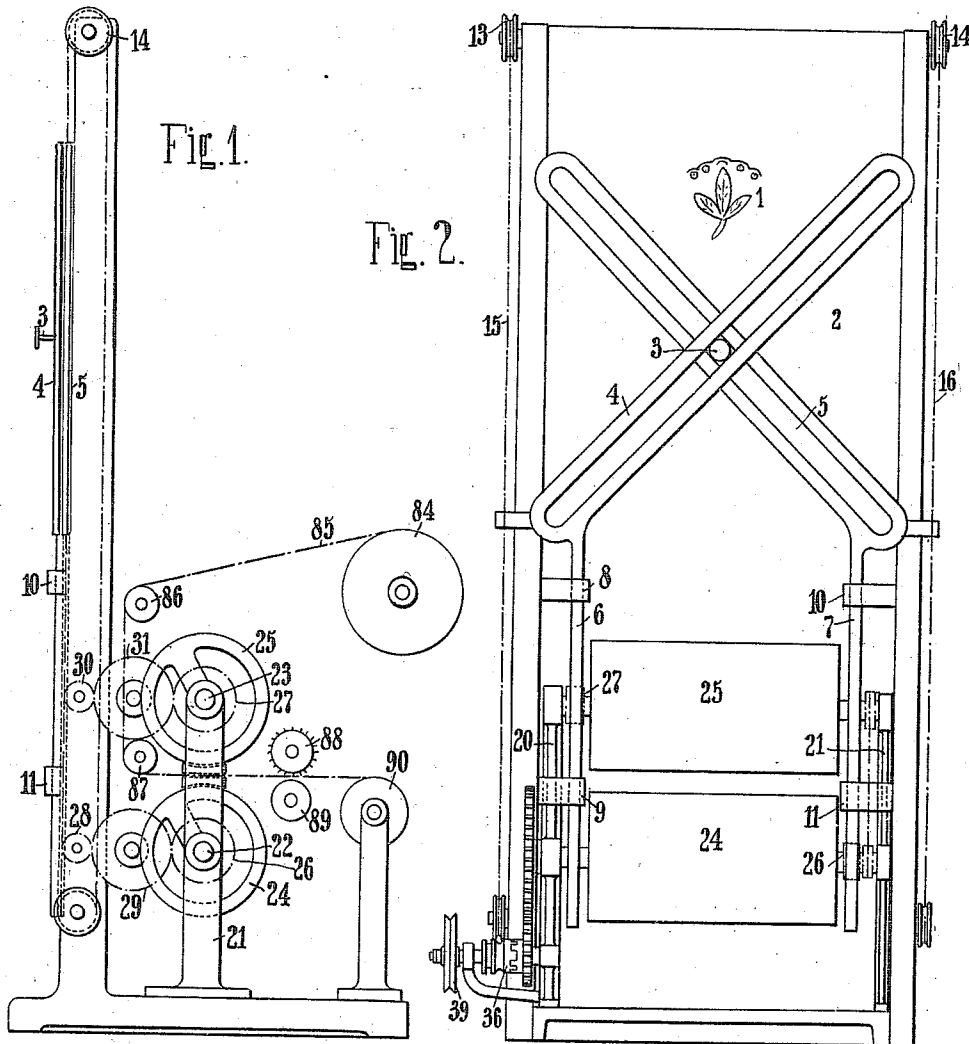


J. J. KNECHT.
CARD CUTTING MACHINE.
APPLICATION FILED JAN. 7, 1910.

985,812.

Patented Mar. 7, 1911.

3 SHEETS—SHEET 1.



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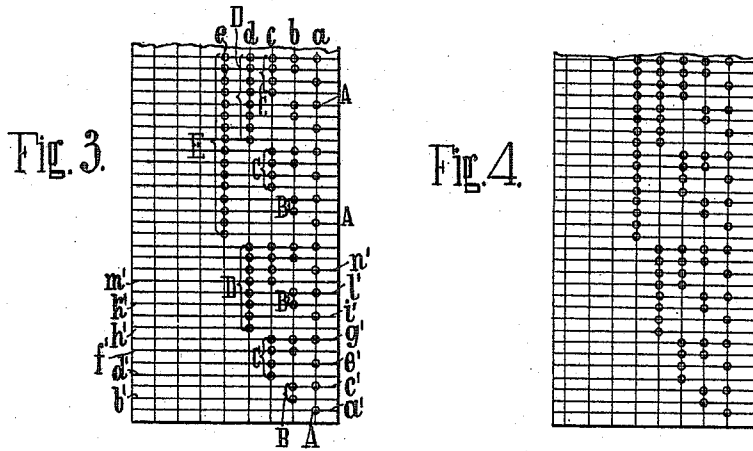
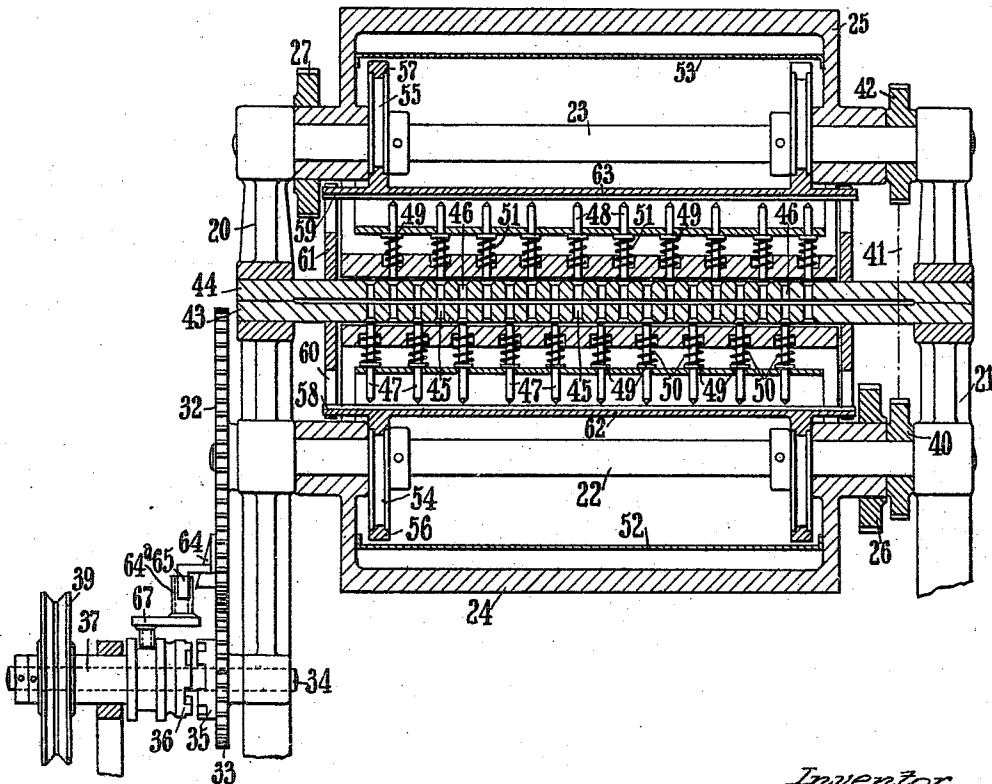


Fig. 5.



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3 SHEETS—SHEET 3.

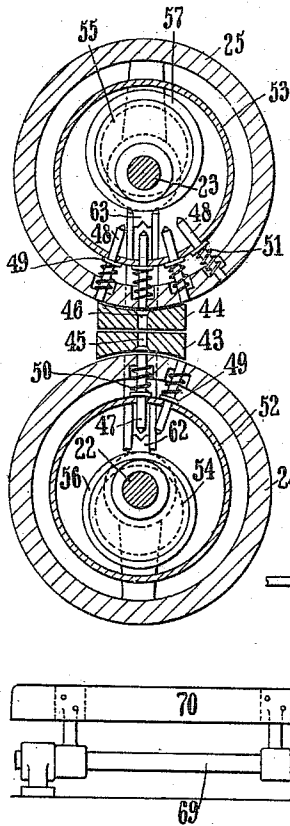


Fig. 6.

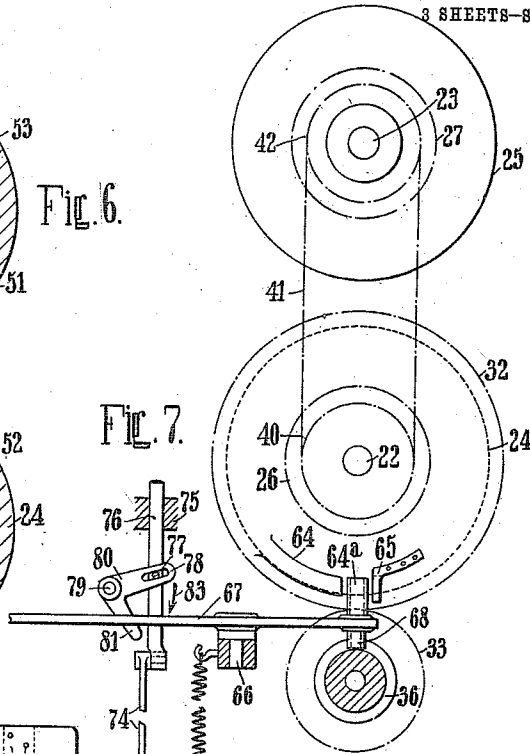


Fig. 7.

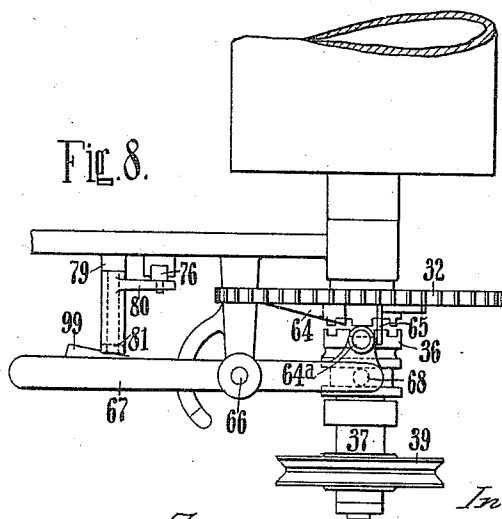


Fig. 8.

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UNITED STATES PATENT OFFICE.

JOHANN JACOB KNECHT, OF CHEMNITZ, GERMANY.

CARD-CUTTING MACHINE.

985,812.

Specification of Letters Patent.

Patented Mar. 7, 1911.

Application filed January 7, 1910. Serial No. 536,836.

To all whom it may concern:

Be it known that I, JOHANN JACOB KNECHT, a citizen of Switzerland, and residing at Chemnitz, Saxony, Germany, have invented certain new and useful Improvements in Card-Cutting Machines, of which the following is a specification.

My invention relates to card-cutting machines, and a primary object is to provide a new card-cutting machine for automatically-operated embroidering machines. In my new machine the punches are mounted in two parallel drums or cylinders and can be driven into cards passed between the drums.

One illustrative embodiment of my invention is represented by way of example in the accompanying drawings, wherein:—

Figures 1 and 2 are diagrammatic side and front elevations, respectively, Figs. 3 and 4 developments of parts of the two revoluble drums, Figs. 5 and 6 vertical longitudinal section and transverse section, respectively, through the two superposed revoluble drums on an enlarged scale, and Figs. 7 and 8 show in elevation and top plan view, respectively, and likewise on an enlarged scale means enabling the card-cutting mechanism to be automatically disengaged after it operates each time.

Referring to the drawing, 1 designates the pattern according to which the cards are to be cut, 2 the pattern board, and 3 the pantograph pin movable readily in two guides 4, 5 at right angles to one another. These guides are respectively secured to or integral with slides 6 and 7 movable parallel to one another in the brackets 8, 9 and 10, 11, respectively. These slides are formed as racks and are balanced by counterweights, not shown, suspended respectively from cords 15 and 16 running over pulleys 13, 14, respectively. When pin 3 moves the two slides are moved up or down, but obviously the motion of the two slides may be derived from the embroidery frame of an embroidering machine.

Shafts 22, 23 are journaled in the pedestals 20, 21. Drum 24 is free to rotate on shaft 22 and drum 25 on shaft 23. Gear wheel 26 is firmly connected with drum 24 and gear wheel 27 with drum 25. Wheel 26 can be actuated by the toothing of slide 7 with the intermediary of pinion 28 and gear wheel 29, and wheel 27 can likewise be

actuated by the toothing of slide 6 with the intermediary of pinion 30 and gear wheel 31.

On shaft 22 is secured gear wheel 32 which meshes with pinion 33 revoluble on shaft 34 fixed in the frame. With wheel 33 is rigidly connected the axially non-displaceable part 35 of a clutch-coupling with which the claws 36 of the part 37 axially displaceable on shaft 34 can be brought into engagement. The driving pulley 39 is secured on the part 37 of the clutch.

On shaft 22 is secured sprocket wheel 40 by which the rotation of shaft 22 is imparted with the intermediary of chain 41 to the sprocket wheel 42 secured on shaft 23.

Between the two cylinders or drums 24, 25 I arrange two plates 43, 44 having perforations 45, 46, respectively. Within the drums I arrange in rows and radially movable punches 47, 48 guided in the walls thereof.

As the developments of parts of the drums 24, 25 illustrated in Figs. 3 and 4, respectively, clearly show, the punches are arranged in groups in the rows *a, b, c, d, e* . . . Row *a* contains groups A, each of which comprises only one punch; row *b* contains groups B, each of which consists of two punches; row *c* contains groups C, each of which consists of four punches; row *d* contains groups D, each of which consists of eight punches, and so on. From this it is clear that the groups A, B, C . . . are to each other with respect to the number of punches forming each group as the members of a geometrical series, *i. e.* as 1 : 2 : 4 : 8 : 16 and so on. The resultant values of all the punches in each horizontal row *a', b', c', d', e', f', g', h', i', k', l', m', n'* . . . are to one another with respect to the displacement of the embroidery frame as the members of an arithmetical series *i. e.* as 1 : 2 : 3 : 4 : 5 : 6 : 7 : 8 : 9 : 10 : 11 : 12 : 13 and so on. Namely, all the holes which are punched by the punches of the vertical row *a* have the value 1, since the smallest motion can be imparted by the card to the embroidery frame by the holes of this vertical row *a*, the holes which are cut by the punches of the vertical row *b* have the value 2, those cut by the punches of the vertical row *c* the value 4, those cut by the punches of the vertical row *d* the value 8, those cut by the punches of the vertical row *e* the value 16, and so on. But on

the horizontal row a' is only one punch, which is located on the vertical row a and consequently has the value 1; the horizontal row b' likewise contains only one punch, but on the vertical row b and consequently this punch has the value 2; on the third horizontal row c' are two punches, namely one on the vertical row a having the value 1 and the other on the vertical row b having the value 2; these two punches make holes simultaneously in the card, by means of which holes three units are imparted in known manner to the embroidery frame; on the fourth horizontal row d' is a punch which is located, however, in the vertical row c , and since the punches of row c correspond to four units, the holes cut by them in the card also impart four times the unit motion to the embroidery frame; on the fifth horizontal row e' are two punches again, namely one on the vertical row a having the value 1 and one on the vertical row c having the value 4 which would cause a total motion of $1+4=5$ imparted to the embroidery frame by means of the card; and so on. Accordingly, it will be readily understood that the sum of the holes cut by the punches of every horizontal row $a', b', c', \dots$ cause displacements of the embroidery frame which are in arithmetical progression, namely as 1 : 2 : 3 : 4 : 5 and so on.

The punches of the one drum are arranged displaced or staggered relatively to those of the other drum, so that at any time one punch of the one drum is located between two punches of the other drum. In this manner I obtain the advantage that the two drums can be arranged exactly one over the other and the punches of the bottom drum can perforate the paper at the same time as the punches of the top drum.

Each of the punches 47, 48 has a collar 49 with which the springs 50 and 51 coact tending to make the punches approach the axes of their drums and normally holding them against the cylindrical walls 52, 53 secured in the drums.

Near the ends of the drums are secured on the shafts 22 and 23 the eccentrics 54 and 55, respectively, whose straps 56 and 57, respectively, are rigidly connected together by a bar 62 and 63, respectively, and are guided by means of the parts 58 and 59, respectively, which pass through the walls of the drums, in the fixed slotted guides 60 and 61, respectively, located outside the drums, as shown in Fig. 5. At each revolution of the shafts 22, 23 the bars 62, 63 will strike against the inner ends of the punches located in the plane of the two axes of the drums and drive the same outwardly.

The illustrative embodiment comprises a device for automatically disengaging the clutch 35, 37 after every revolution of shaft 22. This device comprises a lug 64 secured

to or integral with wheel 32 and a bracket-shaped stop 65 secured a short distance from said lug, as clearly shown in Figs. 5, 7 and 8. When wheel 32 on shaft 22 has completed one revolution lug 64 coacts with the antifriction roller 64^a of a lever 67 fulcrumed on pivot 66; this lever carries a pin 68 arranged in a groove in the axially displaceable part of the clutch. In this manner lever 67 is oscillated as is requisite for releasing the clutch. Owing to roller 64^a coacting with stop 65 the gear wheels 33, 32 and the eccentrics on the axles of the drums are stopped after every revolution of the latter.

The clutch can be thrown into gear by hand or by means of a treadle. For throwing it into gear by means of the foot I secure the treadle 70 on the revoluble shaft 69, as shown in Fig. 7, in such manner that when the treadle is depressed shaft 69 is rotated in the direction of arrow 71. On shaft 69 is secured lever 72 pivotally connected at 73 with tie rod 74 articularly connected with rod 76 guided at 75. This rod 76 carries a pin 77 entering into slot 78 of the angle lever 80, 81 fulcrumed at 79. Arm 81 of this lever when rotated in the direction of arrow 83 (Fig. 7) coacts with the wedge-shaped member 99 (Fig. 8) on lever 67, rocks this and throws the clutch into gear. Roller 64^a then leaves the vertically downwardly projecting part of stop 65 (Fig. 5) and arrives between this part and wheel 32, so that this wheel can rotate freely. On the revoluble roller 84 is wound the card paper 85 which is wound up on a roller 90 after passing over guide rollers 86, 87 and feed rollers 88, 89.

My apparatus operates as follows:—At each stitch the displacement of the pantograph pin 3 (Figs. 1 and 2) is imparted to the drums 24, 25 by the toothed slides 6, 7 with the intermediary of the gear wheels 30, 31, 27 and 28, 29, 26, respectively, and rotates the same so that two definite rows of punches 48 and 49 are located opposite the rows of perforations in the plates 44, 43. Now when shaft 22 is rotated by means of the gear wheels 32 and 33 and shaft 23 is also rotated, the bars 62 and 63 are reciprocated once, the punches 47 and 48 in front of them being driven toward the plates 43 and 44, respectively. The punches 47 move in the holes 45 which guide them and enter into the holes 46 of plate 44 serving as matrix. Simultaneously the punches 48 move in the holes 46 of plate 44 which guides them and enter into the holes 45 of plate 43, so that the card or paper guided between the plates is perforated. When the shafts 22, 23 have completed one revolution the eccentric straps 56, 57 arrive into the position shown in Fig. 6, in which the bars 62, 63 have released the punches. Consequently

the springs 50, 51 return the punches 47 and 48, respectively, from the plates 43 and 44, respectively, and the drums become free for a subsequent movement.

5 I claim:—

1. In a card-cutting-machine the combination of two perforated parallel drums, rotatable independently from one another, two perforated plates arranged between the said drums, the perforations in said drums being adapted to be moved into alinement with the perforations in said plates, a plurality of punches, means for driving said punches through the perforations of each plate.

2. In a card-cutting-machine the combination of two perforated parallel drums, rotatable independently from one another, two perforated plates arranged between the said drums, the perforations in said drums being adapted to be moved into alinement with the perforations in said plates the perforations of one of the drums being staggered relatively to those of the other drum, a plurality of punches, means for driving said punches through the perforations of each plate.

3. In a card-cutting machine the combination of two perforated parallel drums, rotatable independently from one another, two perforated plates arranged between said drums, the perforations in said drums being adapted to be moved into alinement with the perforations in said plates the perforations in said drums being arranged in rows comprising groups, the number of perforations in the groups in the respective rows in order being in geometrical series, a plurality of punches, means for driving said punches through the perforations of each plate.

4. In a card-cutting-machine the combination of two perforated parallel drums, rotatable independently from one another, two perforated plates arranged between the said drums the perforations in said drums being adapted to be moved into alinement with the perforations in said plates, a plurality of punches, said punches being arranged in said drums, means for driving the punches through the perforations in the drums and the perforated plates.

5. In a card-cutting-machine the combination of two perforated parallel drums, rotatable independently from one another, two perforated plates arranged between the said drums, the perforations in said drums being adapted to be moved into alinement with the perforations in said plates, a plurality of punches, said punches being radially moved in said perforations of the drums and eccentric-mounted means for driving the said punches through the perforations in the drums and through the perforations in said plates.

6. In a card-cutting-machine the combination with an embroidery-frame, of two parallel drums, rotatable by the embroidery-frame but independently from one another, two perforated plates, arranged between said drums, a plurality of punches and means comprising a clutch-coupling for driving the punches through the perforations of the said plate, said coupling being automatically disengaged after each revolution of said drums.

7. In a card-cutting machine the combination of two perforated parallel drums, two perforated plates arranged between the said drums, a plurality of punches, reciprocating means for driving the punches through the perforations of each plate, and means comprising a clutch-coupling for driving said reciprocating means and adapted to be automatically thrown out of gear.

8. In a card-cutting-machine the combination of two perforated parallel drums, rotatable independently from one another, two perforated plates arranged between said drums, a plurality of punches, reciprocating means for driving the punches through the perforations of each plate, means comprising a clutch-coupling for driving said reciprocating means and adapted to be automatically thrown out of gear and means for throwing the latter means into gear after the same have been disengaged.

9. In a card-cutting machine, the combination of a perforated drum, a plurality of punches therein, and means for driving the punches in the perforations in said drum, said punches being arranged in rows comprising groups, the numbers of punches in the groups in the respective rows in order being in geometrical series.

10. In a card-cutting machine, the combination of two rotatable, interconnected, perforated, parallel drums, a plurality of radially-movable punches in each drum, and means for driving the punches in the perforations in the drums, said punches being arranged in rows comprising groups, the numbers of punches in the groups in the respective rows in order being in geometrical series.

11. In means for cutting cards for automatically-operated embroidering machines, the combination, with an embroidery frame, of two interconnected, perforated, parallel drums rotated thereby, a plurality of radially-movable punches in each drum, and means for driving the punches in the perforations in the drums, said punches being arranged in rows comprising groups, the numbers of punches in the groups in the respective rows in order being in geometrical series.

12. In apparatus for cutting cards for automatically-operated embroidering machines, the combination, with an embroidery

frame, of a perforated drum operatively connected therewith and driven thereby, a perforated plate arranged adjacent the drum, the perforations in said drum being adapted to be moved into alinement with the perforations in the plate, a plurality of punches in said drum, and means for driving the punches in the perforations in said drum and into said plate.

13. In means for cutting cards for automatically-operated embroidering machines, the combination, with reciprocating slides, of two interconnected, perforated, parallel drums rotated thereby, two perforated plates having perforations in alinement arranged between said drums, the perforations of one drum being adapted to be moved into alinement with some of the perforations in one plate and the perforations of the other drum being adapted to be moved into alinement with the other perforations of the same plate, a plurality of radially-movable punches in each drum, and means for driving the punches in the perforations in the drums and into said plates.

14. In means for cutting cards for automatically-operated embroidering machines, the combination, with an embroidery frame, of two interconnected, perforated, parallel drums rotated thereby, two perforated plates arranged between said drums, a plurality of radially-movable punches arranged in groups in each drum, the groups in one drum being staggered relatively to the groups in the other drum, and means for driving the punches in the perforations in the drums and into said plates.

15. In means for cutting cards for automatically-operated embroidering machines, the combination, with an embroidery frame, of two interconnected, perforated, parallel drums rotated thereby, two perforated plates arranged between said drums, a plurality of radially-movable punches in each drum, and means comprising a clutch-coupling for driving the punches in the perforations in the drums and into said plates, said coupling

being automatically disengaged after each revolution of said drums.

16. In a card-cutting machine, the combination of two rotatable, interconnected, perforated, parallel drums, a plurality of radially-movable punches in each drum, reciprocating means for driving the punches in the perforations in the drum, and means comprising a clutch-coupling for driving said reciprocating means and adapted to be automatically thrown out of gear.

17. In a card-cutting machine, the combination of two rotatable, interconnected, perforated, parallel drums, a plurality of radially-movable punches in each drum, reciprocating means for driving the punches in the perforations in the drum, means comprising a clutch-coupling for driving said reciprocating means and adapted to be automatically thrown out of gear, and means for throwing the latter means into gear after the same have been disengaged.

18. In a card-cutting machine, the combination, with a frame, of a shaft journaled therein, a gear wheel fixed on said shaft, a perforated drum revoluble on said shaft, a plate having a row of perforations fixed on said frame adjacent said drum, the perforations in said drum being adapted to be moved into alinement with the perforations in said plate, a plurality of rows of spring-pressed, radially-directed punches arranged in groups movable in the perforations in said drum, slotted guides fixed on said plate, eccentrics fixed on said shaft, eccentric straps movable on said eccentrics, and a bar movable in said guides attached to said eccentric straps and adapted to drive a row of punches located between the axis of said shaft and said perforations in the plate into the latter when said shaft is rotated.

In testimony whereof, I affix my signature in the presence of two witnesses.

JOHANN JACOB KNECHT.

Witnesses:

WM. WASHINGTON BRUNSWICK,
D. ALFRED BRUNN.