No. 777,779. PATENTED DEC. 20, 1904.

H. G. DITTBENNER.

SAWMILL HOG.

APPLICATION FILED NOV. 10, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

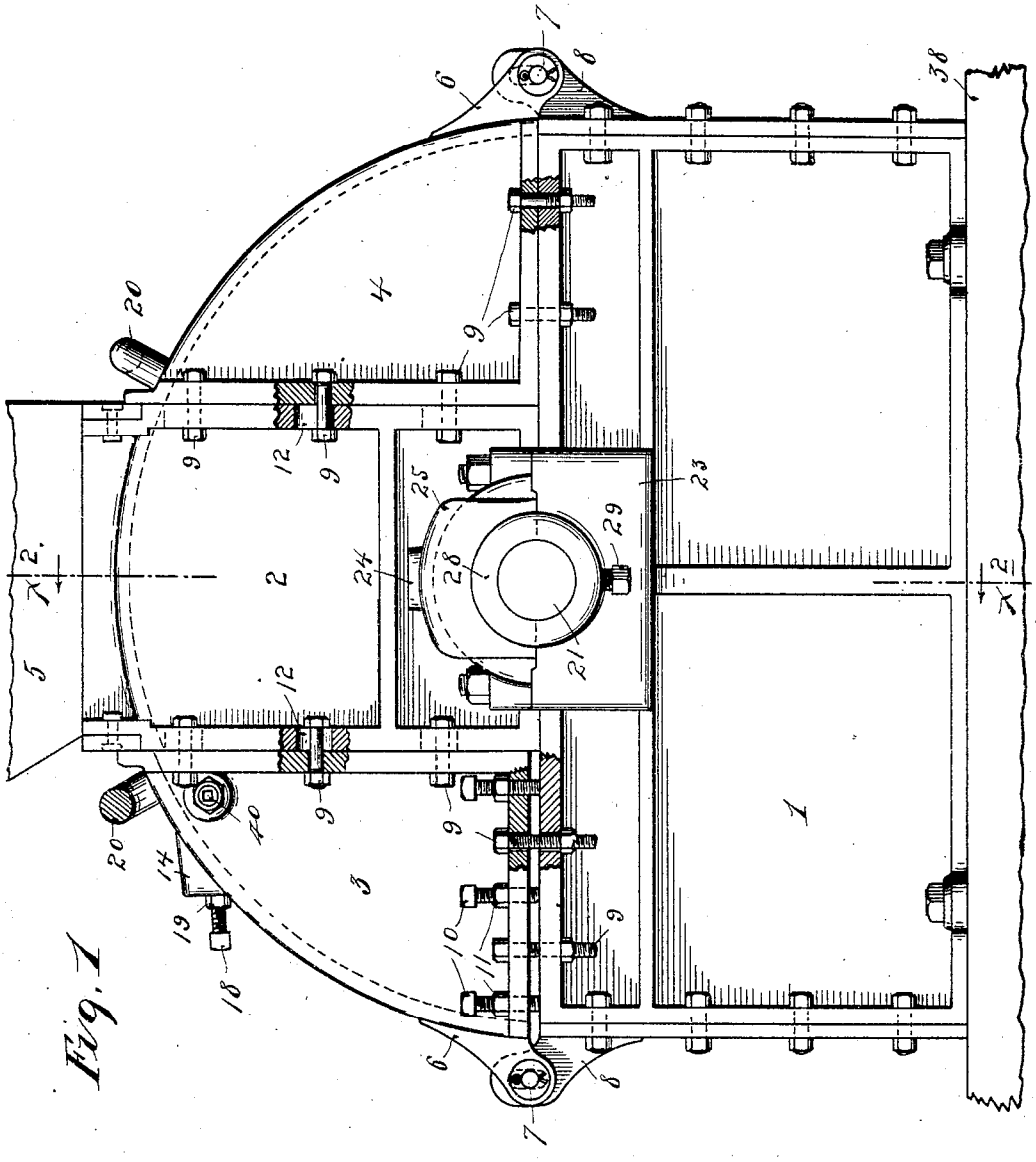


Fig. 1.

Witnesses.
N. D. Kilgore
A. H. Opsahl.

Inventor.
Hermann G. Dittbenner.
By his Attorneys,
Williamson & Merchant

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NO MODEL. 4 SHEETS—SHEET 2.

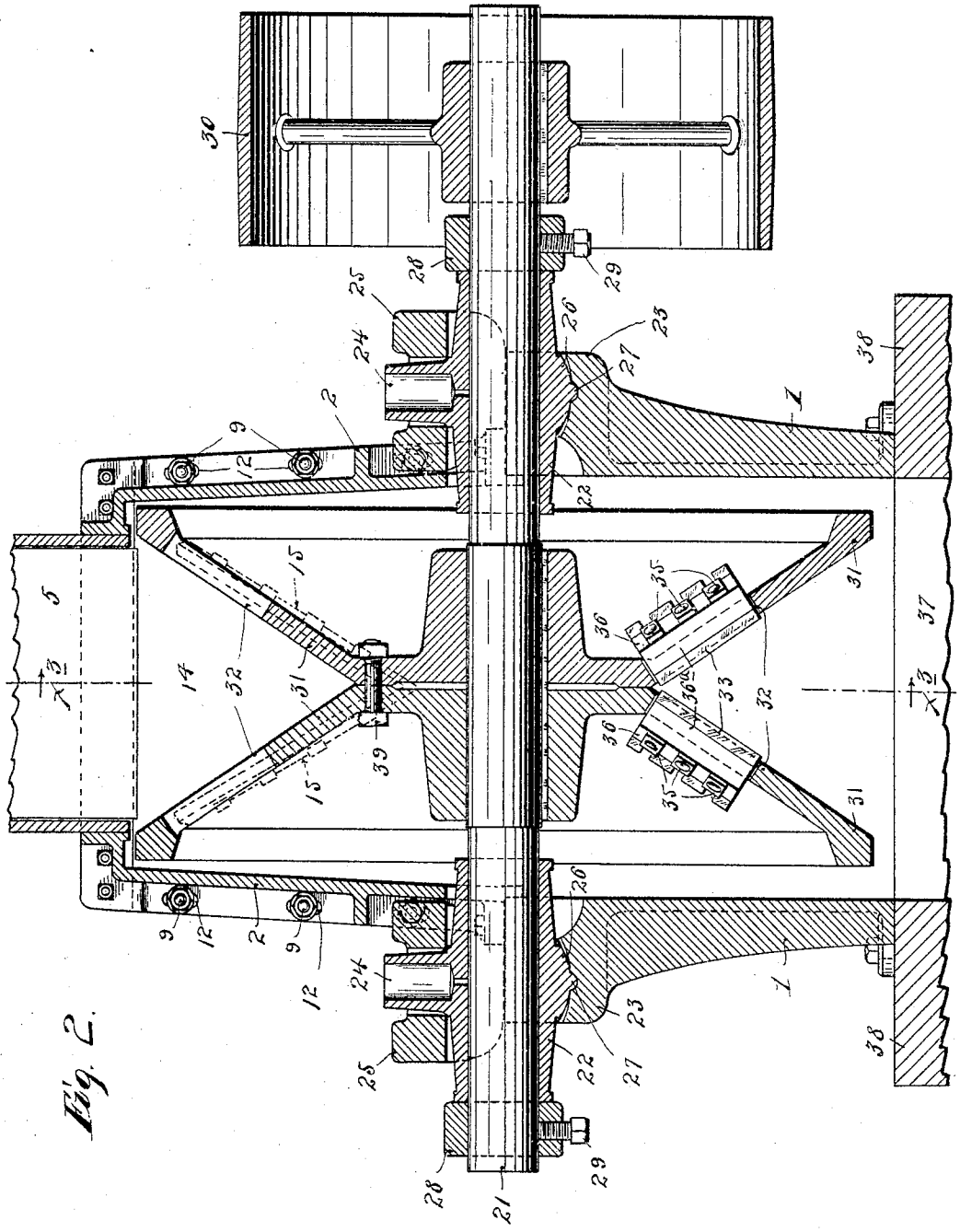


Fig. 2.

Witnesses.
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NO MODEL. 4 SHEETS—SHEET 3.

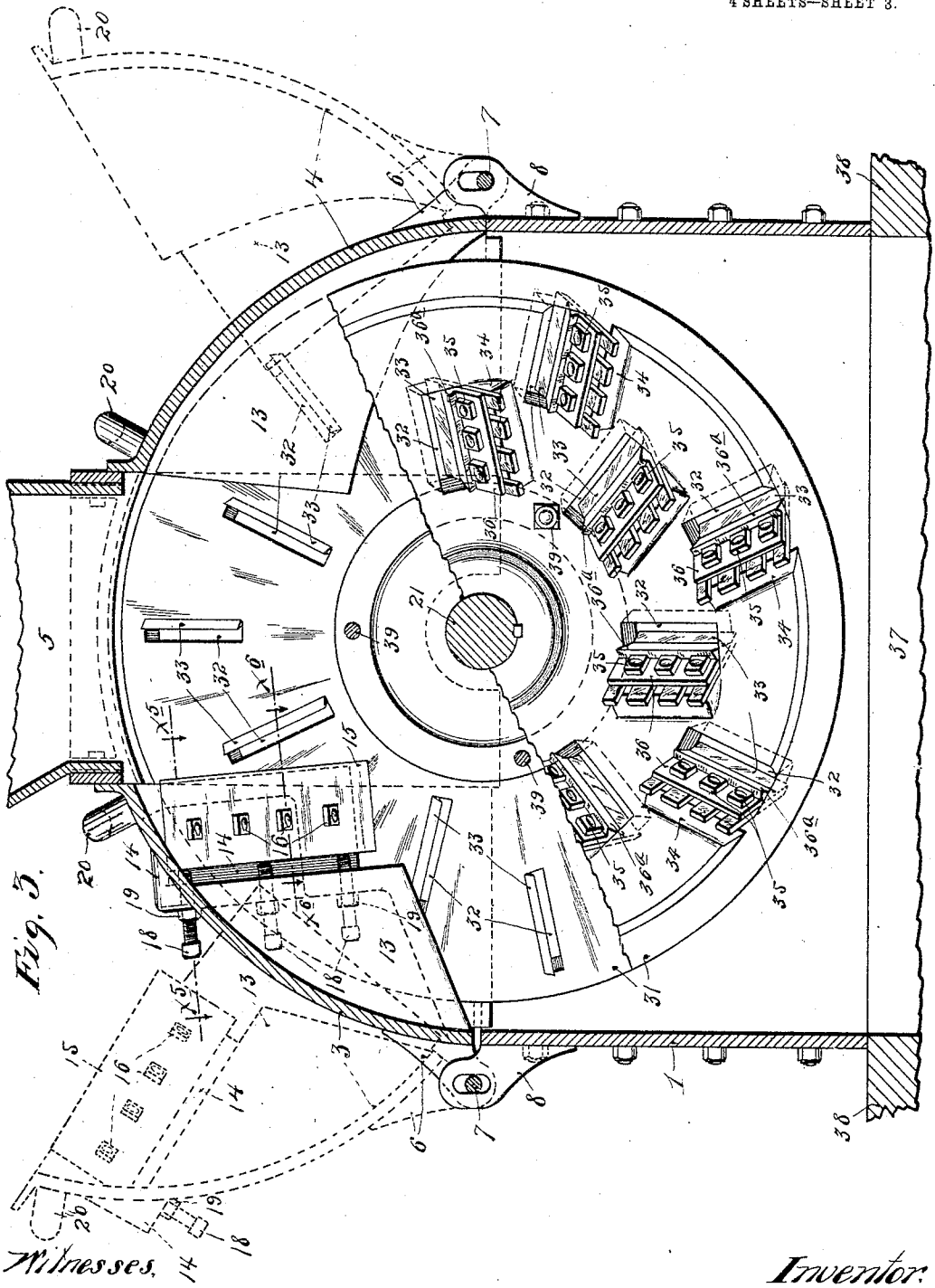


Fig. 3.

Witnesses,
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APPLICATION FILED NOV. 10, 1903.

NO MODEL. 4 SHEETS—SHEET 4.

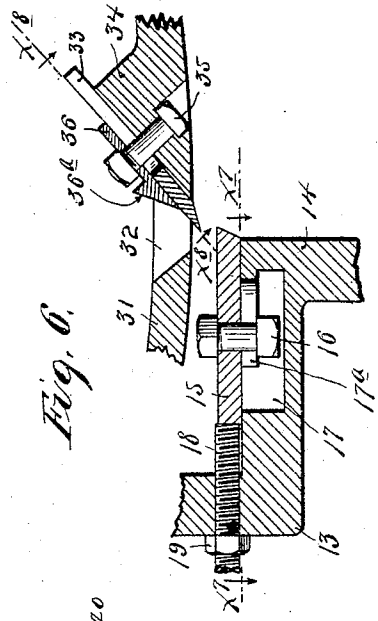


Fig. 6.

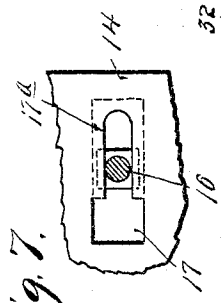


Fig. 7.

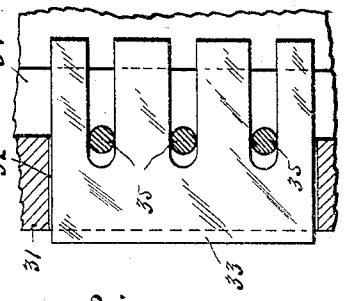


Fig. 8.

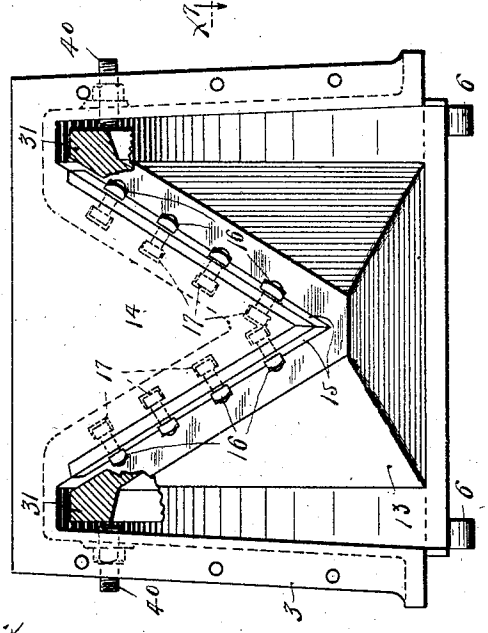


Fig. 4.

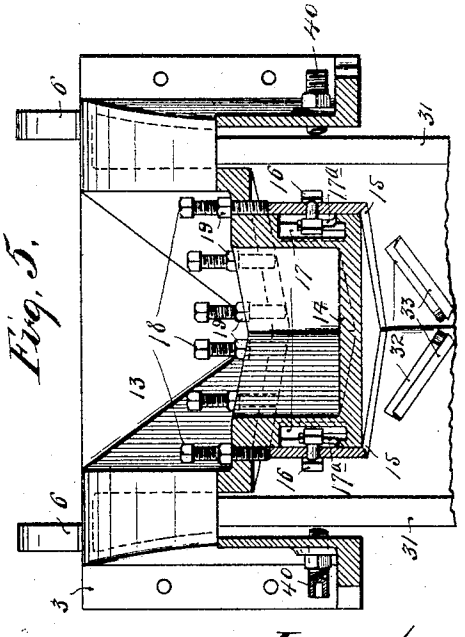


Fig. 5.

Witnesses.

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A. H. Opsahl.

Inventor.

Hermann G. Dittbenner

By his Attorneys,

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No. 777,779. Patented December 20, 1904.

UNITED STATES PATENT OFFICE.

HERMANN G. DITTBENNER, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO DIAMOND IRON WORKS, OF MINNEAPOLIS, MINNESOTA, A CORPORATION OF MINNESOTA.

SAWMILL-HOG.

SPECIFICATION forming part of Letters Patent No. 777,779, dated December 20, 1904.

Application filed November 10, 1903. Serial No. 180,518.

To all whom it may concern:

Be it known that I, HERMANN G. DITTBENNER, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Sawmill-Hogs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to machines for cutting refuse lumber into chips. The chips thus cut are used for fuel, and the machine for cutting the chips is known to the sawmill trade as the "hog."

My invention has for its object to improve the construction of these machines in the several particulars hereinafter noted; and to such ends it consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a side elevation of the complete machine or hog. Fig. 2 is a transverse vertical section taken on the line x^2 x^2 of Fig. 1. Fig. 3 is a vertical longitudinal section taken on the line x^3 x^3 of Fig. 2. Fig. 4 is a detail in elevation showing the so-called "anvil-door" and attached knives looking at the same from the inner side of the machine and showing also portions of the knife-disks. Fig. 5 is a horizontal section taken on the line x^5 x^5 of Fig. 3. Fig. 6 is a detail in horizontal section on the line x^6 x^6 of Fig. 3, some parts being broken away. Fig. 7 is a detail in section on the line x^7 x^7 of Fig. 6, and Fig. 8 is a section on the line x^8 x^8 of Fig. 6.

The case of the machine is made up of a lower rectangular base-section 1 and an upper semicylindrical section consisting of a pair of laterally-spaced intermediate plates 2 and a pair of longitudinally-spaced segmental doors or case-sections 3 4. The intermediate sections 2 are permanently and rigidly secured to the base-section 1, and the feed-hopper 5 is directly and rigidly secured to and extends between the upper ends of the said sections 2. The segmental doors 3 4 have ears 6, that are pivotally connected by bolts 7 to hinge-lugs 8 on the base 1. The said doors 3 4 are thus mounted for hinge-like movements into open positions, their partially-open position being indicated by dotted lines in Fig. 3. The bolts 7 work through vertical slots in the lugs 8, so that the door 3 may be vertically adjusted into different operative positions for an important purpose which will hereinafter appear. The slots in the lugs 8, to which the door 4 is hinged, are not necessary, but are provided in the illustration given simply because the two end plates of the base 1 happen to be cast from the same pattern.

When the doors 3 4 are closed, they are rigidly held in such positions by short nutted bolts 9, passed through perforations in the flanges of the doors and through flanges of the intermediate plates 2 and of the base 1. The door 3 is held in different vertical positions when closed by a plurality of set-screws 10, working through the lower flange of said door and bearing on the upper flange of the base 1, as best shown in Fig. 1. These set-screws 10 act in opposition to the interposed tightening-bolts 9, and they are provided with jam-nuts 11 for holding them in their set adjustments. The horizontally-disposed bolts 9 work through vertical slots 12 in the flanges of the intermediate plates 2 to permit the vertical adjustments of the said door 3.

Both of the doors 3 and 4 are bulged laterally inward at their intermediate portions, as shown at 13, and the door 3 is further provided with an upwardly-diverging **V**-shaped anvil 14, that projects into the case of the machine. A pair of diverging anvil-knives 15 are adjustably secured to the diverging faces of the anvil-block 14 by means of short nutted bolts 16. The heads of these bolts 16 work in recesses 17, formed in the anvil-block 14, (see Figs. 6 and 7,) and the said bolt-heads are adapted to be clamped against the slotted overlying flanges 17^a of the said anvil. The anvil-knives 15 are engaged at their inner edges by adjusting-screws 18, which hold the same projected beyond the anvil any desired distance

and compensate for the wear of the knives. Jam-nuts 19 on the adjusting-screws 18 hold the said screws wherever set. The said screws, it will be noted by reference to Figs. 3, 5, and 6, work through the depressed vertical web portion of the anvil-door 3.

As shown, the doors 3 4 are formed at their free outer portions with heavy eyes 20, into which a hook or other tool may be inserted to throw the said doors into open positions when the bolts 9 are removed.

The heavy driving-shaft 21 of the machine is advisably mounted in independent bearing-sleeves 22, which in turn are held by divided hub portions 23, rigidly secured on the sides of the frame or case of the machine. These bearing-sleeves 22 are preferably formed on their upper portions with oil-boxes 24, that work between the bifurcated upper sections 25 of the hub portions 23. At their lower portions said bearing-sleeves 22 are also preferably rounded at 26 and provided with fulcrum-lugs 27, that loosely fit reversely-formed portions of the said hubs 23 in such manner that the bearing-sleeves are universally adjustable for slight movements, so that they will freely aline with the shaft 21. Outward of the sleeves 22 the shaft 21 is shown as provided with thrust-collars 28, held in position on the shaft by set-screws 29. A pulley 30, rigidly secured to one end of said shaft, affords means for applying power to rotate the said shaft and the cutter-disks carried thereby, which latter will now be described.

Within the case of the machine and rigidly secured to the rotary shaft 21 is a pair of reversely-flaring conical disks 31, placed together in such a manner that they afford a cutter-head having a V-shaped or outwardly-diverging peripheral channel into which the stock or refuse lumber will be directly delivered from the feed-hopper 5. It may be here stated that the anvil of the door 3 and the anvil-knives 15 project into this peripheral channel of the cutter-head and that the cutting edges of the said knives when properly adjusted lie quite close to the diverging surfaces of the two disks 31. The said disks 31 are provided with radial slots 32 in staggered arrangement, as best shown in Figs. 2 and 3, and through each of these slots projects the cutting edge of a knife 33. These knives 33 (see Figs. 6 and 8) are rigidly but adjustably clamped against inclined bearing-surfaces 34 of the said disks 31 by means of short nutted bolts 35, the heads of which are countersunk into peripheral seats of the said disks. Between the nuts of the bolts 35 and the knives 33 are interposed clamping-plates 36, formed with beveled heads 36^a, which deflect the chips and prevent the same from striking against and loosening up the nuts of the said bolts.

The knives 33 should of course be so set that they will pass close to the cutting edges of the coöperating anvil-knives 15, (see Fig. 6,) and it should be here noted that the cutting edges of the said knives 33 are beveled at their outer edges, so that when cutting the chips the cutting strain is thrown onto the cutting edges of the said knives as nearly as possible in the direction of the plane of the said knives. This of course increases the cutting efficiency of the knives and renders them less liable to be broken and, further, enables them to run longer without being sharpened. At this point a still more important relation of the knives should be noted—to wit, that the disk-knives 33 are radially disposed with respect to the axis of the shaft 21, while the cutting edges of the anvil-knives 15 lie in a plane which does not intersect the axis of said shaft, but is tangential to a circle struck from the axis of said shaft. In view of this arrangement of the knives the wood or stock will be cut with a drawing shearing action. Otherwise stated, when a piece of wood is caught between the cutting edges of the anvil-knives and one of the disk-knives the whole force of the cut is not instantaneously thrown upon the same, but the cut is commenced at one point and is continued throughout the length of the disk-knife with a drawing action. This not only relieves the knives from sudden and intense strains, but produces a cleaner-cut chip and will not grind the chip to dust, so that a high-grade fuel is turned out from the machine. It is evident that the innermost disk-knives coöperate with the lower portion of the anvil-knives and that the outermost disk-knives coöperate with the outer portions of the said anvil-knives. It is further evident that the outermost and innermost disk-knives are brought into action in an alternate order of succession.

The chips cut by the machine are dropped out through the bottom of the case and through an opening 37 in the floor or base support 38 and from thence may be delivered to any suitable point by a discharge spout or chute. (Not shown.)

As shown, the two knife-disks 31 are keyed to the shaft 21 and are secured together by short nutted bolts 39. To prevent the knife-disk 31 from being sprung or forced laterally, so as to throw the disk-knives and anvil-knives into contact in case a piece of metal or other very hard material should be caught between the knives, I provide a pair of so-called "abutment-screws" 40, preferably constructed of brass and screwed through the sides of the anvil-door 3 in position to engage with the outer faces of the peripheral flanges of the said knife-disks 31. Furthermore, these abutment-screws, which normally do not contact with the said knife-disks, keep the disk-knives and anvil in proper positions should a piece of iron or very hard material get between the disks and the frame and keep the disks from crowding over and riding on the anvil. Again, should one of the disks be

forced against one of these abutment-screws 40 the latter will act as a brake to bring the cutter-head—to wit, the two knife-disks—to a quick standstill, and thereby lessen the amount of damage which would be caused to the machine.

It is evident that the anvil-knives 15 may be adjusted to compensate for wear and to set them at the proper angle with respect to the disk-knives by adjustments of the set-screws 18. It is further evident that the said anvil-knives may be set nearer to or farther from the diverging faces of the knife-disks 31 by adjusting the anvil-door 3 respectively downward or upward. It will also be understood that it is very important that the anvil-knives and disk-knives be set in proper adjustments in order to produce the best cutting action and to produce chips of the desired thickness. In machines hitherto designed for cutting chipped fuel—that is, in hogs as hitherto constructed—it has been necessary to adjust the knives while certain thereof were thrown into inoperative positions, and hence to make calculations or, in other words, to guess when the knives were set in approximately desired positions. This has been made necessary because when the knives were in operative positions their cutting edges could not be seen, or at least could not be observed in a proper direction to determine their relative set positions. However, in my improved machine or hog when the door 4 is opened up light is admitted into the case between the two disks and a direct line of vision is afforded from the outer side of the case directly between the cutting edges of the anvil-knives and of the disk-knives. Hence it is evident that the anvil-knives and disk-knives may be very easily and accurately set in any desired relation to each other, and hence the time is saved and the machine may be set to do better work. Furthermore, the feed-hopper 5 is independent of the movable parts or doors of the case, and hence is never disturbed.

The machine or hog above described has been built, tried, and put upon the market and has given the greatest satisfaction. The machine is of course capable of modification within the scope of my invention as herein set forth and claimed.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a machine of the character described, the combination with a case having an adjustable anvil-block, of diverging knives applied to said anvil-block, means for adjusting said knives edgewise transversely of the line of adjustment of said anvil-block, and a cutter-head working within said case, and coöperating with said anvil-knives, substantially as described.

2. In a machine of the character described, the combination with a case having a centrally-located feed-hopper and a pair of doors or case-sections on opposite sides, one of said case-sections having adjustable anvil-knives, and the other case-section being movable to afford a line of vision through the case to said anvil-knives, and a cutter-head rotatively mounted within said case and having knives coöperating with said anvil-knives, substantially as described.

3. In a machine of the character described, the combination with a case and an inclosed rotary cutter-head, of an anvil-knife supported by said case, and coöperating knives carried by said cutter-head, the said knives being arranged to pass at an angle, and to cut with a drawing, shearing action, substantially as described.

4. In a machine of the character described, the combination with a case having an interior V-shaped anvil-block and diverging anvil-knives applied to said anvil-block, of a pair of diverging conical disks, affording a cutter-head, rotatively mounted within said case, and disk-knives carried by the said disks and coöperating with said anvil-knives, the cutting edges of which disk-knives radiate from the axis of said disks, and the cutting edges of which anvil-knives lie in a plane extending tangentially to a circle struck from the axis of said disk, whereby the said knives coöperate to cut with a drawing, shearing action, substantially as described.

5. In a machine of the character described, the combination with a case having doors or movable case-sections located at opposite points, one of the said doors having an anvil-block and anvil-knives applied to said anvil-block, of a cutter-head rotatively mounted within said case and provided with knives cooperating with said anvil-knives, substantially as described.

6. In a machine of the character described, the combination with a case having a centrally-located feed-hopper and a pair of segmental doors or case-sections, on opposite sides of said hopper, one of said case-sections being adjustable and having anvil-knives adjustably secured thereto, and a cutter-head rotatively mounted in the said case and having knives coöperating with said anvil-knives, substantially as described.

7. In a machine of the character described, the combination with a case and an anvil-knife supported within the same, of a knife-equipped cutter-head working within the said case, and abutments on the sides of the said case engageable with the said cutter-head, when, and only when, the latter is forced laterally out of a proper running position, substantially as and for the purposes set forth.

8. In a machine of the character described, the combination with a case and anvil-knives supported within the same, of a cutter-head afforded by a pair of conical disks rotatively mounted within said case and provided with a plurality of knives, and abutment-screws

working through the sides of said case and engageable with the marginal portions of said knife-disks, when, and only when, the latter are forced laterally out of their proper running positions, substantially as and for the purposes set forth.

9. In a machine of the character described, the combination with a knife, a support for the same and a nutted bolt for securing said knife to said support, of a clamping-plate interposed between said knife and the nut of said bolt, and having a beveled head protecting the said nut from the action of the chips, substantially as described.

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

HERMANN G. DITTBENNER.

Witnesses:

E. H. KELIHER,

F. D. MERCHANT.