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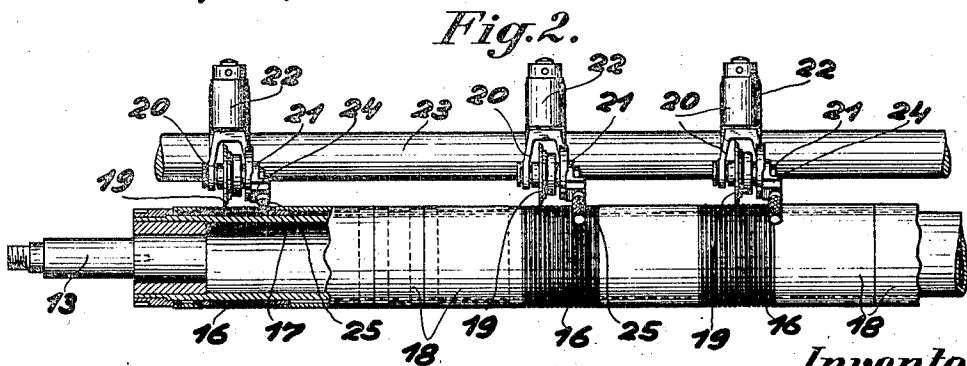
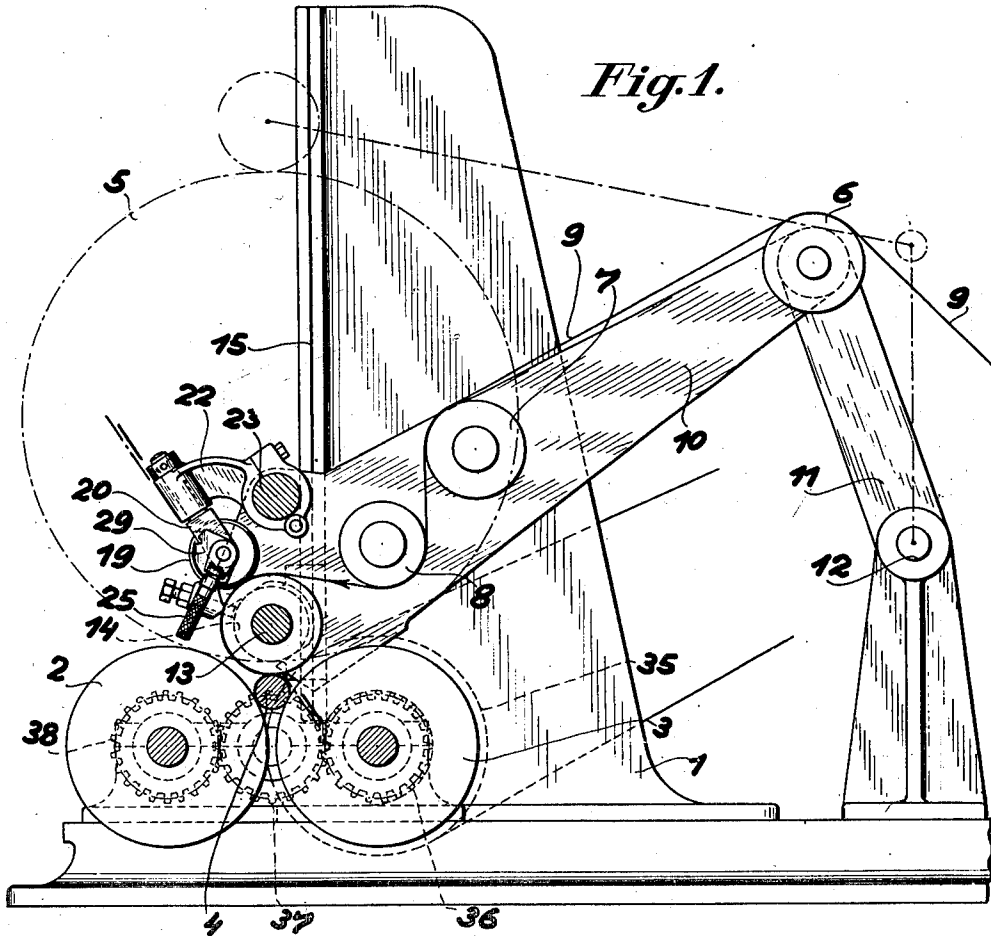
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1,741,520

ROLL CUTTING AND WINDING MACHINE

Filed Aug. 30, 1926

3 Sheets-Sheet 1



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Fig.3.

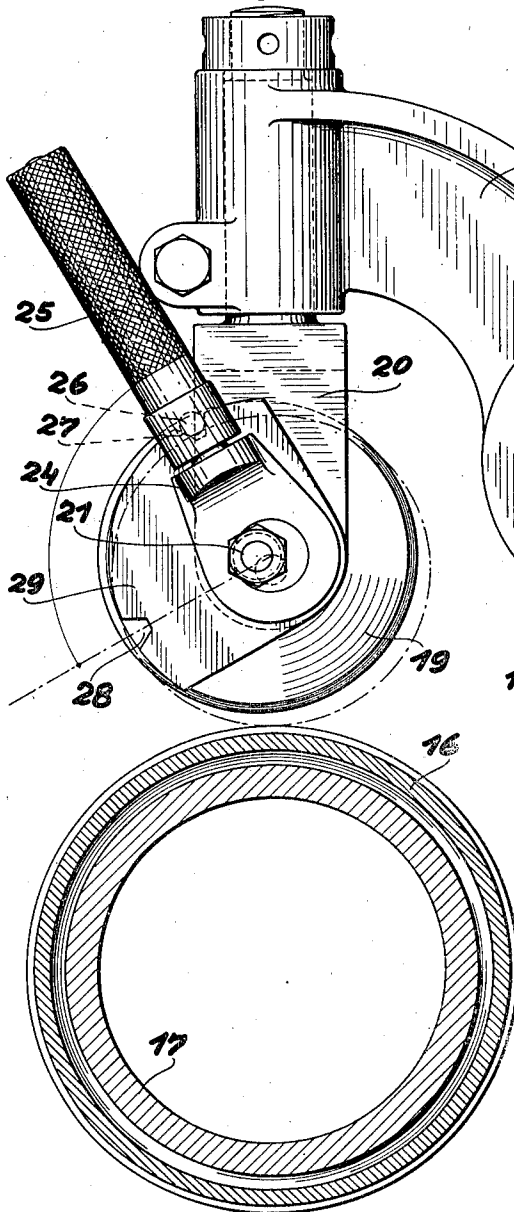
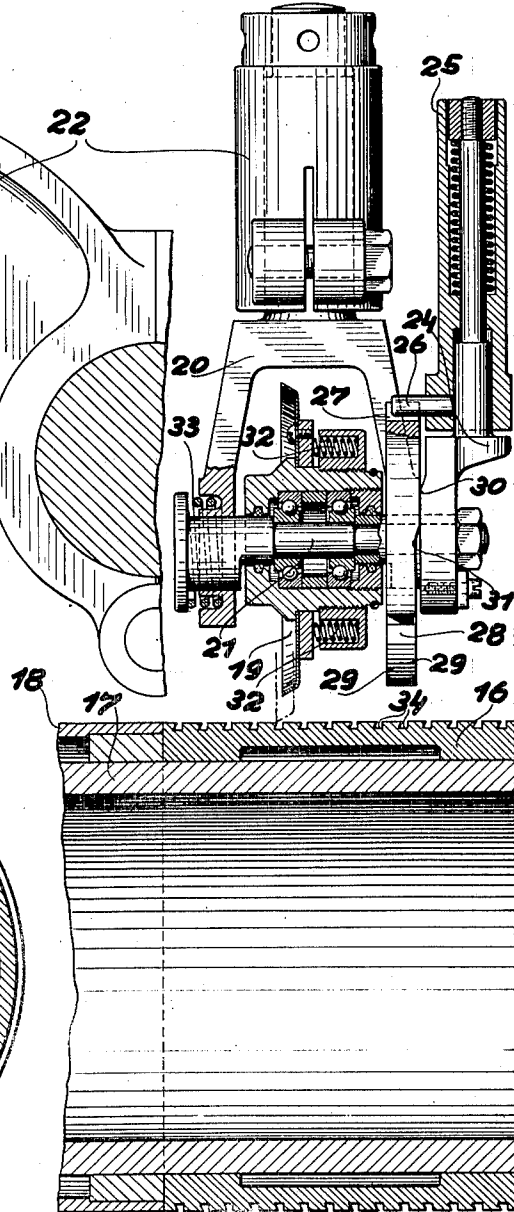


Fig.4.



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Fig. 5.

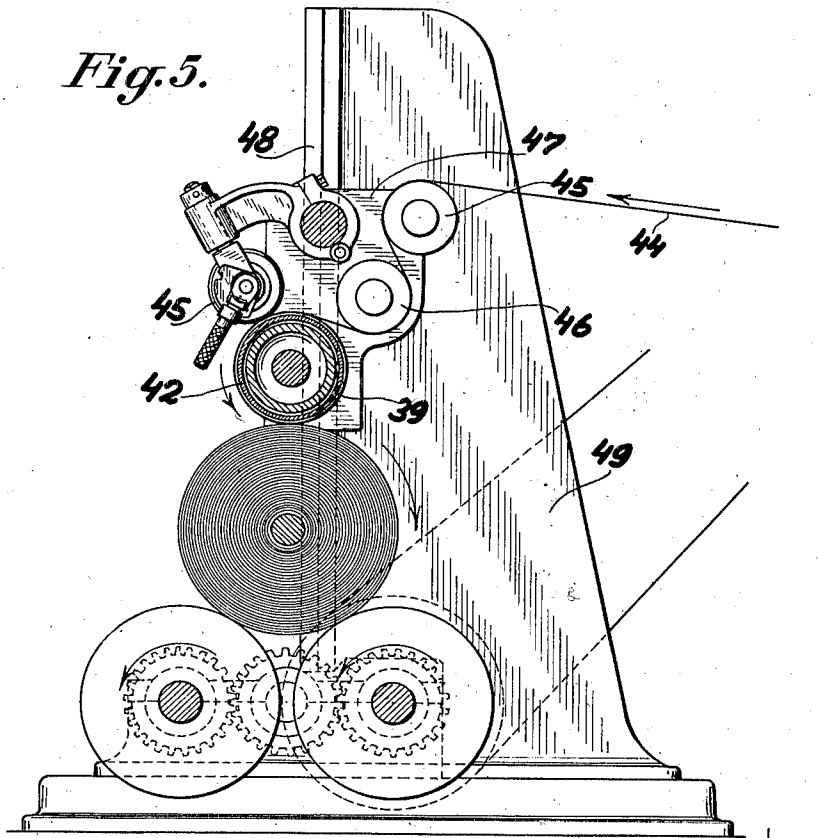


Fig. 6.

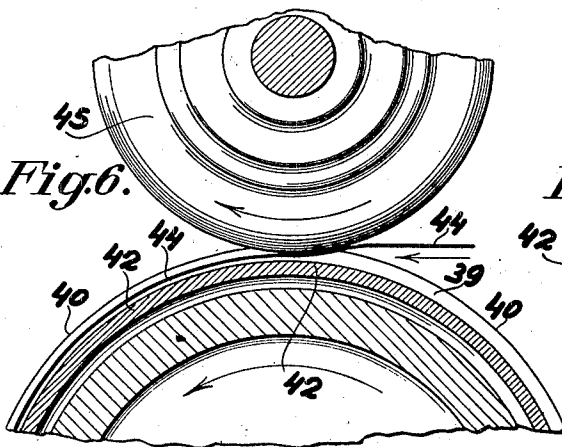
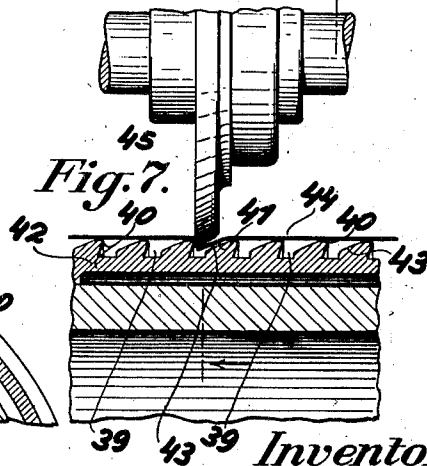


Fig. 7.



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UNITED STATES PATENT OFFICE

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ROLL CUTTING AND WINDING MACHINE

Application filed August 30, 1926, Serial No. 132,644, and in Germany November 6, 1925.

This invention has reference to roll and spool cutting and winding machines and it is intended to improve the construction and manipulation of machines and devices of the kind referred to, to keep the several rolls clear of each other, to obtain smooth layers with sharp edges and to produce other important objects and advantages to be referred to. In its broad aspects the invention relates to a roll-cutting and winding machine in which the cut and properly wound rolls or spools are carried by rotating supporting rollers producing the operation of the rolls to be rotatably wound in combination with means of so disposing the supporting frame for the guide rollers and the circular knives as to make them vertically reciprocable and causing said supporting frame to bear upon the rolls to be wound by means of a pressure roller. In accordance with this invention the lower knife roller operates as a pressure roller itself, by which means a quiet, uniform movement of the web of paper or the like and an unobjectionable dense winding of the rolls is obtained, so as to yield a roll which on being struck, will yield a hard sound. The several advantages of the new machine are particularly apparent in the case of operating with work of great width.

In connection with roll-cutting and winding machines it is well known to employ the lower knife roller also as the guiding roller for the roll of paper to be wound, and particularly in the case of machines with movable winding mandrel and without supporting rollers, but with all these machines in accordance with the previous art the width of the pieces of work was only limited and they were not adapted for the manufacture of rolls with large diameter of say, about 1½ meters. In connection with heavy cutting and winding machines it was common heretofore to only use single knives for the lower knife roller likewise and to lead the paper or the like, after its having left the cutting members, first over a pressure roller which bears upon the roll of paper to be wound.

When working material of great widths with machines of the kind described there is

the drawback that the cutting edges of the cut rollers are liable to overlap or to run one into the other, and that the several individual rolls can only be severed from each other by the exertion of very great force, thus for instance, by the driving in of wedges or the like. With a view of keeping the several cut webs of material separate from each other it has also been proposed to employ various constructions of cut-separators which, however, were open to the difficulty that in the case of a somewhat inexact adjustment injury and laceration of the edges of the paper or the like were likely to occur. The modern printing machines require, however, an unobjectionably well cut roll of paper with perfectly smooth front sides of the roll without fissures and torn portions and equivalent objectionable feature inasmuch as otherwise the running of the plant is very considerably interfered with and retarded.

Now, in accordance with the arrangement according to this invention these difficulties are avoided by the fact that the winding of the cut rolls takes place in a perfectly quiet and regular manner, and by dispensing with the use of special cut-separating devices. By this means it is also possible to employ winding cores or mandrels of comparatively thin diameter, thus for instance of about 50 millimeters or 2 inches, and the diameters of the rolls to be wound may be increased to about 1½ meters or 5 feet. This is a point of great importance in view of the fact that by this means the rapidly rotating printing machines by avoiding the frequently occurring interruptions of work with comparatively small rolls, are caused to operate more economically.

The invention will be more fully described with reference to the accompanying drawing showing by way of example an embodiment of the principles of the invention in Figure 1 in vertical longitudinal section, and in Figure 2 in partial cross section on the line A—B of Figure 1, while Figures 3 and 4 show details on an enlarged scale to be referred to. Figure 5 is a modified form of construction in vertical longitudinal section. Figures 6 and 7 show a portion of the cutting roller

respectively in longitudinal and in transverse section and on an enlarged scale.

In the frame 1 of the machine the supporting rollers 2, 3 for the rolls 5 are mounted which latter are to be wound upon the winding core 4, the said rollers 2, 3 being actuated by a pulley 35 and gear wheels 36, 37, 38. The guide rollers 6, 7 and 8 for the web of material, paper or the like 9 and the circular knives for cutting the web longitudinally are mounted in a support 10 which, by means of link-motion 11, is pivotally mounted on the shaft 12 on the machine frame. With studs or trunnions 13 the lower knife-roller is journaled in the sliding bearings 14 which are guided for vertical movement in the prismatic guides 15 on the machine frame. The lower knives are formed by dove-tailed annular grooves in steel rings 16 which are provided with a plurality of such grooves arranged adjacent each other. The rings 16 are fitted at proper distances apart upon the roller core 17, and are secured in position by intermediate rings 18. By a suitable distribution of the knife rings 16 they may be adjusted to suit all possible widths of rolls to be cut. Instead of an upper knife shaft a series of knife or cutting discs 19 are provided which are made to run upon the ball bearings of a shaft 21 which is eccentrically disposed in a fork-shaped holder 20. The several knives are adjusted and locked in position by means of supporting arms 22 upon a bar 23 along which they are longitudinally displaceable. Upon the shaft 21 of each individual upper knife 19 a manually operated lever 24 is mounted, the spring-operated handle 25 of which is adapted to engage by means of stud 26 with the recesses 27, 28 of a segment 29 connected to the fork 20. By the rocking of the levers 24, 25 in view of its eccentric arrangement the cutting disc 19 is lifted out of the groove 34 of the lower knife roller constituting the counter-knife or made to engage therewith (Figure 4), while at the same time by the upwardly inclined surfaces 30, 31 or the parts 24 and 29 an axial displacement of the knife 19 is produced and in such a manner that the knife 19 upon being lowered is spaced somewhat from the cutting edge of the groove 34 of the counter-knife and is only displaced towards the same after being lowered, while upon the disengaging and raising of the knife the said knife first recedes laterally away from the counter-knife and is only lifted after that. In the operating position the knife 19 is resiliently pressed against the counter-knife by means of springs 32 and 33.

Figure 1 shows the supporting member 10 in the lowest position at the beginning of the operation. Upon the increase of the diameter of the roll the pressure rollers 16, 18 which bears upon the roll and which operates directly as a knife shaft, is raised, and slides in the vertical guides 15, the links 11 permitting

the rocking movement of the supporting member 10. In accordance with the novel manner of winding a smooth, quiet and uniform movement of the web of paper or the like and an unobjectionable winding of the rolls in form of a dense hard sounding body is obtained, as already stated, even in the case of very large working widths.

The modification according to Figures 5-7 is particularly distinguished by the fact that in the undercut or dovetailed annular grooves of the pressure-roller and lower cutting roller the edges opposite the cutting edges are flattened, by which means, when the web of paper is cut, a very advantageous flat bending of one of the edges of the web of paper and positioning of this edge in the annular groove of the lower knife is accomplished. This paper edge is thereby protected against being crushed, and in view of the shortening of the paper edge due to the bending which is of no consequence in the practical operation, this edge is easily retained within the annular groove of the cutting roller upon its way from the cutting point to the winding point, so that the web of paper or similar material is secured against lateral displacement and against becoming entangled with the adjoining web of paper. At the same time the bent-over edges are protected from strain in such a manner that they will lay down again flat, when being wound up, so that paper rolls with smooth, unobjectionable end surfaces may be obtained which is of great importance in the further treatment of the wound-up paper, thus for instance, on modern, rapidly moving rotary printing presses for newspapers and the like. The cutting edges 40 produced by the annular grooves 39 on the rings 42 of the knife roller are arranged opposite the edges 41 which are inclined laterally in such a manner that the lateral edge 43 of the cut web of paper 44 is bent flat downwards and into the annular groove 39 by the action of the back of the circular knife 45, and this flattened portion remains in this groove until it reaches the winding-up point. By this means lateral displacement of the web of paper 44 is prevented and an unobjectionable separation of the adjacently wound rolls of paper or the like is accomplished. The supporting post 47 carrying the circular knives and the guide rollers 45, 46 is movably guided like a carriage on vertical guides 48 of the machine frame 49, so that the rocking hinges and the like provided for the corresponding supporting member of the embodiment first described may be dispensed with. The invention is susceptible of other modifications and changes to suit existing conditions and varying local and other requirements and without deviating from the spirit and scope of the invention, as particularly pointed out in the appended claims.

I claim:—

1. In a roll cutting and winding machine the combination with rotatable supporting means for supporting a diametrically gradually increasing roll of flexible material in contact therewith, of a movable supporting member, a rotatable lower and peripherally fluted cutting member on said supporting member and bearing upon said roll, the annular peripherally extending fluted portions comprising a cutting edge and an opposite outwardly flaring wall, upper, eccentrically movable cutting means engageable with the fluted portions, and guiding means on said supporting member, adapted to guide and feed a supply of flexible material between the cutting members and onto said roll.

2. In a roll cutting and winding machine the combination with rotatable supporting means for supporting a diametrically gradually increasing roll of flexible material in operative contact therewith, of a movable supporting member, a lower peripherally fluted cutting member on the supporting member and resting upon the roll, cutting edges on the fluted portions, a plurality of upper, eccentrically movable cutting means engageable with the fluted portions of the lower cutting member, means to adjust and lock the upper cutting member in position, and guiding means on said supporting member, adapted to guide and feed a supply of flexible material between the cutting members and onto said roll.

3. In a roll cutting and winding machine the combination with rotatable means for supporting a diametrically gradually increasing roll of flexible material in operative contact therewith, of a vertically movable supporting member carrying said roll, a lower cutting roller, bearing upon said roll and operatively connected to the supporting member, a plurality of annular, adjustably mounted cutting members on said roller, a plurality of adjustably mounted, eccentrically movable upper cutting knives, adapted for cooperation with the cutting members on the lower cutting roller and independently movable with relation thereto, and means on the supporting member adapted to guide and feed a supply of flexible material between the upper and lower cutting means, and onto said roll.

4. In a roll cutting and winding machine the combination with rotatable supporting means for supporting a diametrically gradually increasing roll of flexible material in contact therewith of a supporting member, movable with relation to said roll, a plurality of adjustably spaced eccentrically movable cutting means, operatively connected to said supporting member, and a plurality of counter-cutting means cooperating therewith and bearing upon said roll, separate adjusting and locking handles for each of the eccentrically movable cutting means, cam surfaces

engageable with the handles and adapted to produce an axial movement of the cooperating cutting means with relation to each other, and means on the supporting member adapted to guide and feed a supply of flexible material between the cooperating cutting means and onto said roll.

5. In a roll cutting and winding machine, a frame, rotatable supports on the frame for a winding roll of flexible material of progressively increasing diameter, a vertically movable support, a cutting roll carried by and movable with the vertically movable support and in bearing contact with the winding roll and acting as a pressure roll thereon, said roll having a plurality of cutting members each provided with a plurality of cutting surfaces arranged side by side, rotary cutters carried by and movable with the vertically movable support and coacting with the cutting members on the cutting roll to divide the winding flexible material into strips, means for adjusting said rotary cutters toward and from and laterally into and out of contact with the cutting surfaces of the cutting members on the cutting roll with which they coact, and guiding means for leading the flexible material between the cutting roll and rotary cutters and to the winding roll.

6. In a roll cutting and winding machine, a frame, rotatable supports on the frame for a winding roll of flexible material of progressively increasing diameter, a vertically movable support, a cutting roll carried by and movable with the vertically movable support and in bearing contact with the winding roll and acting as a pressure roll thereon, said roll having a plurality of cutting members each provided with a plurality of cutting surfaces arranged side by side, rotary cutters carried by and movable with the vertically movable support and coacting with the cutting members on the cutting roll to divide the winding flexible material into strips, means for adjusting said rotary cutters toward and from and laterally into and out of contact with the cutting surfaces of the cutting members on the cutting roll with which they coact, and guiding means also carried by and movable with the vertically movable support for leading the flexible material between the cutting roll and rotary cutters and to the winding roll.

7. In a winding and cutting machine, the combination with driven rollers for winding a web of material into roll form and supporting and rotating said roll, of a supporting member movable toward and from the roll, a lower rotatable cutting roll carried by the supporting member and provided with a plurality of cutting members and over which the web from the roll is fed, and a coacting upper cutting device comprising a support and a plurality of individual rotary cutting disks carried thereby and ad-

justable toward and from the cutting members upon the lower roll, said lower roll acting directly as a pressure roll upon the roll of material.

5 8. In a winding and cutting machine, the combination with driven rollers for winding a web of material into roll form and supporting and rotating said roll, of a supporting member movable toward and from the
10 roll, a lower rotatable cutting roll carried by the supporting member and comprising a core, rings adjustably and removably mounted upon the core and provided with annular cutting members, and distance members
15 upon the core between and spacing said rings, and an upper cutting device comprising a support mounted on said supporting member and carrying a plurality of individual rotary cutting disks adjustable toward and from the cutting members upon
20 the lower roll, said lower roll acting directly as a pressure roll upon the roll of material.

9. In a winding and cutting machine, a
25 frame provided with vertical guides, driven rollers for winding a web of material into roll form and rotating said web, a supporting member movable on said guides, a link mechanism carrying said supporting member, a lower rotatable cutting roll carried by
30 said supporting member and provided with a plurality of cutting members and over which the web from the roll of material is fed, and an upper cutting device carried by
35 said supporting member and comprising a plurality of individual rotary cutting disks adjustable toward and from the cutting members upon the lower roll, said lower roll being arranged to bear directly upon and
40 act as the pressure element upon the roll of material.

10. In a winding and cutting machine, the combination with driven rolls for winding a web of material into roll form and supporting and rotating said roll, of a supporting
45 member movable toward and from the roll, a lower rotatable cutting roll carried by the supporting member and provided with a plurality of cutting members and over
50 which the web from the roll of material is fed, an upper knife support carried by the supporting member, eccentric shafts upon said knife support, rotary cutting disks carried by said shafts, and means for turning
55 the eccentric shafts for adjusting the rotary disks into and out of operative position.

11. In a winding and cutting machine, the combination of driven rollers for winding a web of material into roll form and supporting and rotating said roll, of a supporting member movable toward and from
60 the roll, a lower rotating cutting roll carried by the supporting member and provided with a plurality of cutting members and over which the web from the roll of ma-

terial is fed, and a coacting upper cutting device comprising a support, eccentric shafts carried by said support, cutting knives carried by the shafts for coaction with the cutting members on the cutting roll, means for turning the eccentric shaft for
70 adjusting the cutting disks into and out of operative position, and means operative on a turning movement of each eccentric shaft for adjusting the cutting disk carried there-
75 by laterally with relation to the cutting member on the cutting roll with which it coacts.

12. In a winding and cutting machine, the combination with driven rollers for winding
80 a web of material into roll form and supporting and rotating said roll, a supporting member mounted for vertical movement, guides for the web of material on said supporting member, a lower rotatable cutting
85 roll carried by the supporting member and provided with a plurality of cutting members and over which the web to form the roll of material is fed from said guides, and an upper cutting device comprising a sup-
90 port carried by the supporting member and having mounted thereon a plurality of individual rotary cutting disks adjustable toward and from the cutting members upon
95 the lower roll, said lower roll acting directly as a pressure roll upon the roll of material.

13. In a machine of the character described, a cutting roll provided with annular cutting blades and grooves between the cut-
100 ting blades, a support above said roll and movable toward and from the same, and cutting disks upon said support for coaction with said cutting blades of the roll, said blades of the roll having surfaces laterally
105 inclined toward the grooves between the blades of said roll for deflecting the edges of material cut by a blade and disk into the groove between said blade and an adjacent
110 blade of the roll.

In testimony whereof I affix my signature.

EMIL JAGENBERG.

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