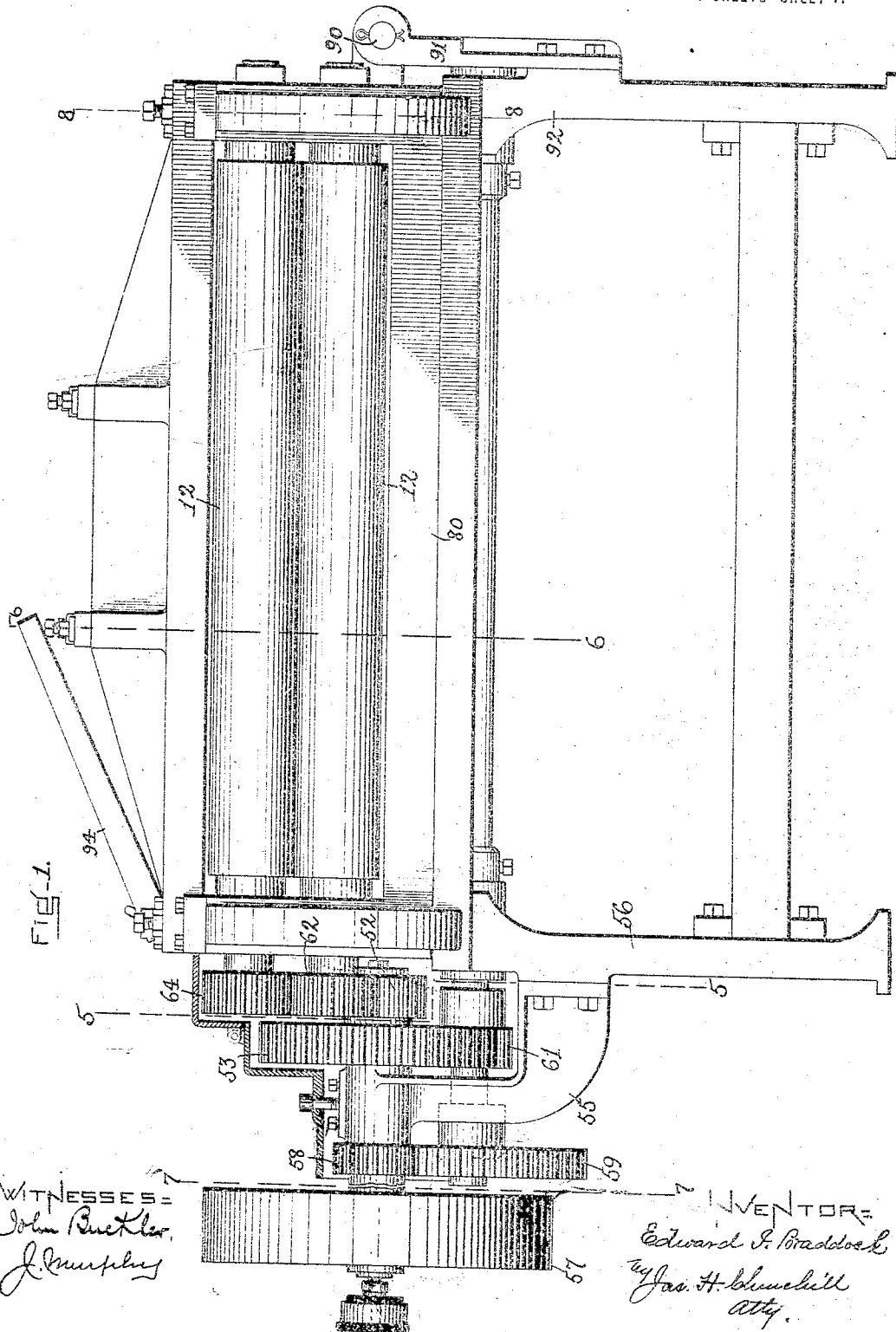


E. I. BRADDOCK.
MACHINE FOR CUTTING SHEETS OR LAYERS.
APPLICATION FILED APR. 3, 1915.

1,160,833.

Patented Nov. 16, 1915.
6 SHEETS—SHEET 1.



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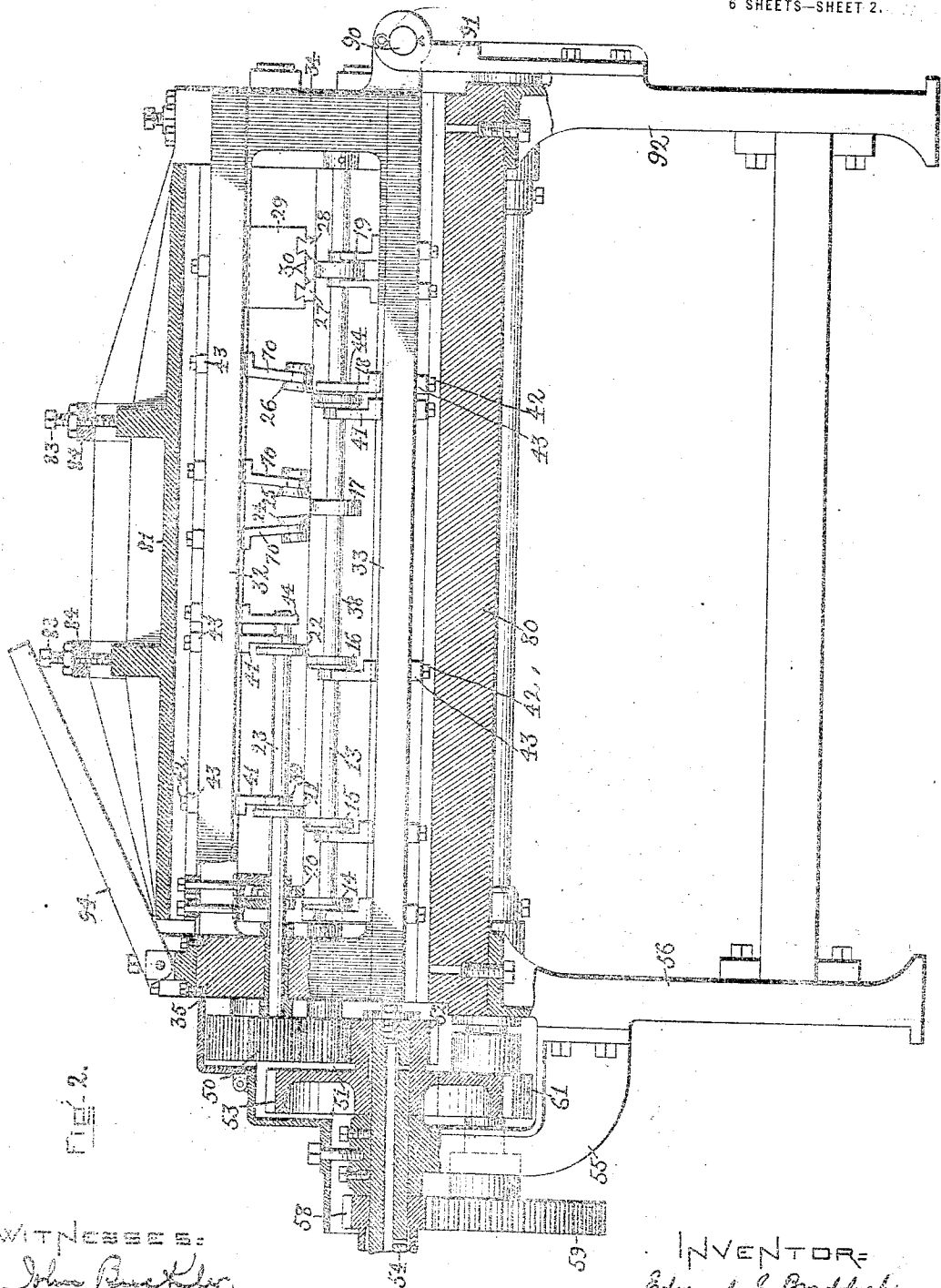
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6 SHEETS—SHEET 2.



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6 SHEETS—SHEET 3.

FIG. 4.

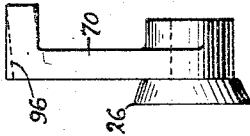
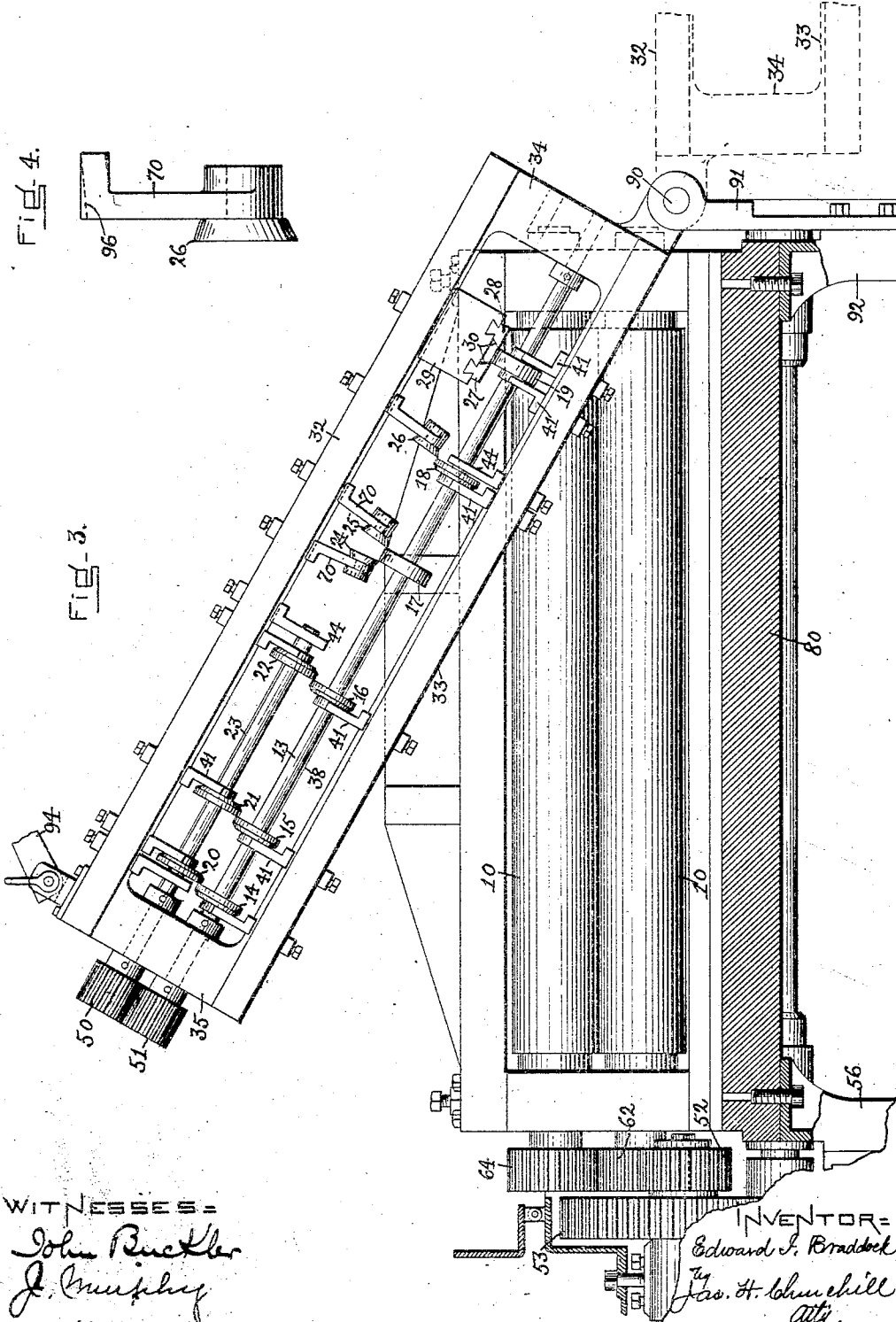


FIG. 3.



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6 SHEETS—SHEET 4.

Fig- 5.

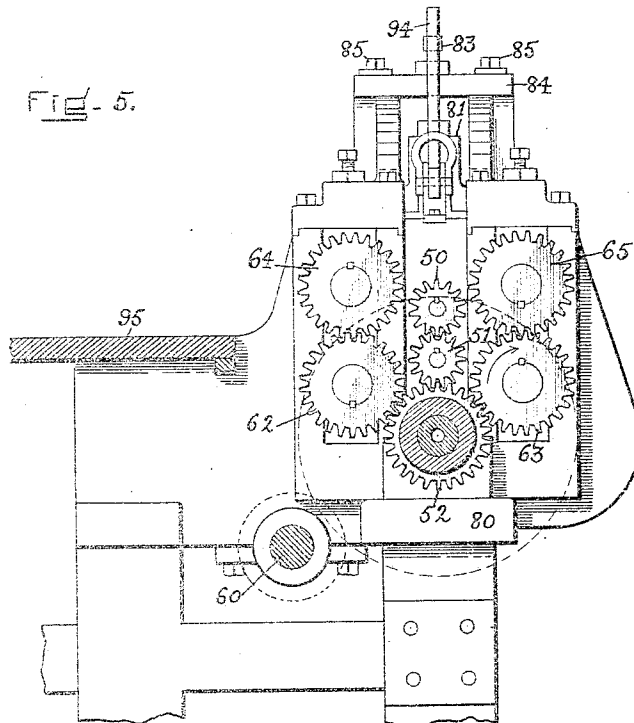
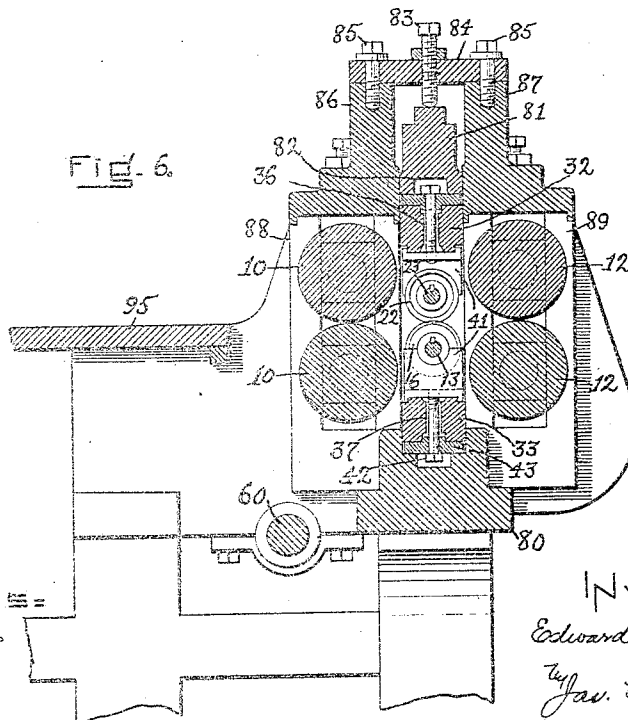


Fig- 6.



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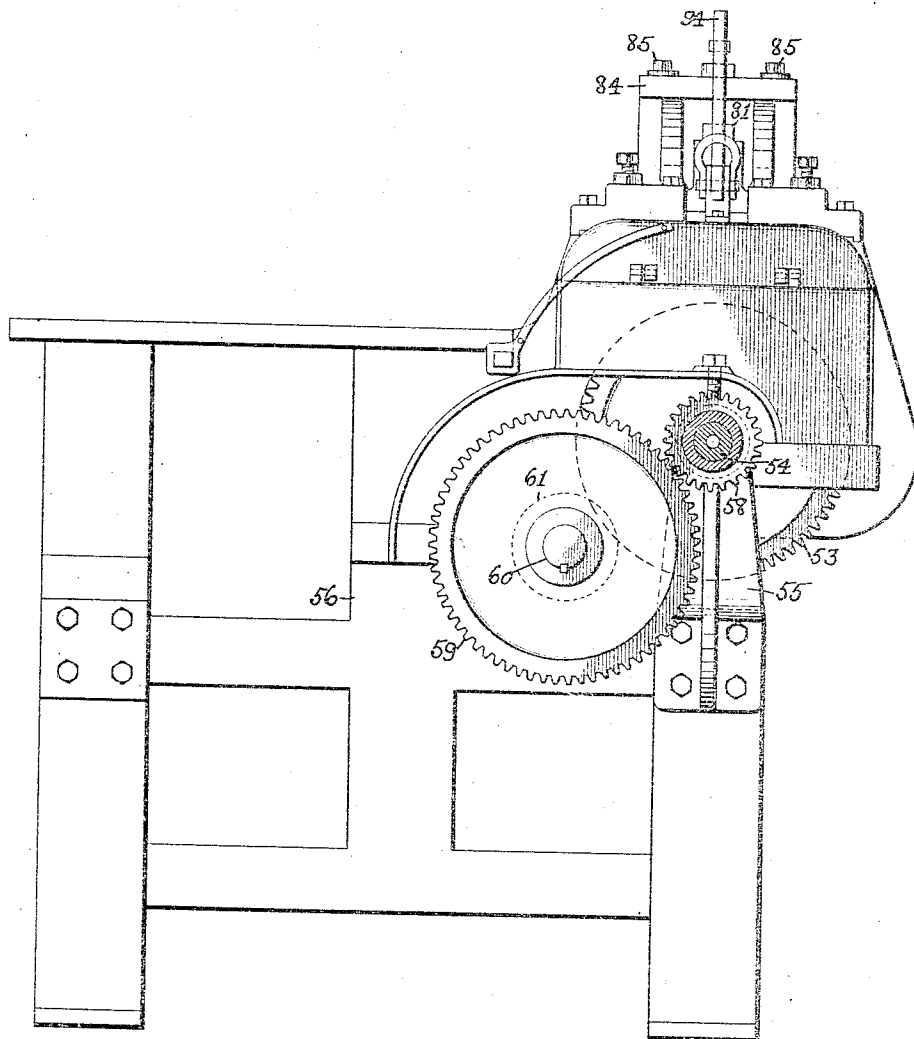
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6 SHEETS—SHEET 5.

Fig-7



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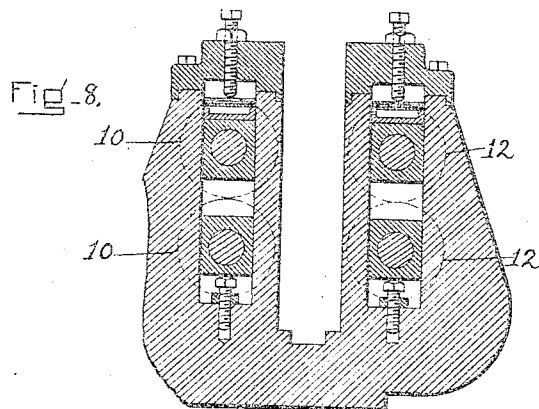
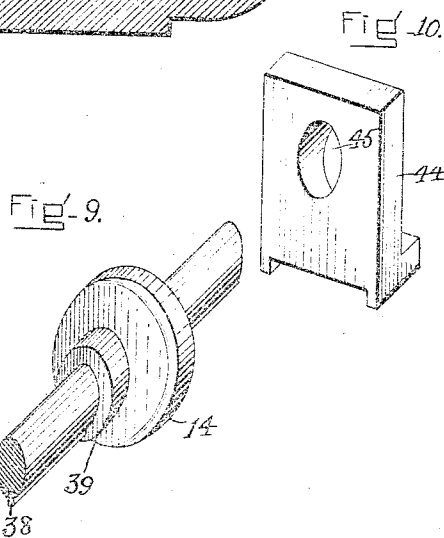
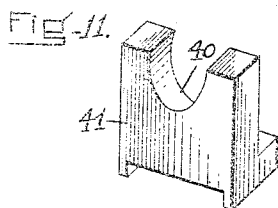
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6 SHEETS--SHEET 6.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR CUTTING SHEETS OR LAYERS.

1,160,833.

Specification of Letters Patent.

Patented Nov. 16, 1915.

Application filed April 3, 1915. Serial No. 19,049.

To all whom it may concern:

Be it known that I, EDWARD I. BRADDOCK, a citizen of the United States, residing in Winchester, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Machines for Cutting Sheets or Layers, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to a machine for cutting sheets or layers into strips or sections, and has for its object to provide a superior machine for this purpose and one in which sheets or layers of rigid material such as metal sheets or layers, or of flexible material such as cloth, paper, felt, and the like may be cut up into strips or sections.

The invention further has for its object to provide a machine in which very narrow strips or sections having a finished edge may be formed.

These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is a front elevation of a machine embodying this invention. Fig. 2, a cross section of the machine, showing the cutters in elevation. Fig. 3, a view like Fig. 2, showing the cutter carrying frame in an elevated position. Fig. 4, a detail of one of the cutters and its hanger. Fig. 5, a section on the line 5—5, Fig. 1. Fig. 6, a section on the line 6—6, Fig. 1. Fig. 7, a section on the line 7—7, Fig. 1. Fig. 8, a section on the line 8—8, Fig. 1. Fig. 9, a detail of one of the positively driven cutters shown in Fig. 2. Fig. 10, a detail of one of the bearing blocks for the cutter shaft, and Fig. 11, a detail of one of the bearing blocks for the rotatable cutters.

The machine herein shown as embodying this invention is provided with means for feeding the sheet or layer of metallic or non-metallic material to the cutting mechanism employed to sever the sheet into sections or strips, and is further provided with means for drawing the cut strips or sections away from the cutting mechanism.

The means for feeding the sheet or layer consists as herein shown of a pair of cylinders or rolls 10, and the means for drawing the cut strips away from the cutting mech-

anism consists of a pair of cylinders or rolls 12.

The cutting mechanism is located between the feeding and drawing rolls 10, 12, and in the present instance is shown as composed of a plurality of sets of cutters, which are arranged with relation to one another so that, the sheet or layer may be cut up into strips or sections which range from a very narrow strip to a substantially wide strip.

For the best results, one of the cutters of each set is positively driven, and the other cutters may or may not be positively driven according to the character of the work to be performed.

In the present instance I have illustrated six sets of cutters having one member or cutter of each set mounted on a rotatable shaft 13 to rotate therewith, and to be positively driven thereby.

The cutters fast on the shaft 13 are shown as disks and are marked 14, 15, 16, 17, 18, 19, and three of these cutters cooperate with three like disk cutters, 20, 21, 22, mounted on a shaft 23 to rotate therewith. A fourth cutter marked 17 fast on the shaft 13 cooperates with a pair of cutting disks 24, 25, which are backwardly inclined with relation to the cutting disk 17, for a purpose as will be described. The fifth cutter fast on the shaft 13 is marked 18, and cooperates with a single cutting disk 26, which is inclined backwardly with relation to the cutting disk 18. The sixth cutter 19 fast on the shaft 13 cooperates with a pair of stationary cutters 27, 28, which are secured to a stationary cutter carrier or block 29, and in the present instance the stationary cutters 27, 28 are shown as cutter bars, which are dovetailed into the block 29 and have backwardly inclined faces 30.

The cutters mounted on the shaft 13 are positively rotated and assist the feed rolls 10 in feeding the sheet or layer through the machine, and when both cutters are positively driven, this feeding action is augmented and enables the machine to cut sheets or layers which are thin and flexible as well as sheets or layers of substantially rigid material. In other words, while the machine is especially adapted for cutting metal sheets, it is also capable of cutting sheets of paper, cloth, felt, or other non-metallic material when both cutters are positively driven.

When only one of the cutters is positively rotated and the other cutter cooperating therewith is free to revolve or is stationary as shown at the right in Fig. 2, the machine

5 is capable of cutting sheets or layers of rigid material, such for instance as metal sheets.

The sets of cutters referred to are carried by a frame, which is normally interposed between the feeding and drawing rolls 10, 12, and is capable of being removed from its normal position so as to render the cutters accessible. The cutter carrying frame as herein shown, consists of a top wall or bar 32, a bottom wall or bar 33, and end walls or bars 34, 35, which may be separate pieces and secured together or which may be cast in one piece.

The top and bottom bars 32, 33 are provided with longitudinally extended slots 36, 37, see Fig. 6, for a purpose as will be described. The end walls 34, 35, support in suitable bearings, the rotatable shaft 13, which is provided with a key 38, by means of which the cutters mounted thereon rotate therewith, and some or all of the said cutters may be provided with hubs 39, see Fig. 9, which are engaged with semi-circular recesses 40 in blocks or bars 41, which are rigidly secured to the bottom wall 33 of the cutter carrying frame by screws or bolts 42, extended through cross bars 43 on the underside of said bottom wall, through the slot 37 in the latter and into threaded sockets in the bars or blocks 41, see Fig. 6.

The shaft 13 may be provided between the end walls 34, 35, of the frame with one or more additional bearing blocks 44, and in the present instance, a single bearing block 44 is shown, which is provided with a circular opening 45 for the passage of the shaft 13, see Figs. 2 and 10, and is rigidly secured to the lower bar or wall 33 of the frame by a cross bar 43 and bolt or screw 42.

In the present instance three of the disk cutters 14, 15, 16, on the shaft 13, have cooperating with them three like disk cutters 20, 21, 22, which are keyed or otherwise secured to the shaft 23 to rotate therewith, and said cutting disks are provided as shown, with hubs 39 with which cooperate blocks or bars 41, which are rigidly secured to the top wall or bar 32 of the cutter frame, by bolts or screws 42 extended through cross bars 43 and through the slot 36 in said wall or bar and into threaded sockets in the bars or blocks 41, see Fig. 6. The shaft 23 has a bearing in the end wall 35 of the frame, and is supported within the said frame by one or more bearing bars or blocks 44, which are rigidly secured to the top wall 32 of said frame, by screws or bolts 42 which extend through cross bars 43 and the slot 36 in said top wall 32.

The shafts 13, 23, with the cooperating sets of cutters secured thereon are positively

rotated, and for this purpose the shaft 23 is provided with a pinion 50, which meshes with a pinion 51 on the shaft 13, and the latter pinion is designed to mesh with and be driven by a gear or pinion 52, which in the present instance is shown as integral with a gear 53, loosely mounted on a shaft 54, journaled in a bracket or arm 55 attached to the side upright 56 of the framework of the machine.

The shaft 54 constitutes the main or driving shaft of the machine and is provided with a pulley 57 and a pinion 58, which meshes with a gear 59 on a shaft 60, suitably supported by the framework of the machine, and provided with a pinion 61 which meshes with and drives the gear 53.

The pinion 52 also meshes with and drives pinions or gears 62, 63, on the lower rolls 10, 12, and the gears or pinions 62, 63, mesh with and drive gears or pinions 64, 65, on the upper rolls 10, 12, see Fig. 5.

The sets of positively driven or rotatable cutters 14, 20, 15, 21, 16, 22, are suitably spaced apart to cut up into strips or sections, a metallic or non-metallic sheet or layer which is passed between them, and they are especially serviceable in cutting up iron or steel sheets, and being positively driven or rotated, the said sets of cutters not only act to cut the metal sheets into strips or sections, but also serve as feeding disks for the cut strips, and feed and guide the latter to the drawing rolls 12, thereby avoiding the necessity of employing other means for guiding the cut strips to the drawing rolls.

While it may be preferred to positively drive or rotate both cutters when metal sheets are to be cut, it is not desired to limit the invention in this respect, as good results may be obtained with one of the cutters positively driven and the other cutter frictionally driven by the metal sheet, and this arrangement of cutters is illustrated by the set comprising the cutters 18, 26, the cutter 26 being loosely mounted in a supporting or bearing block 70, which is secured to the top wall or bar 32 of the cutter carrying frame, by the bolt or screw 42 extended through the cross bar 43 and through the slot 36 into a threaded socket in the block 70. When a freely revolving or loose cutter is employed, it is preferred to arrange the cutter so that its cutting face is inclined backwardly from the cutting edge of the cooperating cutter, which arrangement of the cutters affords a clearance for the cut strip, and avoids the formation of fins, slivers, burs or rough edges, and produces a smooth finished edge on the cut strip, which can be handled with bare hands without danger of being cut, while at the same time a superior product is obtained. This clearance feature is especially advantageous for cutting very narrow strips, as for instance strips as narrow as one

eighth of an inch, and by using two oppositely inclined cutters with an intermediate cutter three narrow strips may be cut simultaneously.

The oppositely inclined cutters may be made as rotatable disk cutters 24, 25, which cooperate with an intermediate disk cutter 17, or they may be stationary cutters 27, 28, which cooperate with the intermediate disk cutter 19. The disk cutters 24, 25, may be positively driven or as herein shown they may be mounted to turn freely in bearing blocks 70, secured to the top wall of the cutter carrying frame by bolts or screws 42, extended through cross bars 43 and through the slot 36 into threaded sockets in the blocks 70, and the stationary cutters 27, 28, may be dovetailed or otherwise secured to the bearing block 29, which is secured to the top wall 32 by a screw or bolt 42, extended through a cross bar 43 and the slot 36 into a threaded socket in the block 29.

It will thus be seen that with the machine herein shown, a metal or other sheet of substantial width may be cut up into sections or strips by the cutters mounted on the positively driven shafts 13, 23, and one or more of these strips may be still further cut up into strips by the cutters 18, 26, and the strips thus produced may be cut up into still narrower strips by the set of cutters 17, 24, 25, or the set 19, 27, 28.

When the metal strip is subjected to the action of the set 17, 24, 25 or the set 19, 27, 28, the center strip which passes between the oppositely inclined cutters 24, 25, or 27, 28, has an opportunity to expand without becoming wedged between the inclined cutters, and as a result very narrow strips may be cut by the machine.

It will be observed that the strain placed upon the cutters is transmitted to the cutter carrying frame, whose lower wall 33 rests upon a solid portion of the framework of the machine, namely upon the cross bar 80, see Fig. 6, and provision is made for solidly backing up the top wall 32 of the cutter carrying frame, which is effected by a removable presser bar 81, which rests on the cross bars 43 supported by said wall, and said presser bar is provided in its lower surface with a channel or slot 82 for the reception of the heads of the bolts or screws 42 extended through said top wall.

The presser bar 81 is pressed down on the cross bars 43 with any desired pressure within limits, by means of screws 83, which are carried by cross bars 84 removably secured as by screws 85 to the upright bars or webs 86, 87, secured to or forming part of the blocks or frames 88, 89, which carry the feeding and drawing rolls 10, 12.

It will thus be seen, that when the presser bar 81 is in position as shown in Figs. 2 and 6, and the screws 83 are set up, the top and

bottom walls of the cutter carrying frame are rigidly or solidly backed up, and a very rigid construction is obtained which prevents springing of the cutters and thereby insures accurate and efficient operation of the machine.

The cutter carrying frame is capable of being removed from between the feeding and drawing rolls, and for this purpose, it is mounted to turn on a pivot pin 90, supported by a bracket 91 attached to the side 92 of the framework of the machine. When it is desired to gain access to the cutters, the presser bar 81 is removed, and the cutter carrying frame is turned on its pivot 90 into the position represented by dotted lines Fig. 3, and when in this latter position, its free end is supported by a leg 94, which is pivoted to the free end of the cutter carrying frame, see Fig. 2. The machine is provided with a suitable table 95 upon which the sheets to be cut are supported as they are fed to the feeding rolls 10 by the operator or otherwise.

The cutting disks which are inclined with relation to their cooperating cutter, may be given the proper inclination by providing their hangers or bearing blocks 70 with inclined upper surfaces 96, represented by dotted lines Fig. 4, and the lower surface of the hanger may also be given the same bevel or inclination if desired.

It will be observed that in the machine herein shown one cutter of each set of cutters is positively rotated, and that the positively rotated cutters cooperate with other cutters, some of which may be positively rotated, others loosely mounted to turn freely and others stationary, and as a result of having at least one cutter of each set positively driven, the machine is capable of cutting sheets of rigid material such as sheet metal, and also can be used for cutting less rigid or flexible sheets, such as cloth, felt, paper, sheet lead and the like, and when used for this latter purpose, it is preferred to have both cutters positively driven or rotated. When the sheets to be cut are rigid, such as iron or steel sheets, both rotatable cutters may be positively driven, or only one may be positively driven and the other stationary or free to turn.

In the present instance, the inclined rotary cutters are represented as arranged to turn freely, but it is not desired to limit the invention in this respect, as the inclined rotary cutters may be mounted so as to be positively driven.

When rigid material such as metal sheets is to be cut, it may be preferred to use inclined cutters as one member of each set of cutters, as by so doing, a smooth and finished edge free from fins or burrs is imparted to the cut sections or strips, and also very narrow metal strips may be cut owing to the

clearance provided by the inclined cutters, which prevents the metal strip being wedged or bound between the cutters, and thereby prevents the strips and especially very narrow strips from curling up, and insures the cut strips passing forward in a flat condition, and this feature is true irrespective of whether the cooperating cutter is positively driven or not.

I have herein shown one construction of machine embodying the invention but it is not desired to limit the invention to the particular construction shown.

Claims:

1. In a machine of the character described, in combination, feeding rolls and drawing rolls spaced apart, a cutter carrying frame located between said rolls and movable from between the same, a rotatable shaft carried by said frame, a cutter mounted on said shaft to rotate therewith, and a cutter carried by said frame and cooperating with the cutter rotatable with said shaft.

2. In a machine of the character described, in combination, feeding rolls and drawing rolls spaced apart, a cutter carrying frame located between said rolls, a rotatable shaft carried by said frame, a cutter mounted on said shaft to rotate therewith, and oppositely inclined cutters cooperating with the cutter rotatable with said shaft.

3. In a machine of the character described, in combination, a framework, a cutter carrying frame supported thereby and movable with relation thereto, a rotatable shaft supported by said cutter-carrying frame, means to rotate said shaft, a cutter mounted on said shaft to rotate therewith, and a cutter cooperating with the cutter rotatable with said shaft and inclined backwardly from the path of rotation of the first mentioned cutter.

4. In a machine of the character described, in combination, a rotatable disk cutter, and cutters cooperating with the opposite sides of said disk cutter and inclined backwardly in opposite directions with relation to the path of rotation of said disk cutter.

5. In a machine of the character described, in combination, a framework, a cutter carrying frame supported thereby and movable with relation thereto, rotatable shafts carried by said cutter-carrying frame, cooperating cutting disks mounted upon said shafts to rotate therewith, and means to rotate said shafts.

6. In a machine of the character described, in combination, a framework, a cutter carrying frame supported thereby and movable with relation thereto, cooperating cutters carried by said cutter-carrying frame, a presser bar located above said cutter-carrying frame to bear upon the same between its ends, and means cooperating

with said framework, and with said presser bar to secure said presser bar in fixed relation to said cutter-carrying frame and to exert a pressure thereon.

7. In a machine of the character described, in combination, a rotatable shaft, a disk cutter provided with a hub and mounted on said shaft to rotate therewith, a bearing block to engage said hub, means to which said bearing block is secured, and a cutter cooperating with the said disk cutter.

8. In a machine of the character described, in combination, a rotatable cutter, and a pair of cutters cooperating therewith and inclined backwardly with relation to the path of movement of said rotatable cutter.

9. In a machine of the character described, in combination, a cutter carrying frame provided with a top wall and with a bottom wall spaced apart, cooperating cutters carried by said walls and located between the same, means to solidly support said bottom wall between the ends of the latter, means to back up the said upper wall, and means to cause said backing means to exert a pressure upon said upper wall between its ends to firmly back up the latter between its ends.

10. In a machine of the character described, in combination, a stationary framework, a cutter-carrying frame pivoted at one end to said framework and normally extended transversely thereof and capable of being turned to a position outside of said framework, and cutters carried by said framework.

11. In a machine of the character described, in combination, a stationary framework provided with uprights spaced apart, a cutter-carrying frame supported by said framework and movable with relation thereto between said uprights, cooperating cutters carried by said frame, a presser bar located between said uprights and capable of engaging the cutter-carrying frame between the ends of the latter for a substantial portion of the length of the same, and means carried by said uprights for engaging said presser bar to cause it to exert a pressure upon the cutter-carrying frame.

12. In a machine of the character described, in combination, a stationary framework, a cutter-carrying frame having end walls and top and bottom walls connected with said end walls, said cutter-carrying frame being supported by and movable with relation to said stationary framework, cooperating cutters carried by said cutter-carrying frame, bearing blocks for said cutters secured to the top and bottom walls of said frame, a removable presser bar capable of being placed upon the cutter-carrying frame and of engaging the latter between its ends, and means carried by said stationary frame-

work to engage said presser bar and cause the latter to exert pressure upon the cutter-carrying frame between the ends of the latter.

- 5 13. In a machine of the character described, in combination, a stationary framework provided with uprights spaced apart, a cutter-carrying frame supported by said framework and movable with relation there-
10 to between said uprights, cooperating cutters carried by said frame, a presser bar located between said uprights and capable of engaging the cutter-carrying frame be-

tween the ends of the latter for a substantial portion of the length of the same, cross 15 bars connecting said uprights, and screws extended through said cross bars and engaging said presser bar.

In testimony whereof, I have signed my name to this specification in the presence of 20 two subscribing witnesses.

EDWARD I. BRADDOCK.

Witnesses:

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