

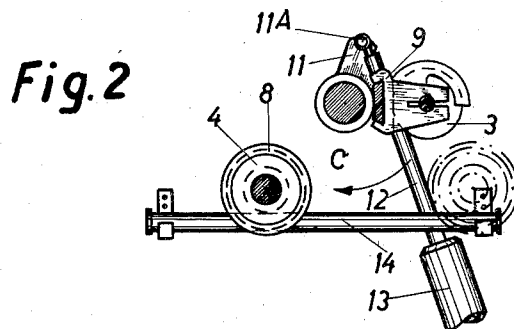
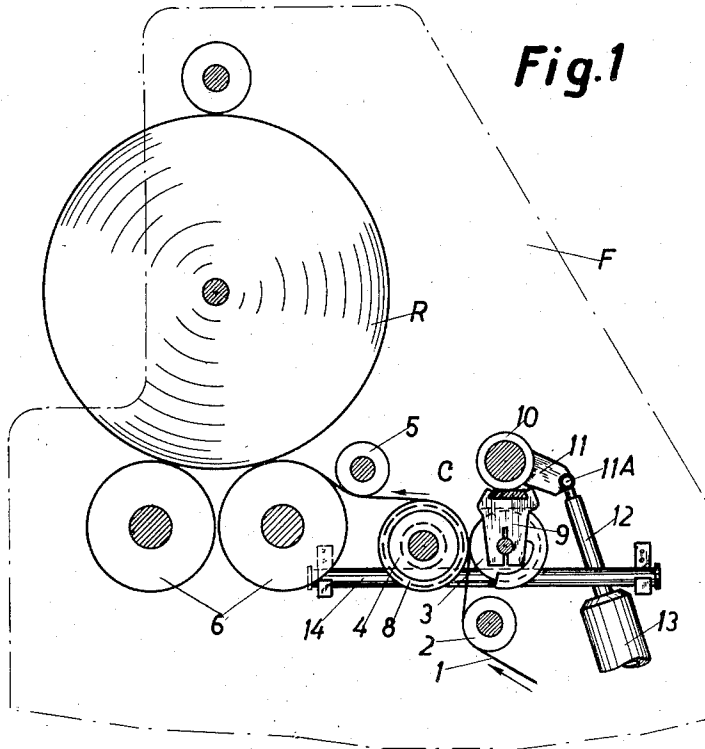
May 21, 1957

E. KUSEL
ROLL CUTTING MACHINES FOR MOVABLE WEBS OF
PAPER, CARDBOARD OR THE LIKE

2,792,889

Filed June 27, 1955

2 Sheets-Sheet 1



Inventor
E. Kusel
By *Joseph Downing* Sec. 101
Attys.

May 21, 1957

E. KUSEL
ROLL CUTTING MACHINES FOR MOVABLE WEBS OF
PAPER, CARDBOARD OR THE LIKE

2,792,889

Filed June 27, 1955

2 Sheets-Sheet 2

Fig. 3

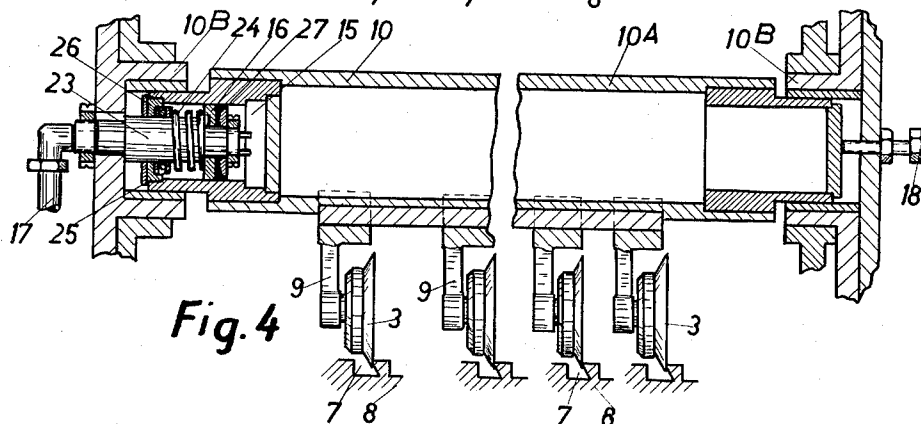
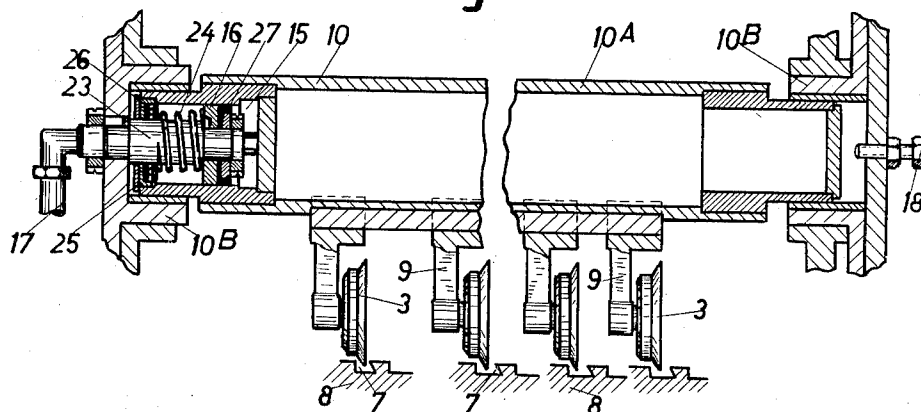
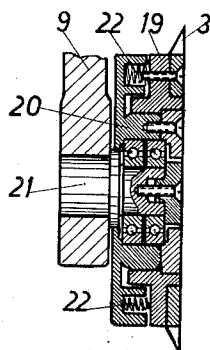


Fig. 4

Fig. 5



Inventor
E. Kusel
By *Harold Downing Lebold*
Attys.

1

2,792,889

ROLL CUTTING MACHINES FOR MOVABLE WEBS OF PAPER, CARDBOARD OR THE LIKE

Ernst Kusel, Dusseldorf-Lohausen, Germany, assignor to Jagenberg-Werke Akt.-Ges., Dusseldorf, Germany

Application June 27, 1955, Serial No. 518,274

Claims priority, application Germany July 5, 1954

5 Claims. (Cl. 164—65)

The present invention relates to improvements in cutting machines for movable webs of paper, cardboard or the like, and more particularly to machines of the type wherein the moving web is guided between circular knives and a counterroller prior to being wound on a suitable core or roll.

In machines of this general type, it is known to move the swingably arranged circular knives, after such knives have been set or adjusted to their desired cutting width by means of pneumatically or hydraulically operated mechanisms located adjacent the counterknife roller which counterroller may be either grooved or defined by a plurality of counterknives, to and away from the counterknife roller. Generally, the machine includes means to dispose the circular knives adjacent to the counterroller until the cooperating cutting edges are in overlapping relationship, but, are not in contacting relationship. To move the cutting knives to the final cutting position, means must be provided to displace such circular cutting knives to such an extent that the same abut the respective cutting edge of the counterroller or counterknife.

In order to accomplish this latter end, it has been proposed to coordinate with each circular knife, a pressure cylinder, which under the action of a pressure medium of central direction, yet controlled independently of each other, will cause the axial displacement of the circular knife and thus its abutting relation to the cutting edge of the counterroller. Such an assemblage requires a plurality of pressure cylinders corresponding in number to the circular knives and the cylinders must be connected by conduits with a control element located at a remote point. Overlooking the plurality of cylinders necessary which materially increase the cost of the assemblage, this arrangement is quite large making it difficult to inspect, particularly by reason of the pressure conduits leading from the cylinders to the control element. In addition, the pressure cylinder lay-out necessary for each knife requires a relatively wide structure for the knives, by which a cutting of the web below the width dimension of the circular knives is impossible as the knives cannot be set closely enough to one another with their cutting edges.

An important object of the invention is to overcome the above and other disadvantageous features currently existing in the art.

To accomplish the foregoing and other advantageous objects, the invention broadly comprises adjustably mounting narrow circular knives on a support which support is slidable axially under the action of a suitable pressure medium whereby it is possible to adjust simultaneously all of the circular knives relative to the cutting edges of the counterknives.

More specifically, the support per se or a part thereof constitutes a pressure cylinder, which under the action of pressure admitted therein is subjected to axial displacement by a piston carried by the frame of the machine. Such displacement is opposed by spring means surrounding the piston and when the flow of the pressure medium

2

is arrested, the spring means serves to move the support axially in the other direction.

To compensate for spacing differences which are unavoidable in the setting of the circular knives, and to achieve a resilient abutting pressure, spring means is interposed between the knife holder and the knives.

Hence, by virtue of the invention, a simple assembly, which is positive and efficient in operation and which can be manufactured and maintained at a reasonable cost is provided.

From a study of the following description, the various objects and advantages of the invention will become more readily apparent, and, the invention consists in the details of construction, and, in the arrangement and combination of parts to be later more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this application, and, in the specification, similar reference characters indicate the same or similar parts in the several views and in which:

Figure 1 is a side elevational view, partly broken away, and partly in cross-section of a machine embodying the invention.

Figure 2 is a side elevational view, partly broken away and partly in cross-section of the cutting assembly in its position permitting the adjustment of the width of cut.

Figure 3 is a vertical sectional view of the means for supporting the circular knives, with the knives shown in full lines in the operating position, prior to axial adjustment.

Figure 4 is a view similar to Figure 3, after axial displacement of the support, and,

Figure 5 is a vertical sectional view of one of the circular knives.

Referring to Figure 1, F denotes a winding machine frame of suitable design, and, a web 1 of paper, cardboard or the like moves over guide roller 2 into a cutting unit C, under guide roller 5 to a winding roll R supported by rollers 6 journaled in the side plates of the frame. The cutting unit C comprises a plurality of circular knives 3 and a grooved counter roller 4.

The counterroller 4 consists of a body having a plurality of cutting elements 8 provided throughout their widths with cutting grooves 7. The elements are slidable axially a small degree relative to one another, and, can be fixed to the body by any means known in the art. Each knife 3 is rotatably supported by a holder 9, with such holders slidable longitudinally on a support indicated generally 10. In order to ensure a resilient abutting pressure between the knives 3 and the cutting edges of the grooves 7 during operation, it will be noted in Figure 5 that each knife is secured to a supporting ring 19, the inner bore of the ring 19 being arranged on a hub 20 having a convex running surface. The hub 20 in turn is rotatably mounted on a shaft 21 conveniently secured to the holder 9. A plurality of coil springs 22 are interposed between the hub and the ring 19 adjacent the periphery of the ring, and, this resilient mounting will permit the resilient abutting pressure between the knives and the cutting edges of the counterroller.

The support 10 includes a tubular body 10A which is rotatably mounted at each end in the side plates of the frame F as indicated at 10B. At each end of the support, a lever extends from the support and the free end of the lever is connected as at 11A with piston rod 12 reciprocable in an air cylinder 13. As illustrated in Figure 2, when air is admitted into the lower end of the cylinder 13, the piston rod is urged upwardly thus turning the support 10 whereupon the circular knives 3 are elevated or swung in a upward direction so that the adjustment of the knives 3 can be effected in an easy fashion. Furthermore, the

3

mounting of the counterroller 4 is such that it can be detached from its drive and can be advanced on guide rails 14 mounted in the frame whereby a simple and easy adjustment of the cutting elements 8 as well as the outwardly and upwardly moved knives are possible.

With reference to Figures 3 and 4, it will be observed that the support 10 or a portion thereof is provided with an air pressure cylinder 15 in which is disposed a piston 16 fixed in the side plate of the frame F. The piston is carried by piston rod 23 and air from an air compressor (not shown) passes through conduit 17 and through the piston to cause an axial displacement of the support 10 and the knives 3 whereby the knives 3 engage the cutting edges of the grooves 7 as shown in Figure 4. On the opposite side plate of the frame F, I provide an adjustable stop 18 to limit the amount of axial movement of the support 10.

When the air entering the support 10 is arrested so that the support and the knives 3 may be returned to the Figure 3 position, it can be seen that a coil spring 24 surrounds the piston rod 23 with one end engaging the face of the piston 16 and the other end, a wall 25 which closes the end of the support 10. A ball bearing 26 is positioned between the wall 25 and the end of the spring 24 to receive the axial pressure developed by the spring and the piston is provided with an elastic sealing ring as is well known in the art.

It is also within the scope of the invention that the disposition of the circular knives against the cutting edges of the counterroller may be effected by the action of the coil spring while the axial displacement of the support holding the circular knives may be moved from the working position by means of air under pressure.

It will be appreciated from the above description that the plurality of circular knives are carried by a common support and that pressure means is employed to displace the common support axially to bring the circular knives into abutting relation to the cutting edges of the counterroller. At least a part of the common support defines a pressure cylinder and the axial displacement of the support is guided by a piston fixed to the machine frame when pressure fluid is admitted into the support whereas, upon the cessation of the flow of pressure fluid, spring means associated with the piston serves to return the support and the circular knives to their starting position.

This assemblage is much simpler structurally than the prior devices thereby permitting the same to be manufactured at a lower cost, and, due to the compact nature of the assemblage, an operator can easily inspect the same during operation.

The invention is not to be confined to any strict conformity with the showings in the drawings, but, may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

I claim:

1. In a machine for cutting webs of paper, cardboard

4

or the like of the type wherein the web is guided between circular knives and a counterroller provided with cutting edges coacting with the circular knives, the improvement comprising a common pressure cylinder defining a support for all of the circular knives, and a fixed piston co-operating with and guiding the cylinder so that the cylinder is displaced axially upon the admission of a pressure medium into the cylinder thereby moving the circular knives to positions abutting the cutting edges of the counterroller.

2. A machine as defined in claim 1 further characterized in that spring means associated with the piston opposes the axial displacement of the cylinder upon the introduction of the pressure medium and serves to return the cylinder to its initial position when the introduction of the pressure medium is arrested.

3. A machine as defined in claim 2 further characterized in that an adjustable stop disposed in the path of movement axially of the cylinder serves to limit the amount of movement of the cylinder.

4. In a machine for cutting webs of paper, cardboard or the like of the type having a frame, means guiding the web between horizontally disposed circular knives and a horizontally disposed counterroller provided with cutting edges coacting with the circular knives, the improvement comprising a tubular support journaled for rotation about a horizontal axis and capable of limited axial movement in the frame, means mounting the circular knives on the support, power means connected to the support to rotate the same whereby the circular knives may be moved toward and away from the counterroller, a cylinder in one end of the tubular support, a piston fixed to the frame and disposed within the cylinder, a fluid pressure conduit in communication with the cylinder, and spring means surrounding the piston so that upon the introduction of fluid pressure into the conduit, the spring means opposes the axial displacement of the support to move the circular knives into abutting relation with the cutting edges of the counterroller and serves to return the support and the circular knives to their initial position when the introduction of the fluid pressure into the cylinder is arrested.

5. The machine defined in claim 4 further characterized in that the frame carries an adjustable stop in the path of movement of the support at the end opposite to the cylinder to limit the amount of axial movement of the support.

References Cited in the file of this patent

UNITED STATES PATENTS

50	307,355	Tweddell et al. -----	Oct. 28, 1884
	823,250	Aldrich -----	June 12, 1906
	2,043,818	Thibedeau -----	June 9, 1936
	2,086,476	Quick et al. -----	July 6, 1937
55	2,285,846	Stocker -----	June 9, 1942
	2,571,201	Clem -----	Oct. 16, 1951