

June 23, 1925.

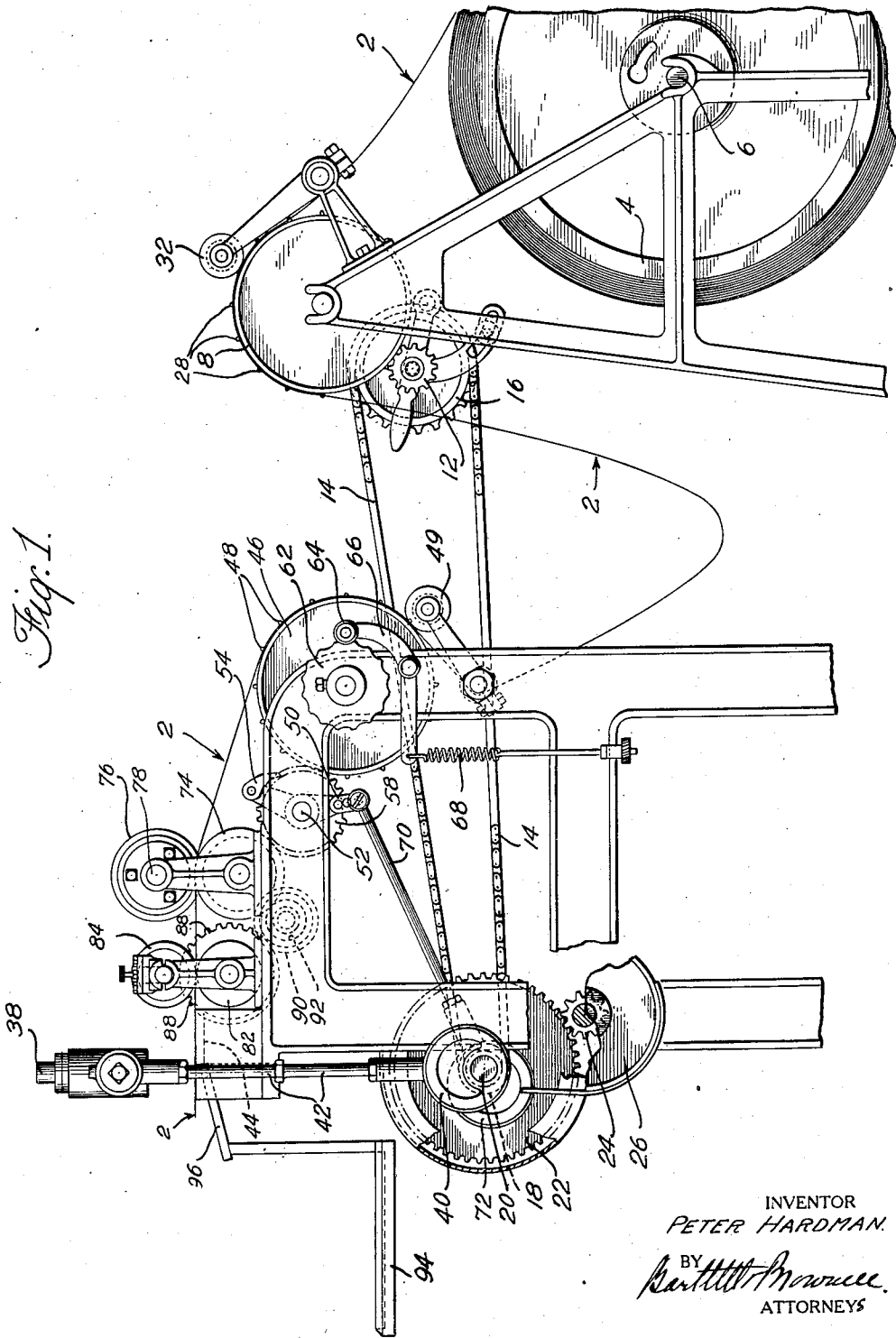
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P. HARDMAN

CARD FORMING MACHINE

Filed March 31, 1924

5 Sheets-Sheet 1



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CARD FORMING MACHINE

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5 Sheets-Sheet 2

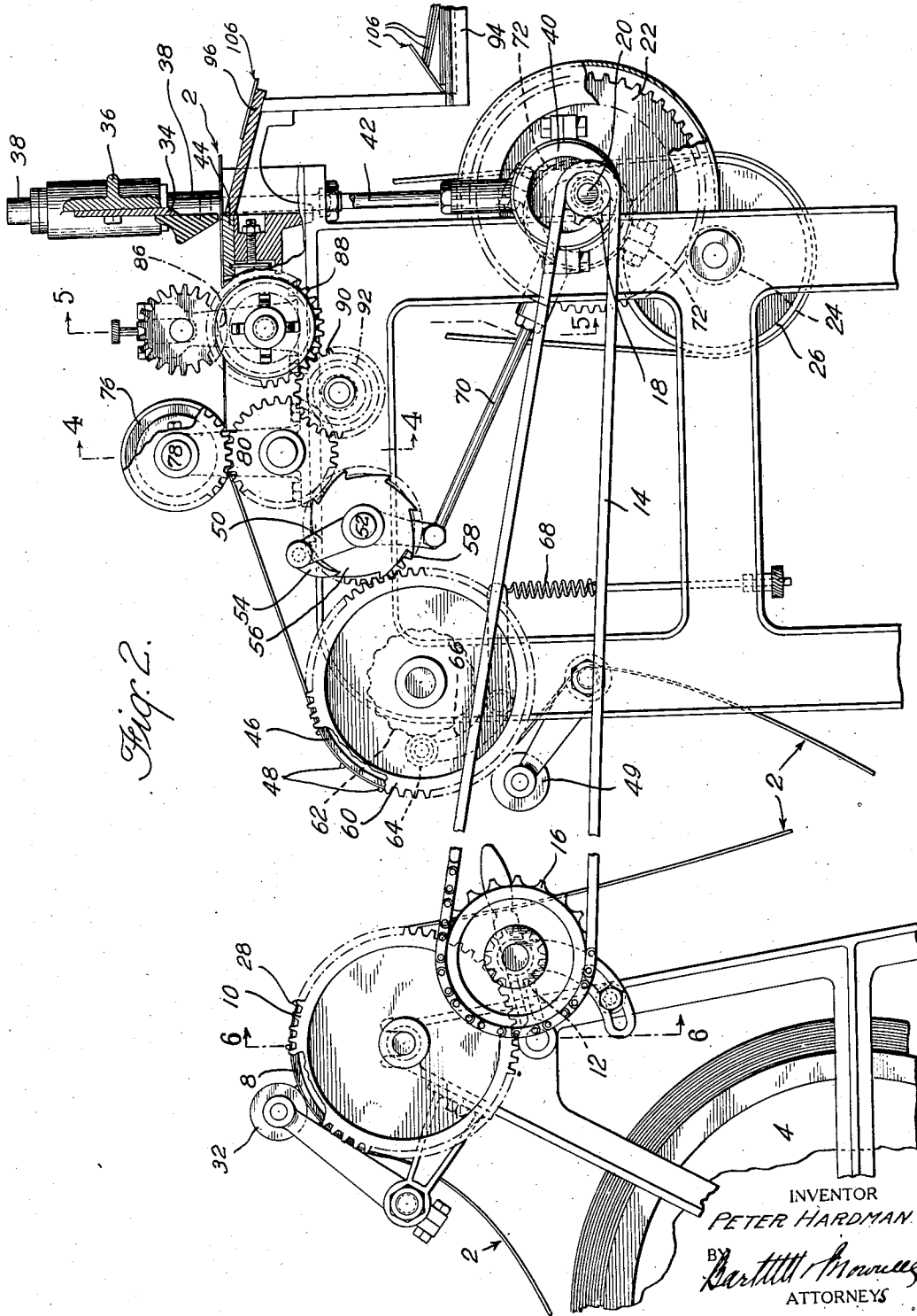


Fig. 2.

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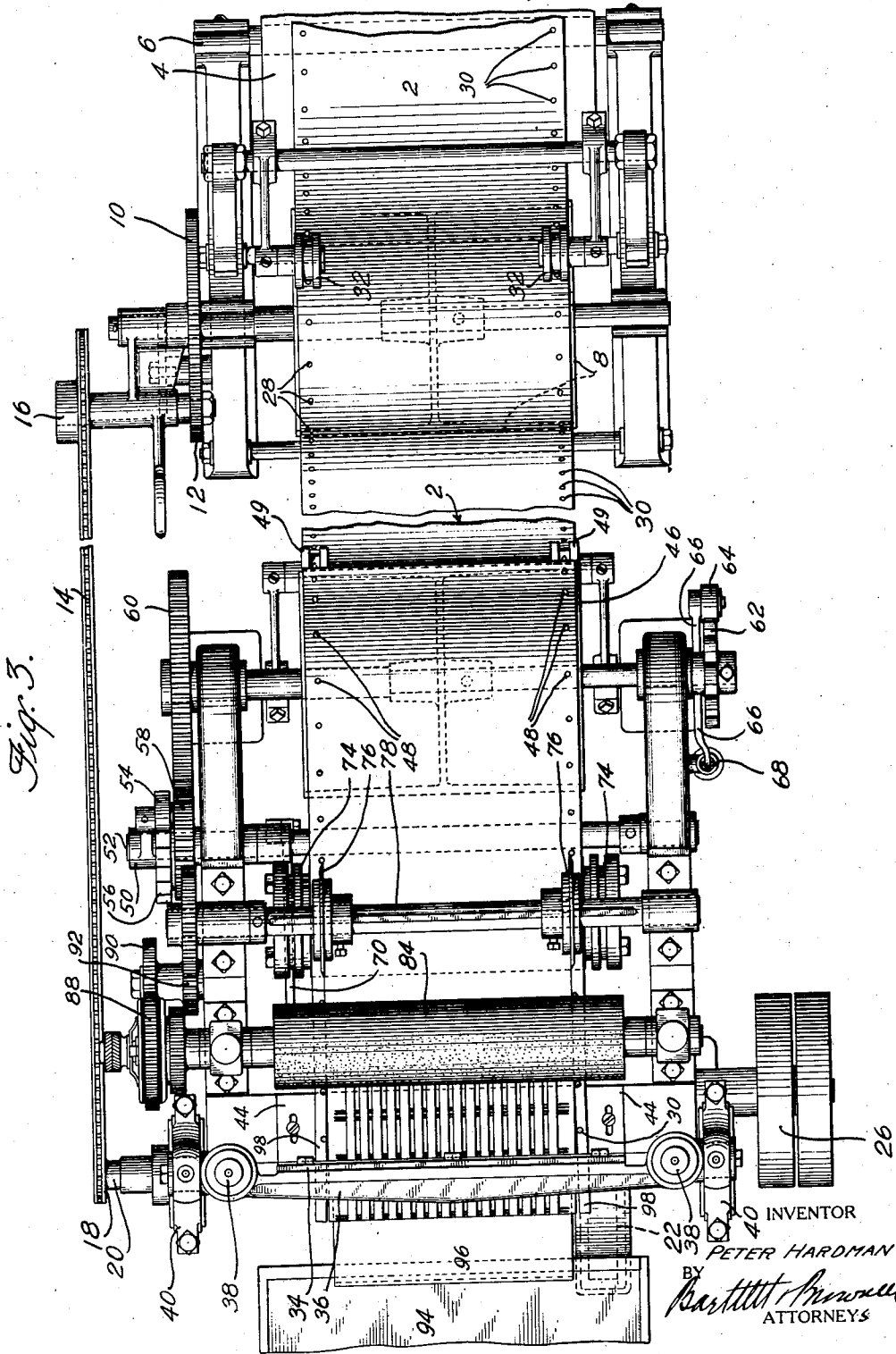
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Fig. 4.

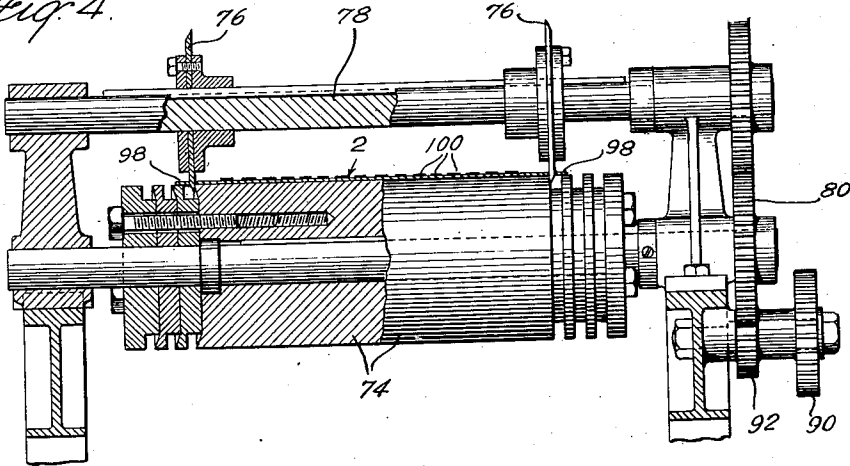
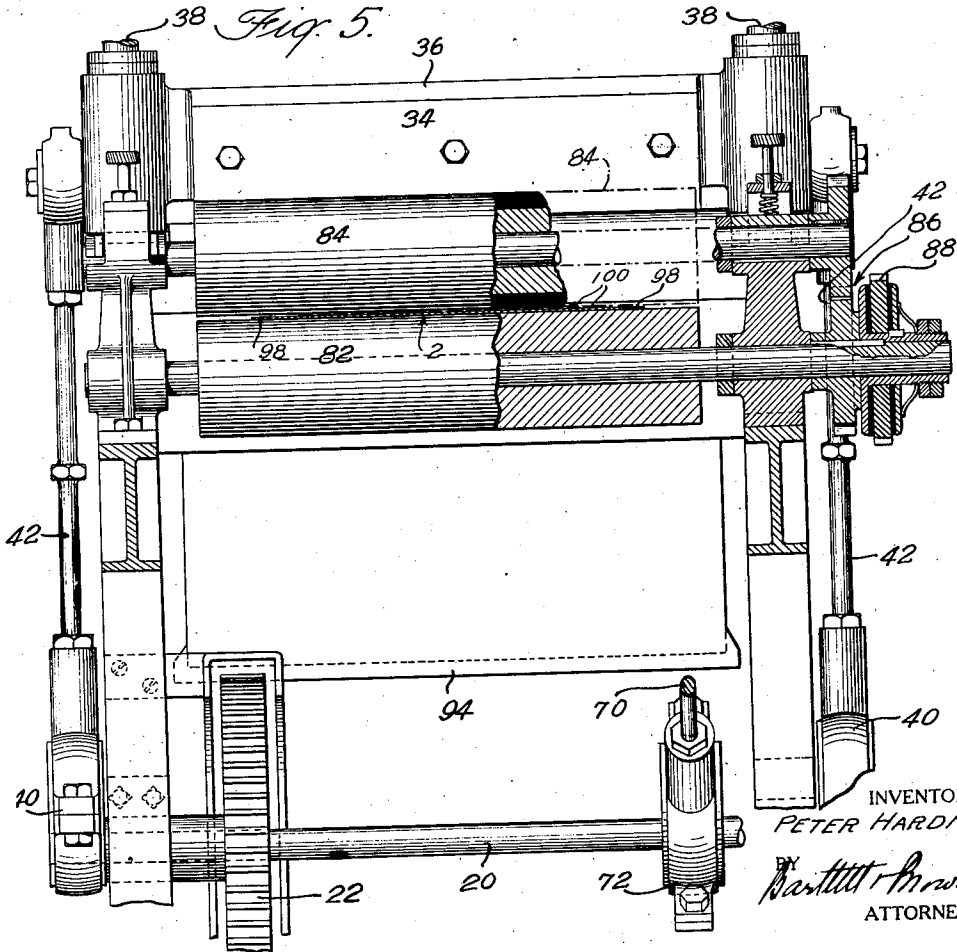


Fig. 5.



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Fig. 6.

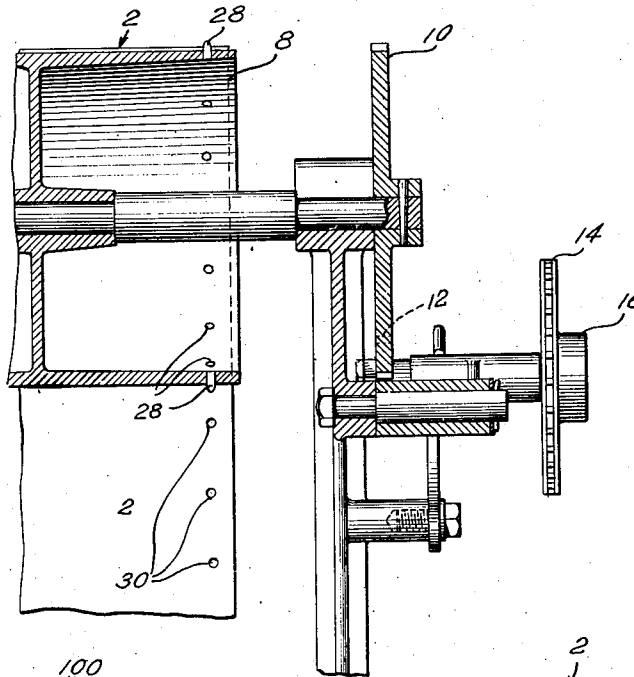


Fig. 7.

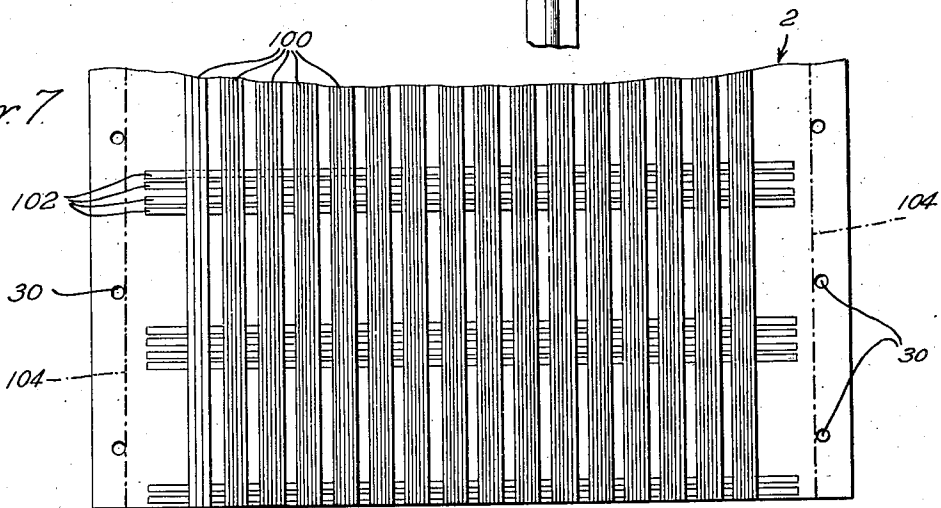


Fig. 8.

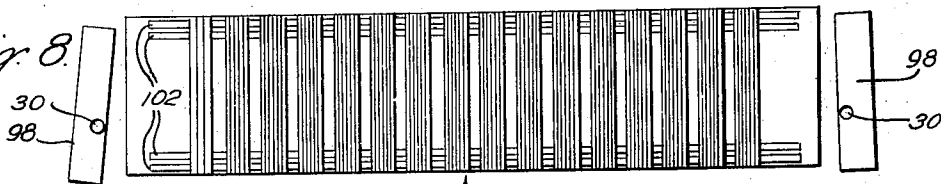
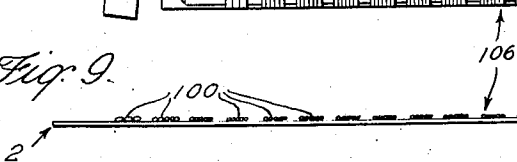


Fig. 9.



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UNITED STATES PATENT OFFICE.

PETER HARDMAN, OF WILLIMANTIC, CONNECTICUT, ASSIGNOR TO THE AMERICAN
THREAD COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW
JERSEY.

CARD-FORMING MACHINE.

Application filed March 31, 1924. Serial No. 703,048.

To all whom it may concern:

Be it known that I, PETER HARDMAN, a citizen of the United States, residing at Willimantic, county of Windham, State of Connecticut, have invented a certain new and useful Improvement in Card-Forming Machines, of which the following is a full, clear, and exact description.

My invention relates to card forming machines and has for its object to produce a machine for forming cards from a continuous web, being especially adapted to form cards having grouped samples of thread mounted thereon. It further has for its object to produce a machine in which the web will properly register with the cutting mechanism so that the severing will take place at definite points between properly spaced rows of adhesive, securing the threads there-
to. It further has for its object to produce a machine which when forming the cards will trim off the edges of the web. It further has for its object to produce a machine which, by simple changes, may be adjusted for cutting cards of various widths.

The following is a description of my invention, reference being had to the accompanying drawings, in which,

Fig. 1 shows a right hand elevation of an embodiment of my invention;

Fig. 2 is an enlarged left hand elevation of the same;

Fig. 3 is an enlarged plan view;

Fig. 4 is an enlarged detail view, partly in section, taken on the line 4—4, Fig. 2, showing the slitting devices of the machine;

Fig. 5 is an enlarged view showing means for feeding the web to the cutting knives, taken on the line 5—5, Fig. 2;

Fig. 6 is an enlarged view of a registered drum acting to draw off the web from the supply, being a section on the line 6—6, Fig. 2;

Fig. 7 is an enlarged plan view showing the slit end of the web before cutting;

Fig. 8 is an enlarged plan view of the finished cards; and

Fig. 9 is an enlarged edge view of the finished product.

Referring more particularly to the draw-

ings, 2 is a web of paper such as cardboard, which it is desired to cut by knives located at the other end of the machine. This web is mounted upon a drum 4 carried by a suitably mounted shaft 6 and has equally spaced perforations along its edges.

Adjacent the drum 4 is a take-off device comprising a drum 8 mounted in suitable bearings and driven by gears 10 and 12, the latter being driven by a sprocket chain 14 engaging a sprocket 16 and a sprocket 18, the latter being mounted upon the main shaft 20 of the machine. This main shaft 20 is provided with a large gear 22 and is driven by a small gear 24 mounted on the same shaft with the driving pulley 26 to which power is primarily applied.

The drum 8 is a registered drum, being provided with spaced projections 28 which engage spaced perforations 30 shown in Fig. 7 in the edges of the web to be cut. The pulley 26 acts through the intermediate connections to continuously drive the drum 8 so as to take off the web from the drum 4 at a uniform rate. The drum 8 is provided with pressure rolls 32 which serve to hold the web in place thereon and in engagement with the projections.

The forward part of the machine is provided with a vertical knife 34 mounted on a bar 36, the ends of which are provided with sockets engaging guides 38. This knife is actuated by eccentrics 40 having links 42 pivotally connected to the ends of the bar 36. These knife operating eccentrics being mounted upon the main shaft 20 are continuously operated so as to produce a periodic rise and fall of the knife which in its downward position engages a severing edge upon the adjustable plate 44.

In order to intermittently feed the web to the knife 34 in timed relation so that the web will be severed at the proper points, I provide a feed controlling roll 46, the same being a registered drum having projections 48 which are adapted to engage the perforations in the edges of the web. The web passes from the roll 8 to the drum 46, pressure rolls 49 being provided for holding the web in contact with the drum 46 and

particularly with the projections 48. The web as it passes from the roll 8 to the drum 46 is permitted to hang down so that there is considerable slack in it, this being necessary for the reason that the motion of the drum 46 is an intermittent motion, while the motion of the drum 8 is a continuous motion. These two drums are, however, so connected that the amount of paper which passes over either of them during a complete revolution of the shaft 20 is the same.

In order to periodically actuate the drum 46 and also the slitting and frictionally driven pulling devices later described, I provide an eccentric 72 mounted on the main shaft 20, which through the link 70 connected to lever 50, mounted on shaft 52, and provided with a pawl 54, actuates the ratchet wheel 56, the ratchet wheel 56 in turn being connected to and actuating gear 58. The gear 58 engages gear 60 located on the shaft of the drum 46 and so actuates this drum. The shaft of the drum 46 carries an index wheel 62 which is engaged by a roll pawl 64 carried on an arm 66 and held by a spring 68 in yielding contact with the indexing device. The rate between the gears 58 and 60 being in the ratio of two to one, the indexing cavities of the indexing device 62 are double in number the teeth upon the ratchet wheel 56.

The gear 58 also drives the gear 80 which is on the roll 74 of a slitting device shown in Fig. 4. The slitting device comprises a roll 74 having grooves provided with cutting edges, which roll is geared to a splined shaft 78 on which is adjustably mounted rotary knives 76.

Adjacent to the slitting device and between the same and the knife is a frictionally driven pulling device which acts to keep the web taut after it leaves the registered drum 46 and feeds it to the knife as fast as the drum 46 will permit. The gear 80 on the roll of the slitting device before described, drives the gear 92 which is compounded to gear 90 and mounted with it on a stud, the gear 90 in turn driving a friction slip gear 88.

The friction slip gear 88, as shown in Fig. 5, drives a lower roll 82 which is geared to an upper roll 84 at 86. On account of these connections the gear 88 is driven at a rate which tends to move the surface of the rolls 82 and 84 somewhat faster than synchronously with the surface of the drum 46, carrying the registering projections 48. The friction slip connection, however, shown in Fig. 5, yields so as to permit movement between the gear 88 and the rolls which it drives so that the effect is simply to maintain the web under tension after it leaves the drum 46 and to feed it forward when the drum 46 permits, the web acting to slow

the feeding rolls down below the rate at which they tend to rotate. The action of the drum 46, and rolls 82 and 84, is so timed that they feed the paper after the knife 34 has gotten out of the way and complete their feeding action before it has descended to cutting position. When the knife 34 descends so as to sever the web, it cuts the central portion and also the slitted side portions, the central portions being delivered to a suitable receiver 94 by a support 96 while the side portions 98 shown in Fig. 8 fall on either side of the support 96.

The indexing wheel 62 is for the purpose of keeping the drum 46 from overrunning and also to maintain it fixed against the friction pull of the gear 88, the spring 68 being strong enough to cause the roller pawl to prevent the pulling action upon the web from revolving the drum 46.

The rate of feeding of the web to the knives can be changed by removing the ratchet wheel 56, shown in Fig. 2 the indexing disk 62 and the pinion 12 and substituting therefor other similar devices having the necessary ratios for the desired results.

The upper roll 84 shown in Fig. 5 of the pulling device is preferably made with an elastic covering such as rubber so that it may yield to the different thicknesses of thread upon the web and also have an increased frictional bearing thereon without undue pressure.

This roll 84 is provided with adjusting means so that its position relative to the roll 82 can be adjusted.

Figs. 7, 8 and 9 show enlarged views of the end of the web and of the complete product, the scale being nearly full size. This web is composed of a pasteboard base 2 on which are mounted groups of threads 100, the groups being parallel to the axis of the web and the threads thereon being parallel to one another. The threads are separately held to the web by transverse lines of adhesive 102, preferably four in number, this being the product of a machine forming the subject matter of a co-pending application Serial No. 703,047, filed March 31, 1924. The end of the sheet as it passes beneath the slitting knives 76 is slit as indicated at 104, which slitting takes place on a line within the perforations 30. When the end of the strip is severed by the knife 34, the product shown in Fig. 8 is produced, the severing action, on account of the timing of the machine, taking place at the centers of the groups of lines of adhesive 102 so that a plurality of separate cards 106 is produced, each having a plurality of groups of sample threads secured thereto by a pair of lines of adhesive situated adjacent to each of their ends and ready to be mounted in any desired manner for display purposes.

As will be evident to those skilled in the art, my invention permits of various modifications without departing from the spirit thereof or the scope of the appended claims.

5 What I claim is:

1. In an apparatus of the character described, the combination of a knife, means for reciprocating the same, rolls for feeding a web of paper thereto, yielding means for driving said rolls, and a registered roll adapted to intermittently retard said web behind the normal feeding rate of said feeding rolls and in timed relation to said knife.

2. In an apparatus of the character described, the combination of a knife, means for reciprocating the same, rolls for feeding a web of paper thereto, yielding means for driving said rolls, a registered roll adapted to retard said web behind the normal feeding rate of said feeding rolls, and means for intermittently operating said retarding roll in timed relation to said knife.

3. In an apparatus of the character described, the combination of a knife, means for reciprocating the same, rolls for feeding a web of paper thereto, a retarding roll engaged by said web and operated intermittently in timed relation to said knife, a gear connection between said feed rolls and said retarding roll tending to drive said feed rolls at a greater peripheral speed than the speed of said retarding roll, and a friction device in the train between said feed rolls and said retarding roll permitting said web to slow down said feed roll.

4. In an apparatus of the character described, the combination of a knife, means for reciprocating the same, rolls for feeding a web of paper thereto, yielding means for driving said rolls, a registered roll adapted to retard said web behind the normal feeding rate of said feeding rolls, means for intermittently operating said retarding roll in timed relation to said knife, and slitting means located between said feeding rolls and said retarding roll.

5. In an apparatus of the character described, the combination of a knife, means for reciprocating the same, rolls for feeding a web of paper thereto, yielding means for driving said rolls, a registered roll adapted to retard said web behind the normal feeding rate of said feeding rolls, means for intermittently operating said retarding roll in timed relation to said knife, means for supporting a supply roll of web, and means for drawing the web continuously from said roll and supply it to said intermittently actuated retarding roll so as to maintain a slack in said web.

6. In an apparatus of the character described, the combination of a knife, means for reciprocating the same, a device for slitting a web parallel to its edges, means for inter-

mittently feeding the several portions of the slit web to said knife so that said web and edges will be severed in a transverse direction, means for separating the transversely severed central portion of the slit end of said web from the transversely severed side portions thereof.

7. In an apparatus of the character described, the combination of a knife, means for reciprocating the same, rolls for feeding a web of paper thereto, yielding means for driving said rolls, a registered roll adapted to retard said web behind the normal feeding rate of said feeding rolls, means for intermittently driving said registered roll, a slitting device between said knife and said retarding roll, and an indexing device controlling the movement of said retarding roll and acting to oppose said feeding rolls.

8. In a machine of the character described, the combination of a main shaft, eccentrics thereon, a cutting knife operated by said eccentrics, another eccentric upon said main shaft, a pawl actuated by said eccentric, and feeding and slitting devices located so as to act on a web in advance of said knife and intermittently operated by said pawl.

9. In a machine of the character described, the combination of a main shaft, eccentrics thereon, a cutting knife operated by said eccentrics, another eccentric upon said main shaft, a pawl actuated by said eccentric, feeding and slitting devices located so as to act on a web in advance of said knife and intermittently operated by said pawl, and means for continuously supplying a web of paper to said feeding devices.

10. In a machine of the character described, the combination of a main shaft, eccentrics thereon, a cutting knife operated by said eccentrics, another eccentric upon said main shaft, a pawl actuated by said eccentric, feeding and slitting devices located so as to act on a web in advance of said knife and intermittently operated by said pawl, a retarding roll actuated by said pawl, and a slip connection between said pawl and said feeding rolls and independent of said retarding roll, and means for continuously supplying a web of paper to said feeding devices.

11. In a machine of the character described, the combination of a main shaft, eccentrics thereon, a cutting knife operated by said eccentrics, another eccentric upon said main shaft, a pawl actuated by said eccentric, feeding and slitting devices located so as to act on a web in advance of said knife and intermittently operated by said pawl, a retarding roll actuated by said pawl, a slip connection between said pawl and said feeding rolls and independent of said retarding roll, means for continuously supplying a web of paper to said feeding devices, and an in-

dexing device acting on said retarding roll in opposition to said feeding rolls.

12. In a machine of the character described the combination of a reciprocating knife, means for longitudinally slitting the edges of a strip of material, means for intermittently feeding the several portions of

said strip to said knife, and a support adapted to receive the central portion only of the slitted web after the slitted web has been transversely severed by said knife so as to separate the central portions from the severed side portions.

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