

C. H. THORDARSON.
MACHINE FOR CUTTING STRIPS FROM WEB MATERIAL.
APPLICATION FILED MAY 14, 1913.

1,116,954.

Patented Nov. 10, 1914.
3 SHEETS—SHEET 1.

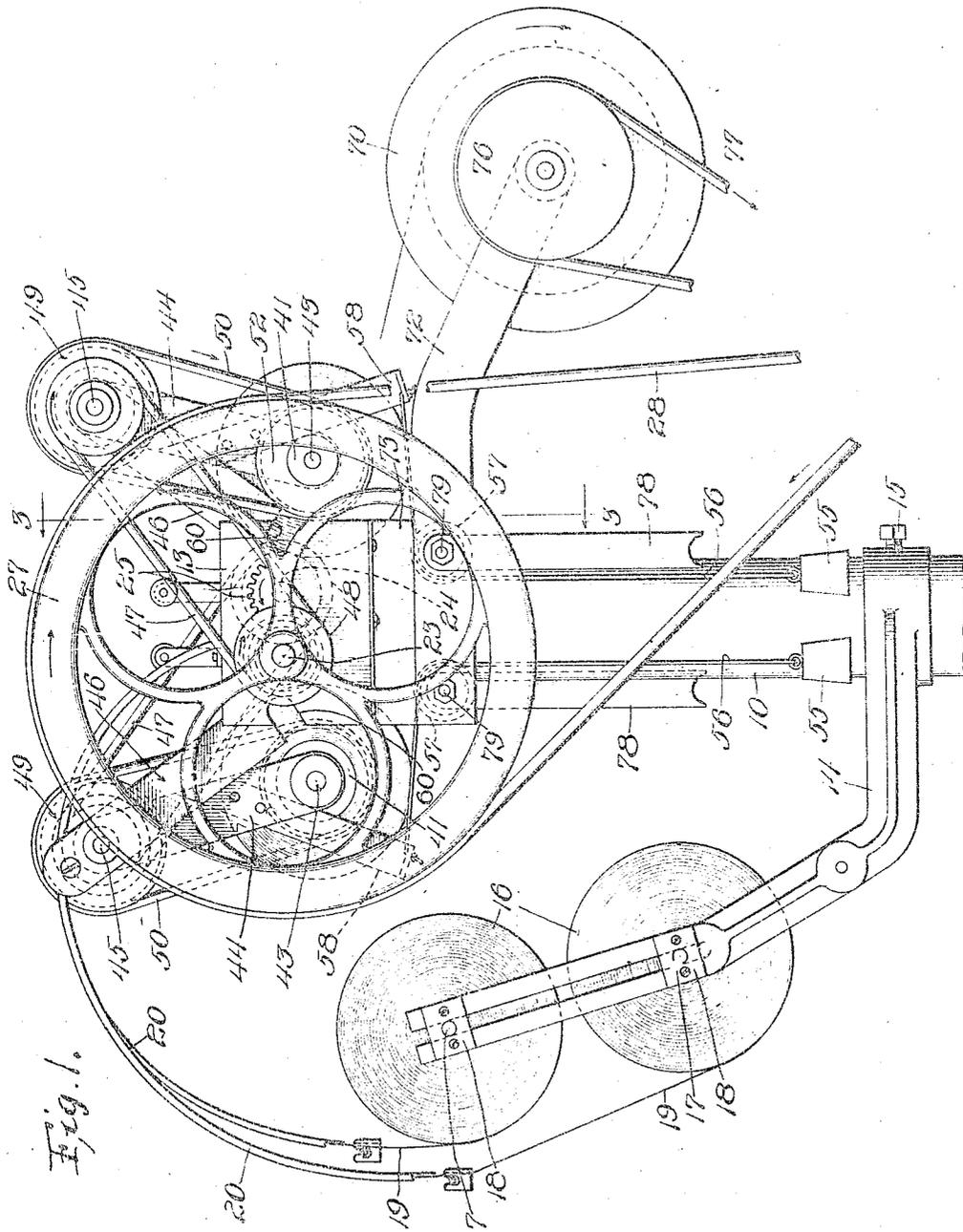


Fig. 1.

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J. W. Burgess

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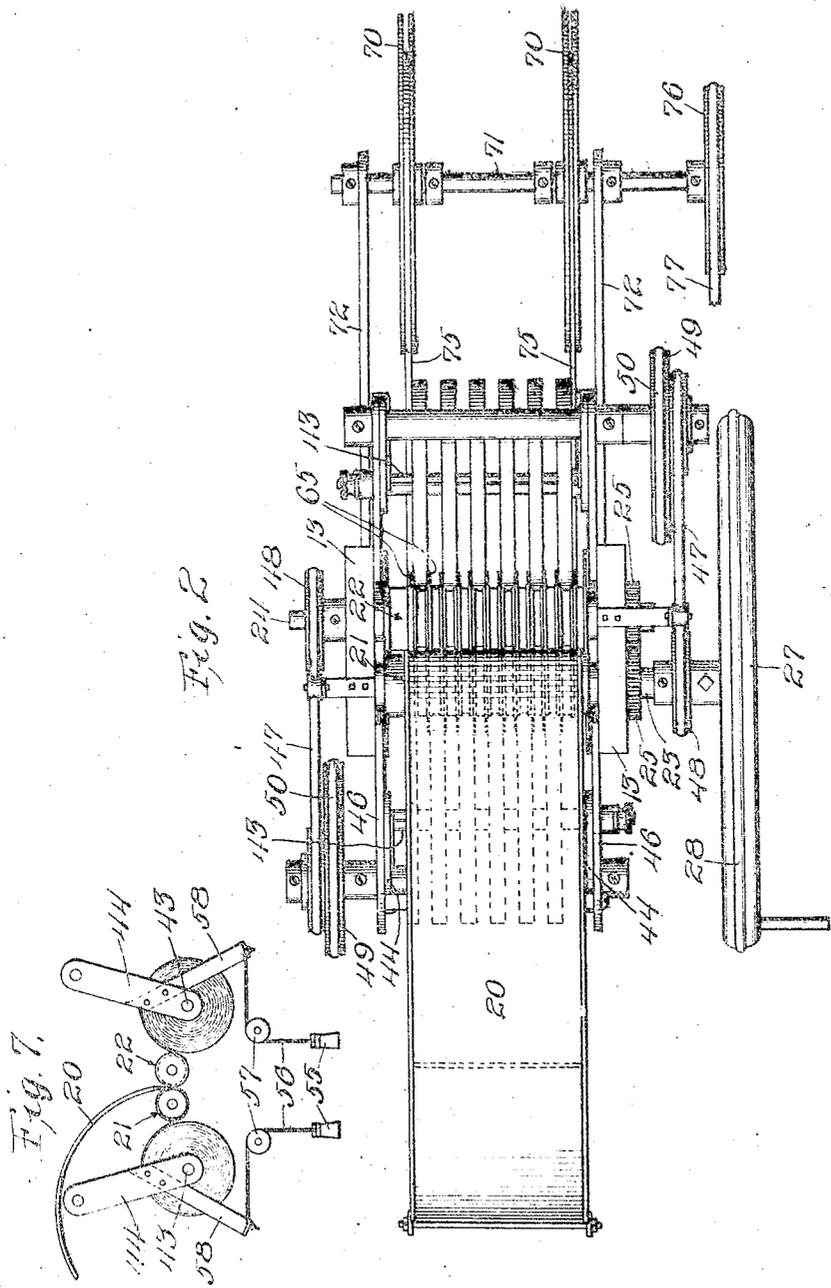
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Witnesses:
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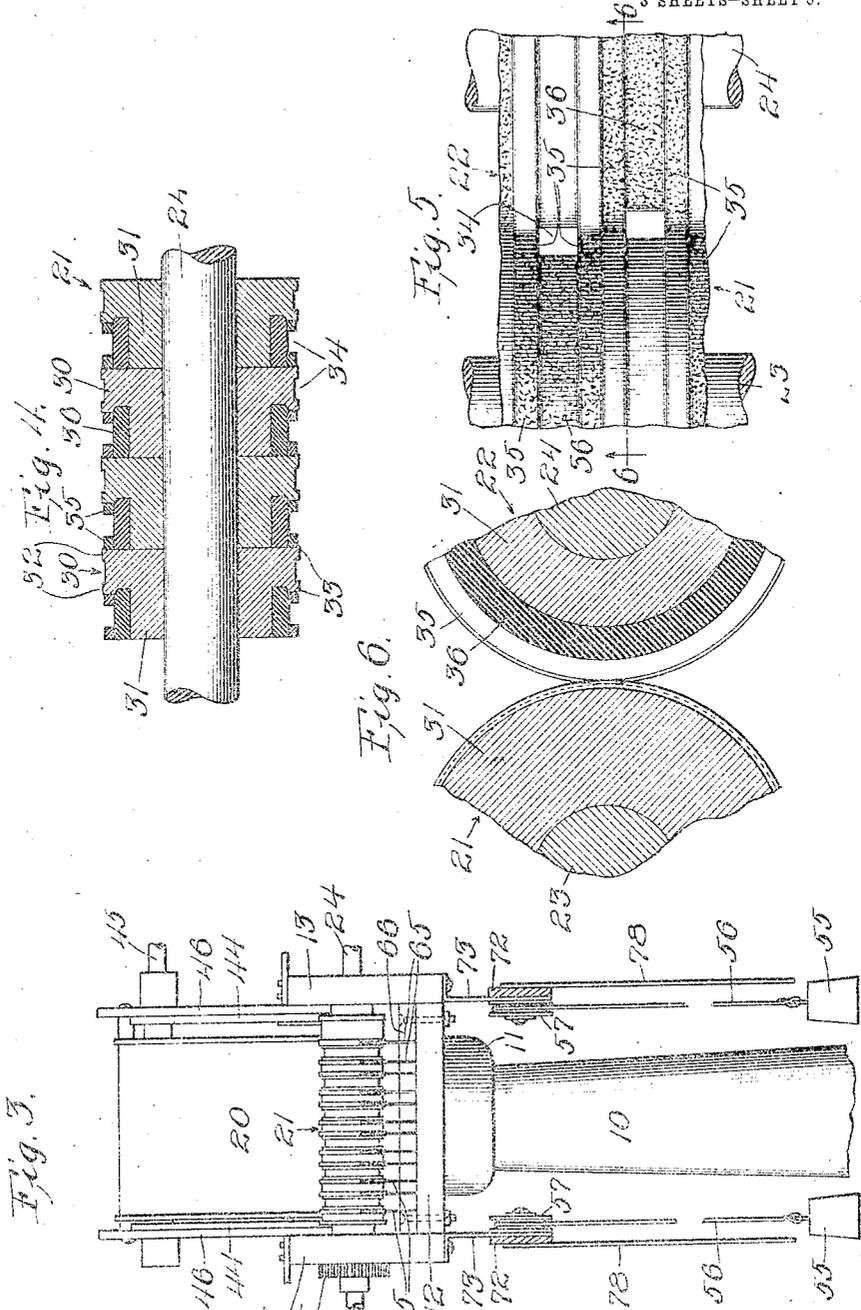
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UNITED STATES PATENT OFFICE.

CHESTER H. THORPARSON, OF CHICAGO, ILLINOIS.

MACHINE FOR CUTTING STRIPS FROM WEB MATERIAL.

1,116,954.

Specification of Letters Patent. Patented Nov. 10, 1914.

Application filed May 14, 1913. Serial No. 767,554.

To all whom it may concern:

Be it known that I, CHESTER H. THORPARSON, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Cutting Strips from Web Material; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to a machine for cutting strips or ribbons from sheets or webs of paper or like thin material and winding the cut strips or ribbons in compact rolls so that they may be readily handled for subsequent use, and embraces also mechanism for cutting at one time strips or ribbons from a plurality of sheets or webs that are fed together to the cutting mechanism of the machine so that each roll of strips or ribbons produced may be composed of two or more strips or ribbons.

The invention relates also to an improved cutting device or element for severing the web into strips with means for positively feeding the web and the strips between the coacting cutting elements.

The invention relates also to an improved means for directing the strips or ribbons to the reels on which they are wound.

The invention relates further to other improvements in machines for the general purpose stated, and the invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

The machine herein shown may be used for a variety of purposes. It has been designed to cut strips from one or more webs of insulating paper or material and wind them in rolls from which they are afterward unrolled and wound between the conductor strips or ribbons of a transformer or other coil to constitute the insulating medium between the turns of the coil, as for instance, by the use of the machine shown in my prior application for United States Letters Patent, Serial No. 744,002, filed January 24, 1913.

In the drawings:—Figure 1 is a side elevation of the principal parts of the machine embodying my invention. Fig. 2 is a plan view thereof. Fig. 3 is a section taken on

the line 3—3 of Fig. 1. Fig. 4 is a partial axial section of one of the cutters. Fig. 5 is a partial plan view of the co-acting paper cutting and feeding elements of the machine. Fig. 6 is a fragmentary section on the line 6—6 of Fig. 5. Fig. 7 is a diagrammatic view showing the relation of the strip receiving reels in their relation to the other parts.

The frame of the machine comprises a standard 10, a head 11 on which is supported a horizontal bed plate 12 and side members 13, 13, the latter to support the principal parts of the machine.

The standard 10 supports a bracket 14, shown as vertically adjustable thereon and fixed thereto by the set screw 15, and said bracket carries a spool upon which a roll or rolls 16 of the web are wound. When two or more webs are wound in a single reel, means to support one roll only will be required. The shafts 17 of the spools or reels which carry said rolls are rotatively mounted in bearings 18, 18 carried by the bracket 14. As herein shown, provisions are made for supporting two of such web rolls, each roll consisting of a single continuous web. The webs 19, 19 which are unwound from said rolls are directed by suitable guides 20 to the space between the two cutting elements of the machine designated, as a whole, by 21, 22 respectively, between which the web or webs are passed and by which they are cut into strips. The said cutting elements 21, 22, herein shown are rotative and for this purpose may be fixed to the rotating shafts 23, 24, respectively, which are rotatively mounted in the vertical side members 13, 13 of the frame. The said shafts 23, 24 are geared together by the intermeshing gears 25 so as to rotate at equal speeds, and one of the shafts, to wit, the shaft 23 as shown herein, is provided with a belt wheel or pulley 27 to receive a driving belt 28 that may be driven by any suitable motor (not shown).

Each of the rotative cutting elements embraces a plurality of disks 30 having hubs 31 (Fig. 4) which are fixed to their carrying shafts in any suitable manner. Each disk is with two laterally separated circular peripheral surfaces 32, provided at their lateral sides with circular cutting edges 33, 33. The rotating cutting elements thus made up of the disks are so arranged that the peripheral surfaces of the disks 30 of the

cutting element at one side of the path of the feed of the material is opposite to the space 34 between two disks of the opposite cutting element so that opposite cutting edges 33 of the opposite disks overlap each other in shearing relation, as most clearly indicated in Figs. 5 and 6; and it is between these co-acting shearing edges that the web material is cut into strips or ribbons.

In order to reliably feed the material between and present it to said shearing edges and to support the material while it is being cut, the spaces between adjacent disks 30 of each cutting element is provided with a friction element, herein shown as having the form of rubber or other yielding rings 35 which lie closely adjacent to the cutting edges 33. These rings 35 are shown as spaced apart and are made separately from, and are supported by, wider rings 36 of yielding material, as rubber, which fill the spaces between adjacent disks. One of each two adjacent disks may be undercut, as shown in Fig. 4, to reliably hold the rings 36 in place. Obviously, however, the rings 35 and 36 may be made integral. The said elements serve to laterally support the sheet material so as to avoid loosening or sagging thereof and, therefore, holds the material reliably to the cutting edges. By reason of the offset relation of the cutting edges of the rotary cutting elements, the peripheral faces 32, 32, at the lateral edges of which are formed the cutting edges, are presented in apposition to and bear against the peripheral faces of the yielding feed rings 35, as most clearly shown in Fig. 5. The said yielding feed rings 35 are substantially flush with the circular peripheral faces 32 of the cutting elements and are immediately adjacent to or in contact with the disks at their cutting or shearing edges, so that when the cutting edges of the disks overlap in shearing relation, the feed rings are slightly compressed by the disks, to thereby afford a positive feed of the web material between the rotative cutting elements. The strips which are thus cut from the webs 19 are wound upon reels 41, 41 located in sets on the opposite sides of the cutting line of the cutting elements 21, 22. Each set of said reels is fixed to a shaft 43 and said shafts are rotatively mounted in the lower ends of swinging arms 44, 44 which latter are swingingly supported at their upper ends on horizontal shafts 45, 45 that extend transversely between and are supported on brackets 46, 46 that extend divergently from and are supported in any suitable manner on the frame members 13. The said arms 44 and the shafts 43 constitute frames to carry the strip receiving reels. The said shafts 45 are rotated from the shafts 23, 24, before referred to, through the medium of belts 47, 47 which are trained about pulleys 48, 48 on said shafts 23, 24 and other pul-

leys 49, 49 on the shafts 45. The reels on which the cut strips are rolled are rotated from the pulleys 49, 49 through the medium of belts 50, 50 trained about the latter pulleys and other pulleys 52, 52 on the reel shafts 43, 43. The arms 44, 44 which thus carry the reels are free to swing at their lower ends toward and away from the cutting elements and the construction enables said arms and the parts carried thereby to thus move toward and away from said cutting elements without interfering with the driving connections between said reels and the shafts 23, 24. The said reels, or the strip rolls wound thereon, are normally pressed toward the cutting elements so that the strips are wound directly upon the reels as they are delivered from the cutting elements so as to thereby wind the strips into compact rolls. As herein shown, the reels are pressed toward the cutting elements by means of the weights 55, 55 which are suspended on the lower ends of cables 56, 56 that are trained between their ends about directing pulleys 57, 57 and are attached at their upper ends to arms 58, 58 which are attached in any suitable manner to the swinging reel carrying frames. Thus it will be seen that the reels are normally held pressed against the adjacent sides of the cutting elements 21, 22 so that the strips cut by said elements are delivered directly from the cutting elements to the reels; and by reason of the pressure exerted by the weights 55, 55 or equivalent pressure, the strips are maintained in proper tension to wind them compactly on the reels and are pressed or ironed by the pressure of the reels or rolls thereon against the rotative cutting elements. In order that the reels, when the strips are first wound thereon may closely approach the cutting elements, the side plates or members 13 may be cut away, as shown at 60, to permit the shafts of the reels to enter therein and the reels to press against the rotative cutting elements.

In order that the strips may be directed accurately to the reels, and in order to hold the turns of the roll laterally in place on the reel, I provide a series of guide fingers 65 which are attached to the machine, as herein shown, by being fixed to bars 66 that are bolted or otherwise attached to the bed plate 12; and said fingers extend outwardly from their points of attachment with their free ends overlapping the reels or rolls of strip thereon, as most clearly shown in Figs. 2 and 3. The said guide fingers are made of flat strips of metal and bear flatwise against the sides of the reels or rolls of strips wound thereon with a slight pressure and thereby maintain the margins of the strips flush with each other so that the sides of the rolls produced are smooth.

It is not always practicable to obtain webs from which the strips are cut of exactly the

width required to produce the number of strips to be produced therefrom, nor is it always practicable to obtain webs having finished edges such as are desirable to have in the strips. For this reason, I have provided means for disposing of the narrow strips cut from the extreme edges of the web, as follows: 70, 70 designate two reels located in rear of the machine and mounted on a rotative shaft 71 which is in turn rotatively mounted on the outer ends of outwardly and downwardly extending bars 72, 72, which are attached at their forward ends to brackets 73, 73 supported by the side plates 13, 13, as herein shown. The said reels 70, 70 are in line with the edges of the web, and the narrow side strips 75, 75 cut from the extreme edges of the web are trained directly rearwardly over the reels 70. The said reels are rotated through the medium of a pulley 76 on the shaft 71 and a belt 77 trained around the pulley and adapted to be trained about the pulley of a driving motor (not shown). This motor may be the same motor that drives the rotative cutting elements.

The reels 41 about which the rolls of strips are wound are removed from the machine, together with the rolls, after the rolls have been wound thereon, by endwise removal of the shafts 43 on which the reels are mounted. In order to clear the reels from the guide fingers 65 when the rolls are to be removed, brace bars 78, 78 are provided which are hinged at their upper ends to the bars 72, or other parts of the machine, as by means of the pins 79, and said brace bars are of such length that when the reel carrying frames are swung outwardly away from the cutting elements, the ends of the brace bars engage the shafts, or other parts of the reel frames so as to hold the reels outwardly away from the cutting elements. As herein shown, the brace bars are notched at their lower ends to engage the shafts of the reel carrying frames.

The belts 47 or the belts 50 which drive the reels 41 fit sufficiently loosely on the pulleys about which they are trained to permit slippage of the belts on the pulleys so that as the rolls of strips gradually increase in diameter they need not be rotated at a greater peripheral speed than at the beginning of the winding operation.

The operation of the machine will be apparent from the foregoing description and a recapitulation thereof is not deemed necessary. It will be understood, however, that the web or webs are guided into the cutting space between the cutting elements by the guide 20 and are unwound from the rolls 16 by tension derived from the feed action of the web between the rolls, and that the strips after being cut from the web are delivered direct to the reels 41 and wound thereon. The said reels are held by a yielding pressure, effected

by the weights 55, 55 in the present instance, against the cutting elements and, as the rolls of strips increase gradually in diameter the pressure devices permit the reel frame to move outwardly to accommodate the increased diameter of the rolls, while at the same time they act to hold the peripheries of the forming rolls against the cutting elements in the same manner as the reels were initially held against the cutting elements. Therefore, at all times the strips are fed directly upon the forming reels, thus obviating the necessity of providing special guiding means for the strips. When rolls of the desired diameter have been formed, the reel frames are swung outwardly away from the cutting elements and are held in this position by the swinging bars 78 while the filled reels are removed and other reels are placed on the reel shafts.

It will be understood that the structural details illustrated and described may be somewhat varied within the spirit and scope of the invention, and that the invention is not limited to such details except as herein-after made the subject of specific claims and as imposed by the prior art.

I claim as my invention:

1. A machine for the purpose set forth comprising two co-acting rotative, strip-cutting elements, each provided with a series of spaced circular cutting edges with the edges of one element overlapping in shearing relation the cutting edges of the other element, and friction feed means between and immediately adjacent to the cutting edges of each element.

2. A machine for the purpose set forth comprising two co-acting rotative, strip-cutting elements, each composed of a series of spaced disks having cutting edges, with the cutting edges of the disks of one element adapted to co-act in shearing relation with the cutting edges of the other element, and friction feed means between and immediately adjacent to the cutting edges of the disks of each element.

3. A machine for the purpose set forth comprising two co-acting rotative, strip-cutting elements, each composed of a series of spaced disks having cutting edges, with the cutting edges of the disks of one element adapted to co-act in shearing relation with the edges of the other element, the disks of one element being arranged out of line with those of the other element, and friction feed means between the disks of each element adapted for compressive rolling contact with the peripheries of the said disks.

4. A machine for the purpose set forth comprising two co-acting rotative, strip-cutting elements, each composed of a series of spaced disks having squared cutting edges, with the cutting edges of the disks of one element adapted to co-act in shearing rela-

tion with the edges of the other element, the disks of one element being arranged out of line with those of the other element, and yielding friction feed means between the disks of each element adapted for compressive rolling contact with the peripheries of said disks.

5. A machine for the purpose set forth comprising two co-acting rotative, strip-cutting elements, each provided with a series of spaced circular cutting edges with the edges of one element overlapping in shearing relation the cutting edges of the other element, friction feed means between and immediately adjacent to the shearing edges of each element, and a guide for directing a web between the cutting elements.

6. A machine for the purpose set forth comprising two co-acting rotative, strip-cutting elements, each provided with a series of spaced circular cutting edges with the edges of one element overlapping in shearing relation the cutting edges of the other element, friction feed means between the cutting edges of each element, a plurality of separate reels for separately supporting web rolls, and guides to receive the webs from said reels and to direct them to the cutting elements.

7. A machine for the purpose set forth comprising two co-acting rotative, strip-cutting elements, each embracing a series of disks arranged side by side and each provided at its lateral margins with two circular cutting edges, the disks of one element being out of line with those of the other elements so as to thereby bring the cutting edges thereof in shearing relation, and yielding friction means in the spaces between said disks, and adapted for rolling and compressive contact with the opposing peripheries of the disks.

8. A machine for the purpose set forth comprising co-acting strip-cutting means, with means for feeding a web thereto, reels to separately receive strips cut from said web, said reels and the strip rolls thereon being adapted to be maintained in contact with the cutting means and the reels being movable toward and from the cutting means, and means acting on the reels to normally press them toward the strip cutting means, while permitting them to yield away from the cutting means as the diameters of the rolls increase on the reels.

9. A machine for the purpose set forth comprising co-acting strip-cutting means, with means for feeding a web thereto, reels to receive strips cut from said web, said reels and the rolls thereon being adapted to be maintained in contact with the cutting means, a swinging frame for carrying said reels, and means acting on said frame for normally pressing the reels toward said

strip-cutting means while permitting them to yield away from said cutting means.

10. In a machine for the purpose set forth, two co-acting rotative strip cutting elements comprising spaced cutting edges which overlap in shearing relation and between which a web is cut into strips, and strip receiving reels adapted for contact with and yieldable from said cutting elements as the diameters of the strip rolls increase.

11. In a machine for the purpose set forth, two co-acting rotative strip-cutting elements comprising spaced cutting edges which overlap in shearing relation, and between which a web is cut into strips, with yielding friction feed means between said edges, and strip receiving reels adapted for contact with and yieldable from the cutting elements as the diameters of the strip rolls increase.

12. A machine for the purpose set forth comprising co-acting strip-cutting means, with means for feeding a web thereto, reels to receive strips cut from said web, a swinging frame for carrying said reels, means acting to yieldingly press the reels toward said cutting means, and a swinging bar hinged to a fixed part of the machine frame and adapted to engage at its free end said frame to hold the reels away from the strip-cutting means.

13. A machine for the purpose set forth comprising two rotative strip-cutting elements, each embracing a series of spaced disks having cutting edges arranged in overlapping shearing relation, with means for feeding a web between them, and two sets of reels, one at each side of said cutting elements to receive strips cut from the web, and means whereby said disks are pressed toward and in contact with said cutting elements, but yieldable away therefrom as the diameters of the strip-rolls thereon increase.

14. A machine for the purpose set forth comprising co-acting strip-cutting means, with means for feeding a web thereto, and two sets of reels, one on each side of the strip-cutting means to receive the strip cut from said webs, the reels of one set being out of line with the reels of the other set whereby alternate strips are delivered to reels on opposite sides of the strip-cutting means.

15. A machine for the purpose set forth comprising two rotative strip-cutting elements, each composed of a series of spaced disks having cutting edges with the cutting edges of one set overlapping in shearing relation the cutting edges of the other set, means to guide a web between said elements, and two sets of reels, one set at each side of the said cutting elements, to receive the strips cut from said web, with the reels of one set out of line with the reels of the other

set, whereby alternate strips are directed to reels at opposite sides of the machine.

16. A machine for the purpose set forth comprising two rotative strip-cutting elements, each composed of a spaced series of circular disks having cutting edges, with the cutting edges of one set overlapping in shearing relation the cutting edges of the other set, means to present a web between the said elements, two sets of reels, one set at each side of the said cutting elements, to receive the strips cut from said web, with the reels of one set out of line with the reels of the other set, whereby alternate strips are directed to reels at opposite sides of the machine, and means whereby the said reels are yieldingly pressed toward said cutting elements.

17. A machine for the purpose set forth comprising co-acting, rotative strip-cutting elements, means for feeding a web thereto, two sets of reels, one set on each side of said strip-cutting elements and adapted to bear directly against said elements to directly receive the strips cut from said web, and means for yieldingly pressing said reels toward said strip-cutting means while permitting them to yield away from the cutting elements.

18. A machine for the purpose set forth comprising co-acting, rotative strip-cutting elements, with means for feeding a web thereto, two sets of reels for receiving the strips cut from said web, located one at each side of the cutting means and adapted for contact with said elements on lines remote from their lines of co-action, a swinging frame for carrying said reels, and means co-acting with said frame for yieldingly pressing said reels toward said strip-cutting elements.

19. A machine for the purpose set forth comprising co-acting strip-cutting elements, with means for feeding a web thereto, two sets of reels for receiving the strips cut from said web, located one on each side of the cutting means, swinging frames for carrying said reels, cables attached to said swinging frames, pulleys about which the cables are trained and weights suspended by said cables, for the purpose set forth.

20. A machine for the purpose set forth comprising two co-acting rotative, strip-cut-

ting elements, each provided with a series of spaced circular cutting edges with the edges of one element overlapping in shearing relation with the cutting edges of the other element, reels to receive the strips cut from a web and guides adjacent to the cutting elements overlapping and pressing against the opposite sides of each reel to directly receive the strips from the cutting elements and guide them to said reels.

21. A machine for the purpose set forth comprising co-acting strip-cutting means, means for feeding a web thereto, reels movable toward and from the cutting means to receive the strips cut from the web and fixed guides arranged in pairs between the cutting means and said reels, with the guides of each pair overlapping a cooperating reel and the roll wound thereon.

22. A machine for the purpose set forth comprising two co-acting rotative, strip-cutting elements, each provided with a series of spaced circular cutting edges with the edges of one element overlapping in shearing relation the cutting edges of the other element, reels to receive the strips cut from a web, means to press the reels toward the strip-cutting elements while permitting them to yield away therefrom, and guides overlapping the reels and the rolls wound thereon to guide the strips from the cutting means to said reels.

23. A machine for the purpose set forth comprising two rotative cutting members formed with cylindric squared peripheries to constitute lateral shearing edges which overlap in shearing relation, a yielding friction feed member on each cutting member immediately adjacent to the cutting edges, arranged with the friction feed members, one on each of two cooperating shearing edges, said feed member of each cutting member beating in rolling contact against the squared periphery of the other cutting member.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 9th day of May, A. D. 1913.

CHESTER H. THORDARSON.

Witnesses:

W. L. HALL,
GEORGE E. HIGHAM.