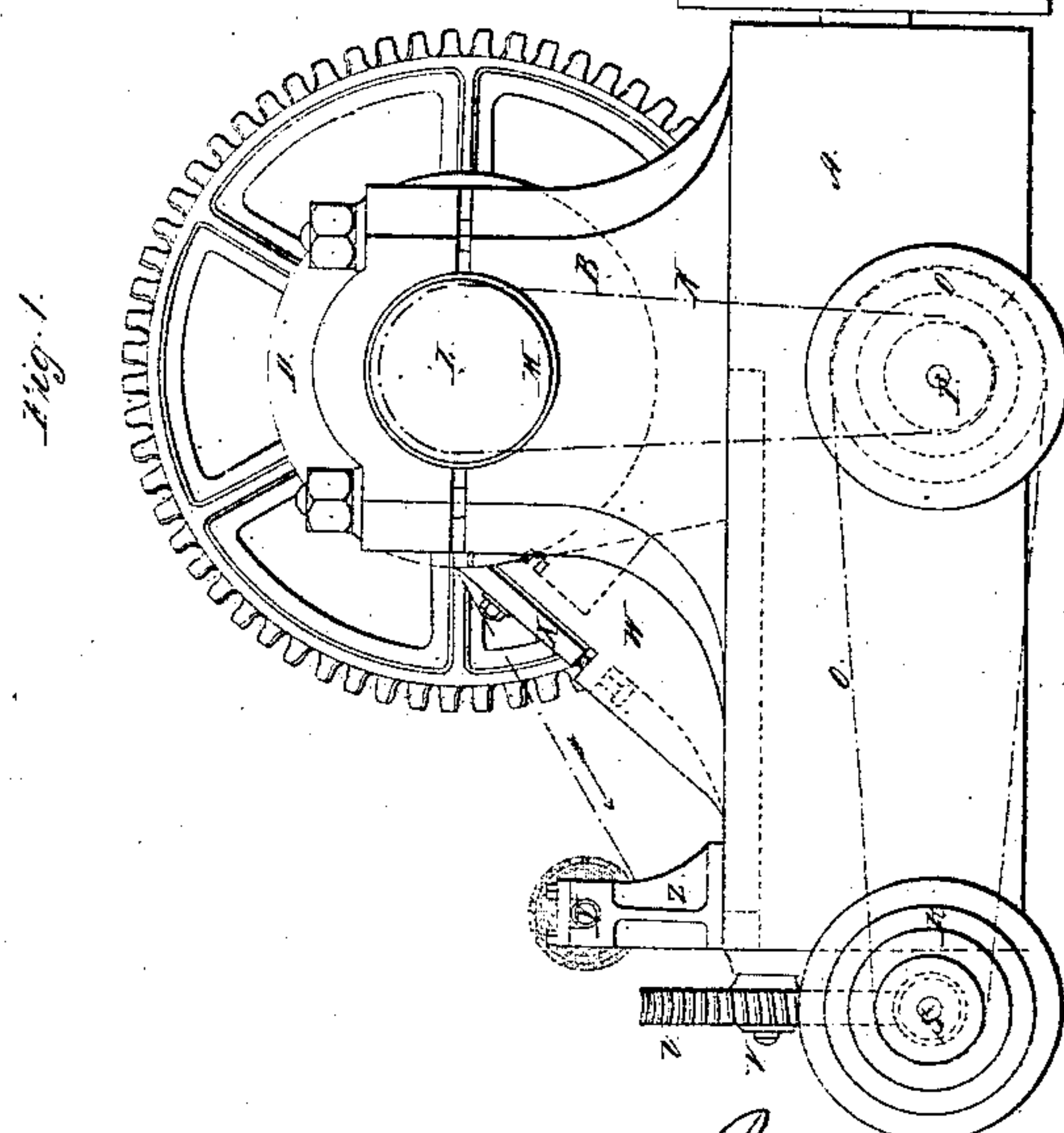
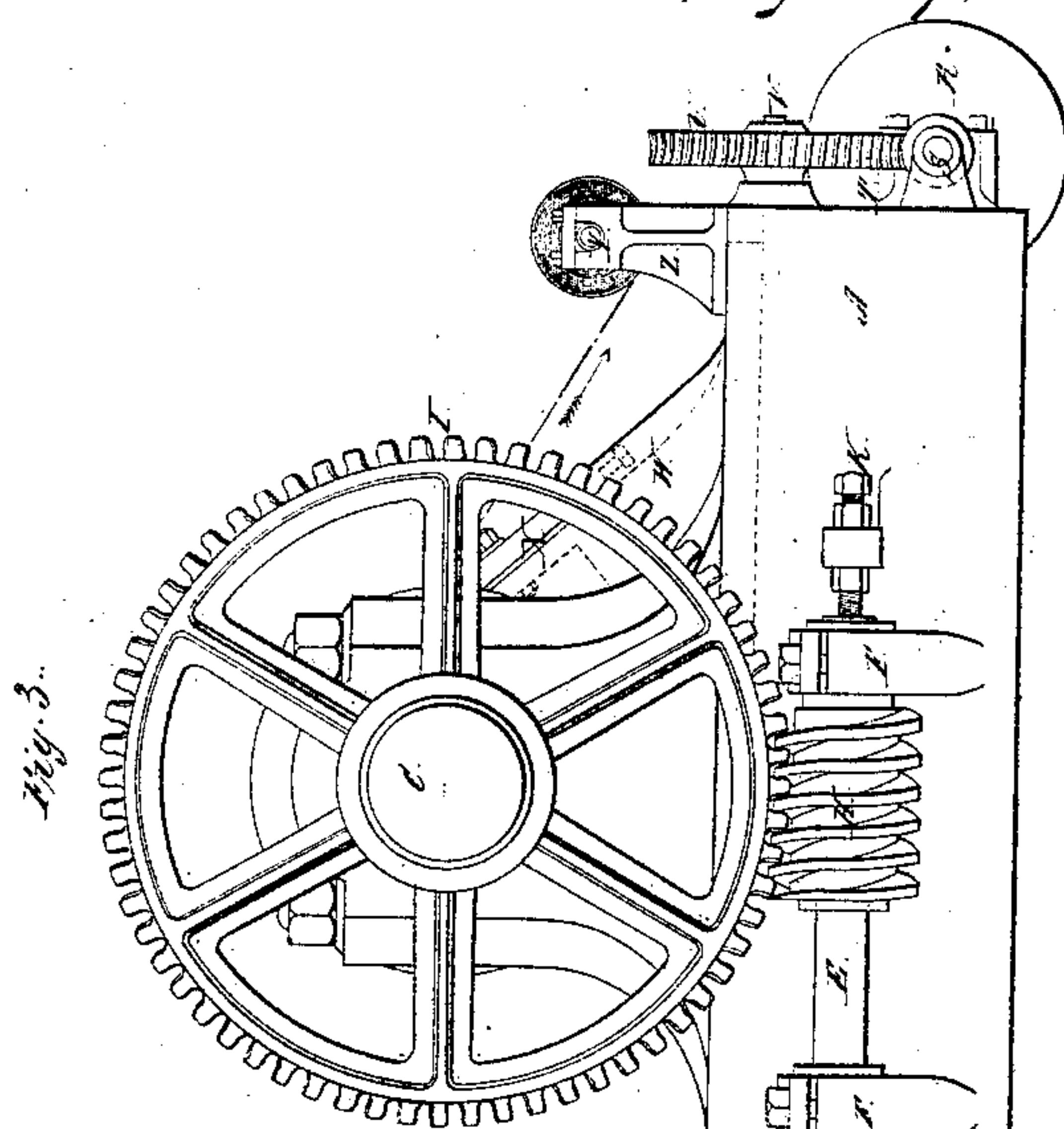
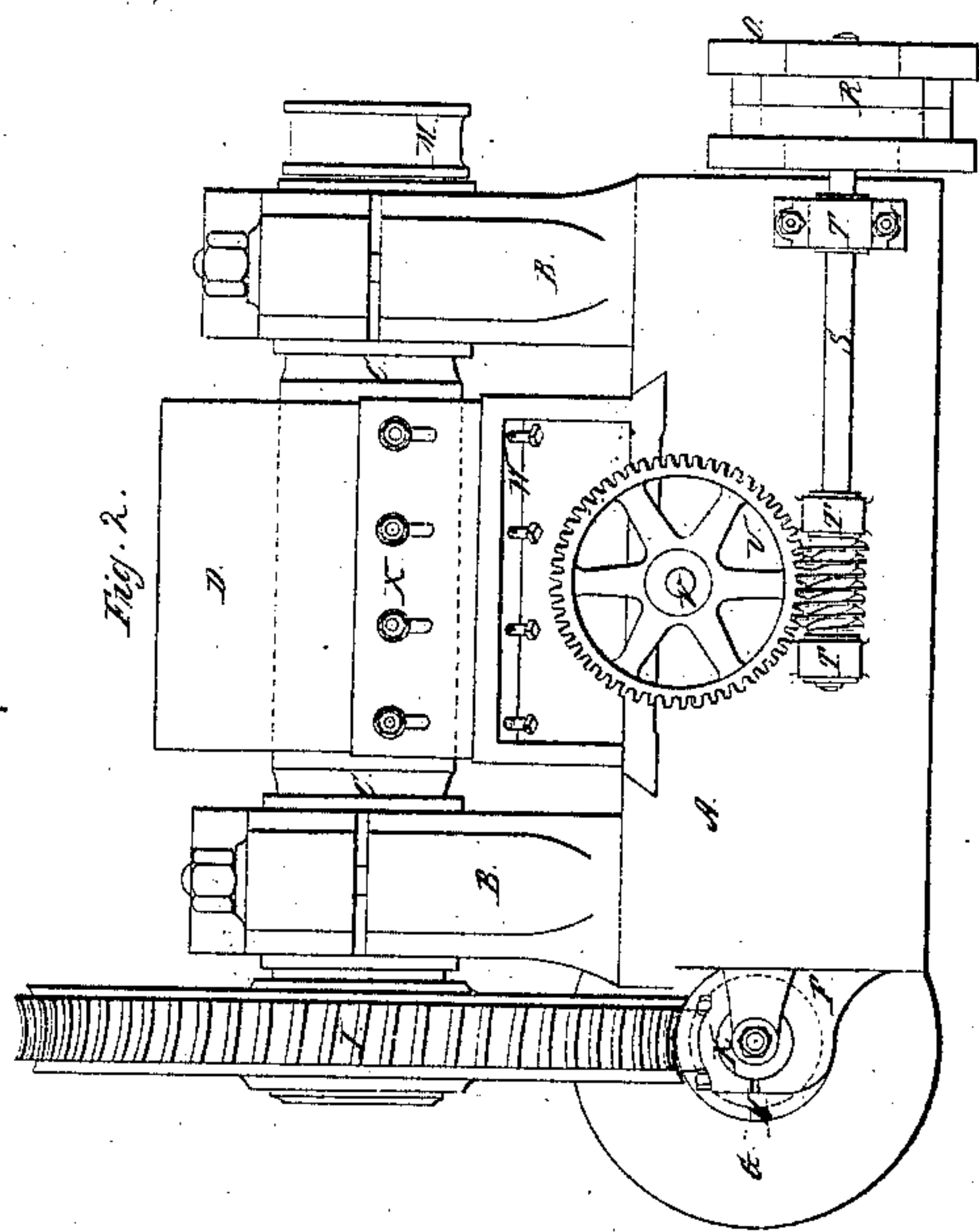


H. W. Wimbhurst, Making Sheet Iron,

N^o 25,601.

Patented Sep. 27, 1859.



Witnesses:
W. Sash
W. Farfox.

Inventor:
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UNITED STATES PATENT OFFICE.

HENRY WM. WIMSHURST, OF DALSTON, GREAT BRITAIN.

SHEET METAL.

Specification of Letters Patent No. 25,601, dated September 27, 1859.

To all whom it may concern:

Be it known that I, HENRY WILLIAM WIMSHURST, of Dalston, in the county of Middlesex, England, gentleman, have invented certain Improvements in Manufacturing Sheet Metal; and the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known and of the usual manner of making, modifying, and using the same, reference being had to the drawings hereunto annexed and to the letters and figures marked thereon—that is to say:

My said invention relates to the manufacture or production of sheet metal, as for example lead and tin foil, as an article of manufacture and trade in a more expeditious and economical manner than has heretofore been the case, by cutting the same from a block or solid mass by means of a cutting mechanism, in lieu of rolling or beating the same by means of a rolling or beating mechanism.

In the ordinary mode of making sheet metal, either cast pigs of the metal are subjected to rolling pressure under several pairs of rollers, or when partially laminated a number of sheets are placed on each other, and either passed through a pair of rollers whose centers are made gradually to converge, or the said number of sheets so placed together are acted upon by a hammer until reduced to the required thickness.

By my improved process, either a cylinder or block of the metal intended to be formed into sheets is first cast in a mold, and then acted upon by a knife or cutting tool for its reduction to the sheet or foil form. When the cylindrical form is primarily adopted, the detail may be somewhat as follows: A spindle or shaft of iron or other metal is provided, the ends of which are turned so as to fit truly into bearings or journals. The center of this spindle is either fluted or tinned, so as to allow of a perfect combination between it and the metal to be cut into foil or sheets. This spindle is placed in a cylindrical mold, and the metal is cast around it to the desired length and diameter. The spindle with the metal thereon is then placed in its bearings in a machine somewhat similar to a turning lathe, and made to revolve by steam or other power. A knife or cutter of the length of the cylinder of metal is gradually brought

near to the cylinder by means of wheel-work or by any other convenient means (the cutter being supported on a sliding frame), and a continuous shaving or sheet of the metal is thereby taken from the cylinder until the whole of the metal (or nearly so) is removed from the shaft or spindle.

When the rectangular or block form is adopted, the block of metal may be placed on the bed of a machine somewhat similar to an ordinary planing machine, the knife being fixed over the block, and made to descend a certain fixed distance just before the block of metal is pressed forward past the cutting edge of the knife, whereby a sheet of the metal of the size of the block is produced at each forward stroke of the machine. If preferred, the knife or cutter may be made to move, and the block remain stationary.

Although I have described in detail two modes of carrying this invention into practice, I do not intend to limit the arrangements to those details, as my invention essentially consists in the production of sheets of metal by means of any arrangement of cutters in place of producing such sheets by means of rolling, or beating, or crushing mechanism. And in order that my said invention may be fully understood, I shall now proceed more particularly to describe the same, and for that purpose I shall refer to the several figures on the sheet of drawings hereunto annexed, the same letters of reference indicating corresponding parts throughout all the figures.

Figure 1 of my drawings represents an end elevation of an arrangement of my machinery or apparatus for producing sheets of lead, tin, or other ductile metal or alloy; Fig. 2 is a front elevation of the same; and Fig. 3 is an elevation of the opposite end of the machine to that shown at Fig. 1.

A is a cast-iron bed plate having two strong vertical pillow blocks B, B, cast on the upper face thereof, which constitute the bearings for the reception of the metal cylinder C, which is formed with large journals, so as to enable it to rotate steadily in its bearings. This metal cylinder before being placed in its bearings has a cylinder of lead D or other ductile metal intended to be reduced to sheets or foil cast over it in a suitable cylindrical mold, the supporting metal cylinder being laid carefully in the mold, so as to be in a perfectly central position, and

therefore concentric with the lead or other ductile metal cylinder cast around it; or this operation may be performed without removing the cylinder C from its bearings
 5 by inclosing it in a cylindrical metal mold, which is divided in the direction of its axis, and provided with suitable fastenings for holding it together while the metal is being cast.

10 A stream of cold water may be allowed to flow through the center of the cylinder C during the operation of casting, for the purpose of cooling the metal from the interior gradually toward the surface or exterior, whereby a more solid and homogeneous casting is obtained than when such casting is allowed to cool from the outer or exterior surface toward the interior. The surface of the supporting cylinder may be
 20 fluted, grooved, or tinned for the better holding of the lead cylinder, and preventing all chance of its becoming loose on the supporting cylinder. The combined cylinders are then placed in the machine, as shown in the drawings, and the plummer blocks are tightened up. A slow rotatory motion is imparted to the cylinders from the driving shaft E, which works in bearings F, F, cast on the side of the bed plate, and carries a
 30 cone driving pulley G and endless worm H, which latter gears into a corresponding worm wheel I, fast on one end of the supporting cylinder C. In order to prevent back lash, a longitudinal adjustment of the
 35 worm H is effected by the end adjusting screw K. The supporting cylinder C is extended beyond its bearing at the opposite end to that which carries the large worm wheel, so as to form a pulley M. This pulley imparts motion by means of a belt N
 40 to a cone pulley O, keyed on to the shaft P, which works in suitable bearings in the opposite sides of the bed plate, and is parallel to the axis of the cylinder C. This cone pulley gives motion by means of a belt Q
 45 to the cone pulley R, fast on one end of the shaft S, which works in bearings T, T, cast on the front side of the bed plate. This shaft carries an endless screw or worm,
 50 which gears into and drives the worm wheel U, fast on one end of a V-threaded screw spindle V, which works through a fixed nut in the under side of the slide W, suitable adjustments being adopted for preventing back
 55 lash of the slide W. This slide works accurately in grooves made for that purpose in the surface of the bed plate, and it carries the cutting tool X, such tool being so fitted to the slide by means of slots and screw
 60 bolts as to be readily adjusted in its position on the slide, as will be easily understood on referring to the drawings.

It is obvious that the rotation of the cylinder C will cause the slide W with its cutting tool to advance constantly toward the

center of the cylinder, and that the knife will thereby produce a continuous shaving or sheet. When found requisite a stream of water or other lubricant may be kept flowing over the cutting tool, but in most cases
 70 this will not be necessary. As the cutting edge extends along the entire length of the metal cylinder D, and is adjusted so as to be perfectly parallel to the axis of such cylinder, it follows that a continuous sheet of
 75 metal will be turned off from the cylinder D, the thickness of such sheet depending upon the advance made by the cutting tool during each revolution of the cylinder under treatment. Thus, by suitably adjusting the
 80 belts N and Q on their respective cone pulleys, the advance of the knife may be accelerated or retarded, in the first case producing a comparatively thick sheet or foil, and in the second case a thinner one. 85

The continuous sheet or foil, as fast as it is cut, is received on to the collecting spindle Y, which is carried in bearings in the brackets Z and driven either by the machine itself or by the attendant. If found desirable, a
 90 pair of friction drawing rollers may be employed for the purpose of drawing the sheet or releasing it from contact with the cutting edge of the knife as fast as it is cut from the cylinder or block, such friction drawing
 95 rollers, with the sheet or foil passing between them, being held together by springs, and actuated by the machine itself through the intervention of regulating friction gear.

It may here be observed, that although I
 100 have illustrated a means of producing sheet metal or foil by cutting such sheet from a cylinder, to which a rotatory motion is imparted after the manner of ordinary lathe turning, I wish it to be distinctly understood
 105 that I do not confine or restrict my invention to any particular construction or arrangement of machinery or apparatus for manufacturing sheet metal or foil so long as the essential feature of my invention,
 110 namely, the use of a knife or cutting tool for such purpose, in lieu of rolling or beating mechanism, be retained. For example, sheets of foil may be produced from a rectangular block placed horizontally on the
 115 bed of an ordinary metal planing machine, or placed vertically in a slotting machine, the knife or cutter being of the same width as the block operated upon or of the sheet to be produced, whereby a sheet of foil will be
 120 cut or shaved off the block at every stroke of the cutter or traverse of the block beneath such cutter. It is obvious that the actual cutting motion may be derived either from moving the cutter or the metal to be cut. 125

Having now described and particularly ascertained the nature of my said invention and the manner in which the same is or may be used or carried into effect, I would observe in conclusion that I do not confine or
 130

restrict myself to the precise details or arrangements which I have had occasion to describe or refer to, as variations may be made therefrom without deviating from the principles or main features of my said invention; but

What I consider to be novel and original, and therefore claim as the invention to be secured to me by Letters Patent for the United States is:—

I claim the improvement herein described in the manufacture or production of sheet metal or metal foil as an article of manu-

facture and trade, by cutting the same from a block or solid mass by means of a cutting mechanism, in lieu of rolling or beating the same, by means of rolling or beating mechanism, as this has heretofore been done. 15

In testimony whereof I have signed my name to this specification before two subscribing witnesses. 20

HENRY WILLIAM WIMSHURST.

Witnesses:

J. HENRY JOHNSON,
THOS. A. BYRNS.