E. KLEIN.

DEVICE FOR FOLDING AND DIVIDING STRIPS OF PAPER.

APPLICATION FILED FEB. 17, 1909.

924,794. **Patented June 15, 1909.**

Fig. 1.

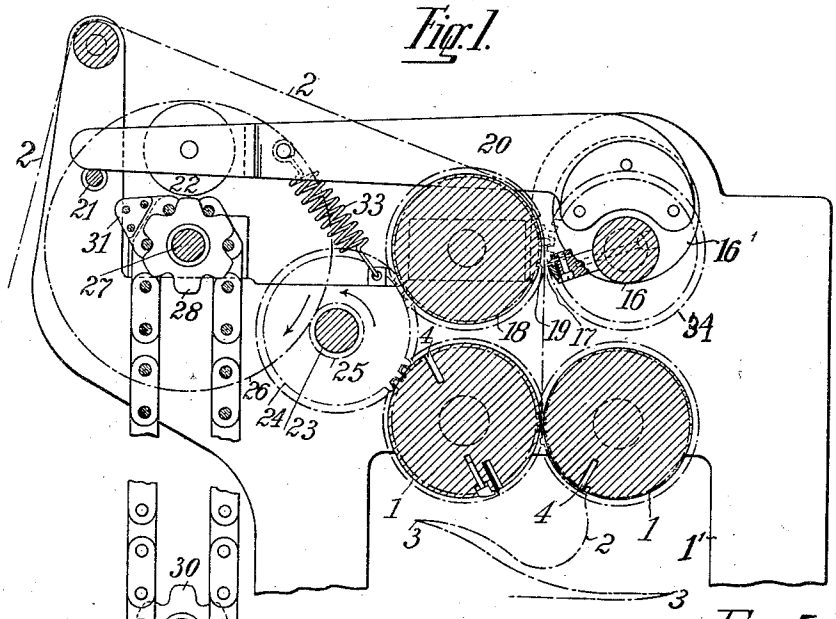


Fig. 3.

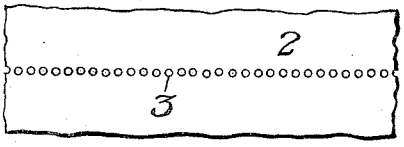


Fig. 2.

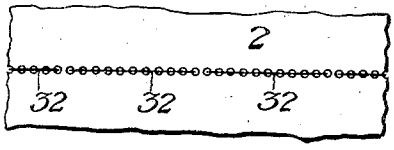


Fig. 5.

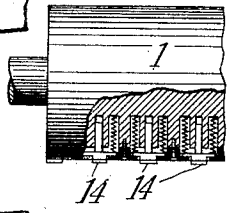


Fig. 4.

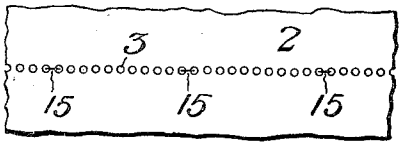
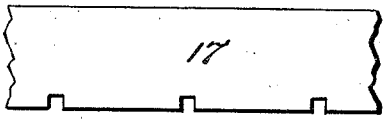


Fig. 6.



Witnesses:
H. D. Penney
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Inventor;
Eugen Klein,

By his Attorney,
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UNITED STATES PATENT OFFICE.

EUGEN KLEIN, OF DRESDEN, GERMANY.

DEVICE FOR FOLDING AND DIVIDING STRIPS OF PAPER.

No. 924,794. Specification of Letters Patent. Patented June 15, 1909.

Application filed February 17, 1909. Serial No. 478,383.

To all whom it may concern:

Be it known that I, EUGEN KLEIN, engineer, a subject of the Kingdom of Saxony, German Empire, residing at Winckelmannstrasse 31, Dresden, in the Kingdom of Saxony, Germany, have invented a certain new and useful Improved Device for Folding and Dividing Strips of Paper, of which the following is a specification.

The invention relates to devices for alternately folding and dividing strips of paper, and a primary object is to provide a device such that the places of the folds which are to be cut are provided with somewhat long incisions before being introduced between the folding rollers, so that the strip of paper is held together at such places only by narrow connecting pieces or bridges which are then completely cut through between the folding rollers.

In order that the invention may be clearly understood reference will be made to the accompanying drawing in which one embodiment is represented diagrammatically by way of example, and in which:

Figure 1 is a cross-section of the new device, and Fig. 2 is a side elevation, part being broken away, showing a portion of one of the folding rollers having knives arranged therein, whereas Figs. 3 to 5 illustrate on an enlarged scale the action of the successively operating knives on the strip of paper, and Fig. 6 shows the knife of the cutting device, by which the long cuts separated by bridges are produced at the places where the strip of paper is to be folded, according to a previously determined number of sheets, before the strip is folded.

When the cutting device which is described in detail hereinafter is placed, as shown in the form illustrated, in front of the folding rollers 1, the paper must not be wholly cut through by it. On the contrary, until the strip of paper enters between the folding rollers it must form one connected whole in order that it may be supplied to the folding rollers; for this reason the cutting device is so arranged that it does not entirely cut through the paper but leaves some small bridges or connecting pieces which must be completely cut through later between the folding rollers with the aid of narrow knives 14 in one of the folding rollers.

Before passing the folding rollers 1 journaled in the frame 1′, the strip 2 of paper runs through the cutting device, in which it is provided with long incisions 32, clearly shown in Fig. 5, according to an optional, previously determined number of sheets which, if desired, may be indicated by transverse lines of perforations 3 clearly shown in Fig. 3, but owing to bridges being left, these incisions leave the strip of paper still connected together. When the strip passes farther through the folding rollers and when the small knives 14 clearly shown in Fig. 2 arranged elastically in one of the folding rollers 1 meet these bridges, the strip of paper is completely separated at these places.

The arrangement of the device may be such that first one of the rollers of a pair of folding rollers 1 of a known folding device mounted in the frame 1′ carries a row of knives 14, the purpose of which is to make small cuts 15, clearly shown in Fig. 4, between the separate sheets during each revolution of the folding rollers 1, even in the event of rows of perforations 3 being provided beforehand.

Above the pair of folding rollers 1 is arranged journaled in eccentrics 16′ an axle 16 to which a knife 17, shown separately in Fig. 6, is attached; if preferred, this knife may be replaced by several shorter knives attached one beside another with spaces between them. This knife-axle 16 may be temporarily approached by toothed-wheel gearing or in other suitable manner to a counter-roller 18 having a longitudinal groove or incision 19, so that the knife 17 can enter into the groove 19. This axle 16 is intermittently actuated by means of the two eccentrics, in which it is journaled, which are connected with levers 20. When the levers rest with their extreme ends on a stop 21 they hold the axle 16 thrown out of gear. At a short distance in front of their extreme ends which lie on the stops, the levers 20 carry pulleys 22, the purpose of which is explained hereinafter. The main driving shaft 23 of the entire device journaled in the frame 1′ engages by means of a toothed wheel 24 with the rollers 1 and with the counter-roller 18 of the cutting device. The toothed wheel 25 which is also on the main shaft 23 meshes with a toothed wheel 26 which is arranged with two sprocket wheels 28 on the axle 27. The Galle's chains 29 on the sprocket wheels 28 run below over sprocket wheels 30 which serve only as

guides and whose common axle is in movable bearings, not shown in the drawings, for the purpose of enabling the chains to be rapidly lengthened or shortened.

On one link of each of the two Galle's chains there are lifters or tappets 31 which lift the levers 20 connected with the eccentrics, after the folding rollers 1 have rotated a certain number of times, by passing under the pulleys 22. In consequence of this operation the axle 16, carrying a toothed wheel 34, is connected with the counter-roller 18 and is rotated, and the strip of paper is provided with long cuts 32 as clearly shown in Fig. 5. As soon as the tappets or lifters 31 have passed under the levers or their rollers 22, the springs 33 always return the levers into their normal positions.

The change in the number of sheets, according to which the cutting device is to operate, is regulated optionally by changing correspondingly the number of links in the Galle's chains.

When the strip of paper passes through the folding rollers the connecting pieces or bridges which still remain in it are cut by the small knives 14 and the strip of paper is completely divided at this place.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a device for folding in alternate directions and dividing into sheets a strip of paper, the combination, of a frame, and a folding roller provided with a plurality of elastically mounted small knives mounted therein, an axle mounted eccentrically in the frame, a lever for rotating the axle, a counter-roller having a longitudinal groove in its periphery geared with the axle, a long knife attached to said axle and adapted to enter said groove when the axle is rotated, and means for driving the folding roller and the counter-roller and intermittently actuating said lever.

2. In a device for folding in alternate directions and dividing into sheets a strip of paper, the combination, of a frame, and a folding roller provided with a plurality of elastically mounted small knives mounted therein, an axle mounted eccentrically in the frame, a spring-pulled lever for rotating the axle, a counter-roller having a longitudinal groove in its periphery geared with the axle, a long knife attached to said axle and adapted to enter said groove when the lever is actuated, a driving shaft geared with said folding roller and with said counter-roller, and a Galle's chain lifting-device driven by said shaft for actuating said lever intermittently, as set forth.

In witness whereof I have hereunto signed my name this 3d day of February 1909 in the presence of two subscribing witnesses.

EUGEN KLEIN.

Witnesses:
ARTHUR THALER,
MOSE LIEBERS.