June 3, 1930. M. J. A. DAVY ET AL 1,761,906

PUNCHING AND CUTTING MACHINE

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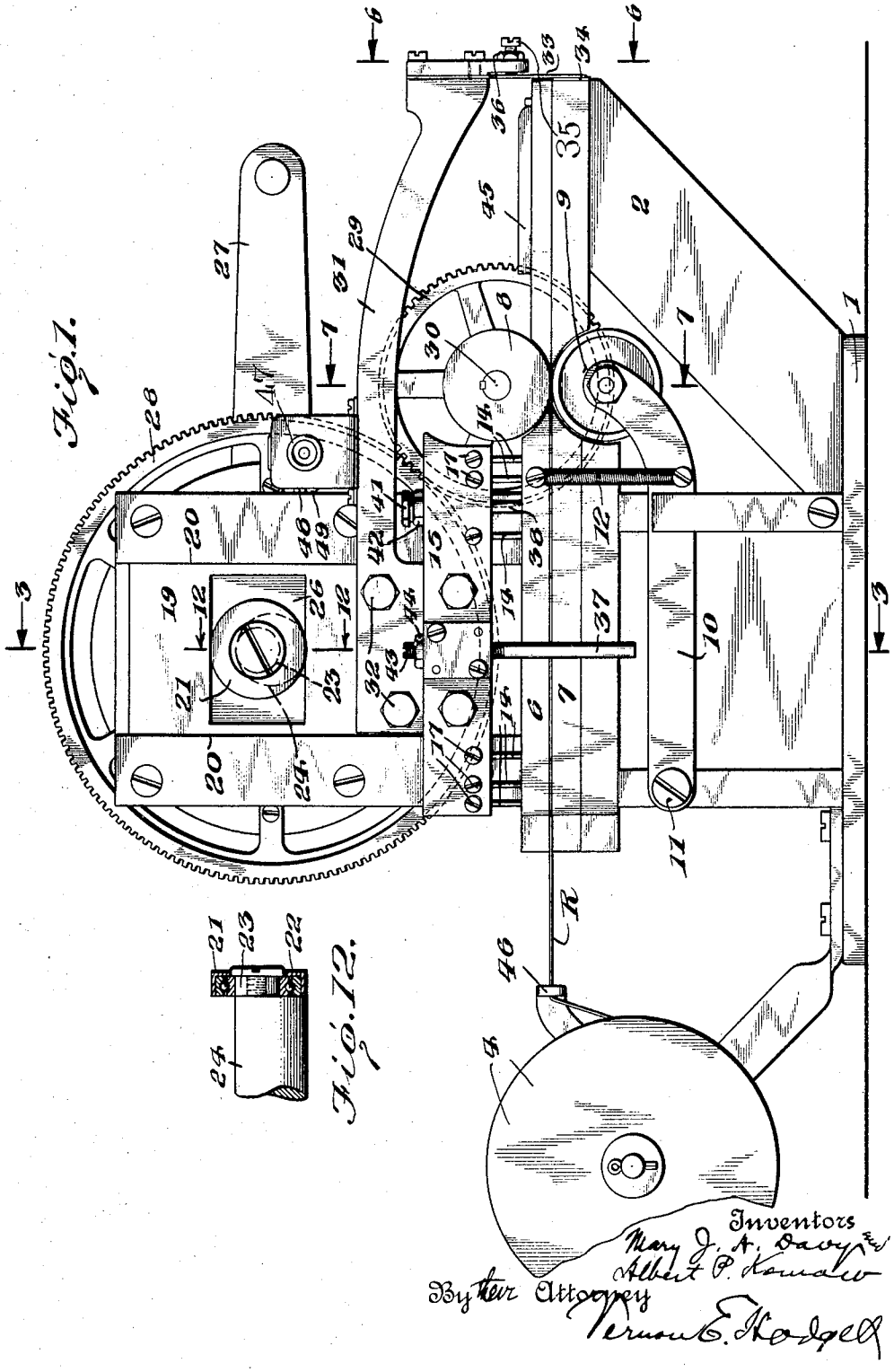


Fig. 1.

Fig. 12.

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PUNCHING AND CUTTING MACHINE

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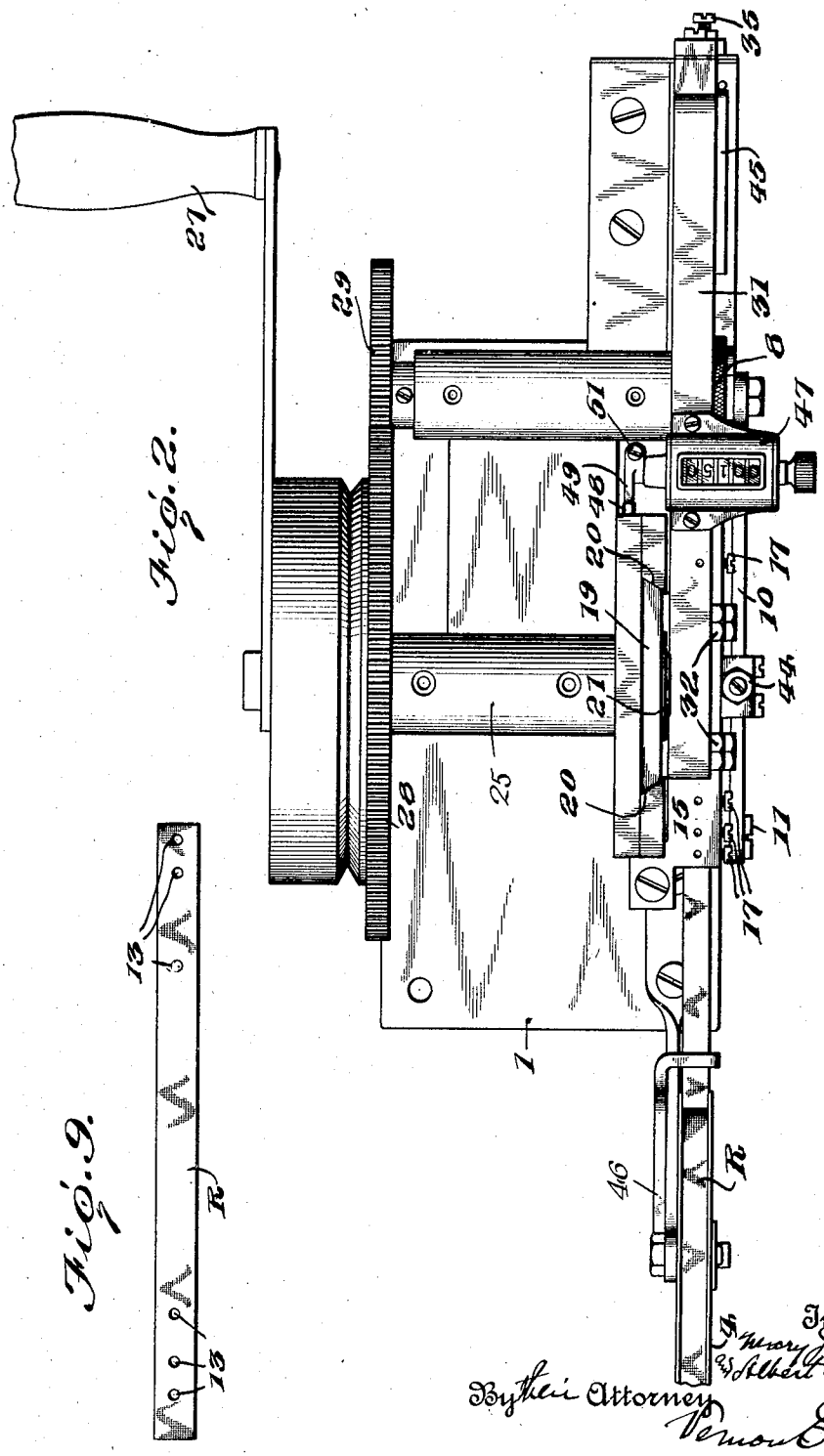


Fig. 2.

Fig. 9.

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PUNCHING AND CUTTING MACHINE

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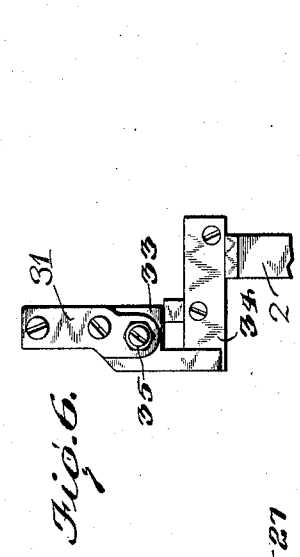


Fig. 6.

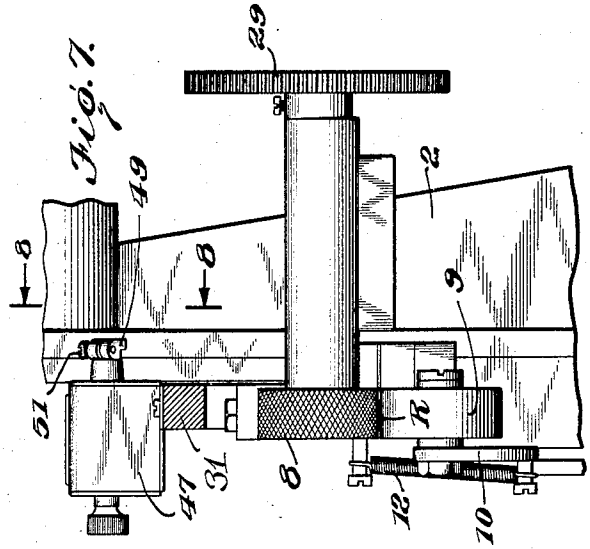


Fig. 7.

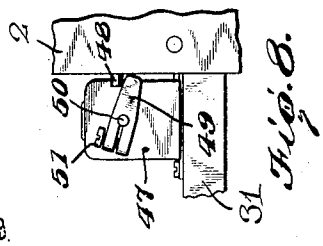


Fig. 8.

Fig. 3.

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PUNCHING AND CUTTING MACHINE

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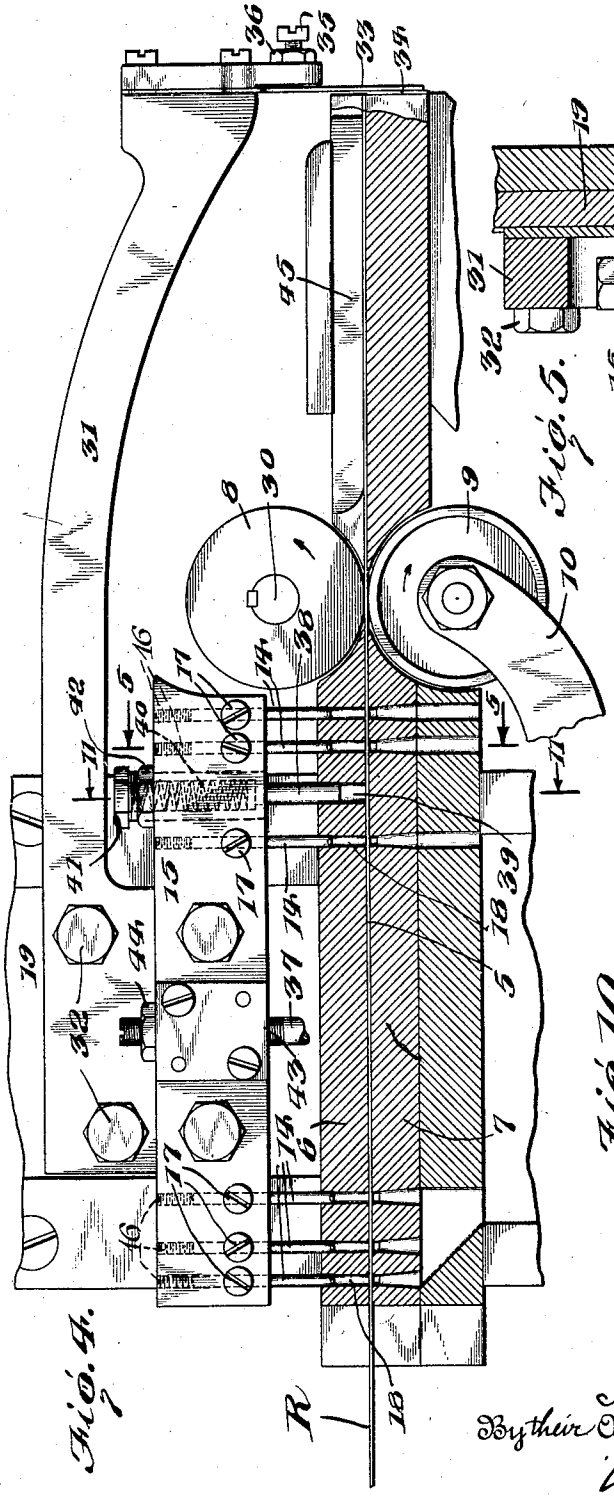


Fig. 4.

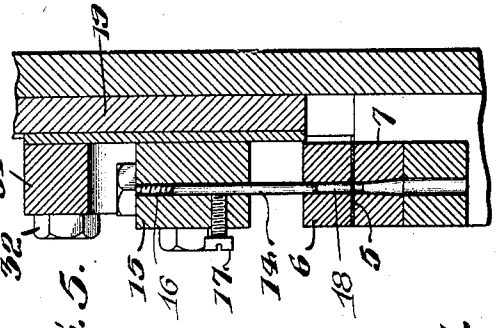


Fig. 5.

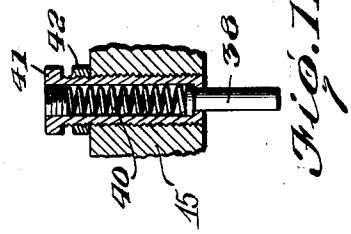


Fig. 11.

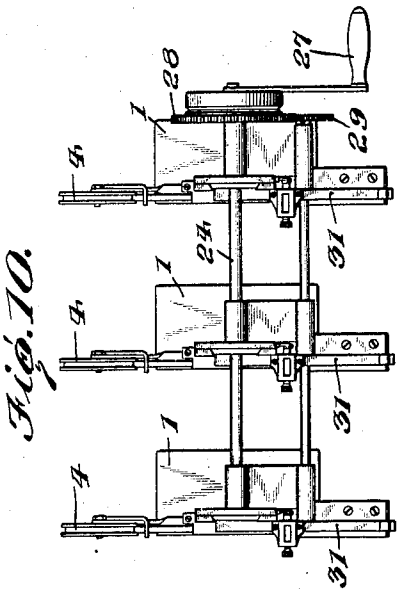


Fig. 10.

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UNITED STATES PATENT OFFICE

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PUNCHING AND CUTTING MACHINE

Application filed December 5, 1925. Serial No. 73,491

Our invention relates to an improvement in punching and cutting machines.

The object is to provide means for punching holes through material and cutting it into predetermined lengths.

In the form illustrated, it includes means for alternately feeding, and punching and cutting ribbons.

It further includes mechanism for the intermittent feed which alternates with the punching and cutting the ribbon operation.

The invention further consists in mechanism for simultaneous cutting and punching material, with means for intermittent feed of the material.

In the accompanying drawings:—

Fig. 1 is a view in side elevation;

Fig. 2 is a plan view;

Fig. 3 is a vertical, transverse section on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged partial section through the die plates;

Fig. 5 is a fragmentary view in transverse, vertical section on line 5—5 of Fig. 4;

Fig. 6 is an end view at the line 6—6 of Fig. 1, looking in the direction of the arrows;

Fig. 7 is a transverse, vertical section on the line 7—7 of Fig. 1;

Fig. 8 is a view of the counter actuating means taken through the line 8—8 of Fig. 7;

Fig. 9 is a view of a punched and cut length of ribbon;

Fig. 10 is a view showing a battery of cutters and punchers;

Fig. 11 is a transverse, vertical section on line 11—11 of Fig. 4; and

Fig. 12 is a transverse section on line 12—12 of Fig. 1.

The machine stands on a base 1 and includes a suitable frame work 2. The ribbon R is drawn from a reel 4, mounted at one end of the machine, through a shallow, narrow, ribbon channel 5 formed between upper and lower die plates 6 and 7, between and by means of the two feed rollers 8 and 9. Feed roller 8 has a knurled periphery to take hold of the ribbon and feed roller 9 is carried by an arm 10 which is pivotally supported at 11, and held in yielding frictional contact with the roller 8 from below by a spring 12, the purpose of which construction is to allow a momentary separation of the feed rollers and an interruption of the forward feed of the ribbon while the holes 13 are punched in the ribbon and the ribbon is being cut into lengths.

The punches 14 are adjustably secured in a head 15. Screws 16 adjust these punches from the top and set screws 17 hold them securely in place. These punches are each fitted to a corresponding die 18 in the die plates. The holes 13 are punched in the ribbon by the downward movement of the punches through these dies.

The punch head 15 is securely bolted to the lower end of a reciprocating plunger 19 which travels up and down in guideways 20 at either edge, as shown in Fig. 2. This movement of the plunger 19 is positively accomplished both ways, up and down, by means of a cam roller 21, see Figs. 1, 2, 3 and 12, supported preferably on ball-bearings 22, mounted on the eccentric hub 23, on the end of the main drive shaft 24, mounted in bearing 25. This eccentrically mounted cam roller 21 is fitted to and rolls in a slot 26 in the plunger and with each complete rotation of the shaft 24 the plunger is raised and lowered by the counter clockwise movement of the cam roller in the slot.

Shaft 24 is provided with a crank handle 27 by which it is turned and the machine is operated. Shaft 24 has a large gear wheel 28 keyed to it which meshes with and transmits motion to a smaller gear 29 on the shaft 30 to which the upper feed roller 8 is keyed and by which it is driven as viewed in Figs. 1, 2, 4 and 7.

A long arm 31 is secured by bolts 32 to

the plunger 19, just above the punch head 15, and this arm reaches out to the end of the machine where it carries one blade 33 of the shears which cuts the ribbon, the companion blade 34 being secured on the end of the frame 2 just below, see Figs. 1, 4, and 6. The upper blade 33 is made adjustable for wear by the set screw 35 and a lock-nut 36.

The punching and cutting occur simultaneously and the feeding of the ribbon is intermittent and this is of course necessary in order to give time for the punching and cutting. To accomplish this in a simple manner: A trip rod 37 projects downwardly from the punch head 15 in position to engage the arm 10 which supports the lower feed roller 9. This trip rod 37 is set so that it reaches the arm 10 in time to strike it and push the roller 9 out of contact with the ribbon and upper feed roller 8, thus checking the feed of the ribbon. At the same time, a presser rod 38 also carried by the punch head is brought down through an orifice 39 into contact with the ribbon, holding it in place while released by the feed rollers while the cutting and punching operations are in progress. The presser rod 38 is slidable in the punch head and has a spring 40 back of it to give it play in the punch head when its further downward movement is arrested by contact with the ribbon and against the die plate 7 below. Provision for the adjustment of the tension of the spring 40 is made through adjusting screw 41 at the top, and a lock-nut 42 holds it securely, see Fig. 11. Trip rod 37 is made adjustable by the threads 43 turning in a threaded hole in the punch head and a lock-nut 44 holds it in place.

Numeral 45 indicates a removable cover, which is intended to rest in place by its own weight. It keeps the ribbon flat in its channel at the outer end of the machine. This cover is made removable to gain access to the ribbon.

A guide 46 is arranged for the ribbon to pass through from the reel 4 to the machine.

A counter 47, of any approved make, registers each ribbon cut. A stud 48 is placed in the path of travel of the rocker arm 49 of the counter so that each upward movement gives a count. The rocker arm is adjustable in its spindle 50 by set screw 51.

The machine may of course be driven by power if desired and a belt 52 is shown in dotted lines in Fig. 3 for this purpose.

A battery of several of these machines obviously might be employed as indicated in Fig. 10.

The operation has been explained in the course of the description. The main shaft 24 is turned, and the eccentrically mounted roller operating in the slot of the plunger causes the latter to move up and down, the down stroke stopping the feed and forcing the punches through the ribbon in their path and the shears cutting the portion of the ribbon simultaneously that was punched by the preceding downward stroke of the punches and so it continues, the feed rollers always being first separated to stop the ribbon feed while the punching and cutting takes place.

Obviously other materials might be operated upon in this same way, as the machine is adaptable to the cutting and punching of other materials.

We claim:

1. A machine of the character described including stationary guides, a reciprocating plunger mounted for longitudinal movement in said guides, and having an opening therein, a rotary shaft having an eccentric hub formed thereon and extending into the opening for moving the plunger, a cam roller carried by the hub, anti-friction bearings interposed between the hub and cam-roller, and means for removably holding said bearings and cam-roller in position on the hub.

2. A machine of the character described including a drive shaft, a plunger connected with and driven by said drive shaft, guides for said plunger, a head secured to and movable with said plunger, upper and lower die plates spaced apart to receive material therebetween, and having openings therein, punches carried by said head in position to enter the openings for punching the material, driven and idler feeding rollers, a shaft carrying said driven feeding roller, said shaft being geared to and driven from the drive shaft, a pivoted arm carrying said idler roller, a spring connected with said arm for normally holding said idler roller in feeding position, and a pin carried by the head for engaging said arm to move the idler roller out of feeding position during the punching operation.

3. A machine of the character described including a drive shaft, a plunger connected with and driven by said drive shaft, guides for said plunger, a head secured to and movable with said plunger, upper and lower die plates spaced apart to receive material therebetween, and having openings therein, punches carried by said head in position to enter the openings for punching the material, driven and idler feeding rollers, a shaft carrying said driven feeding roller, said shaft being geared to and driven from the drive shaft, a pivoted arm carrying said idler roller, a spring connected with said arm for normally holding said idler roller in feeding position, and a pin carried by the head for engaging said arm to move the idler roller out of feeding position during the punching operation, an arm connected with and extending outwardly from the plunger, an adjustable cutter carried by the outer end

of said last-mentioned arm and a removable cover plate for covering the material between the feeding rollers and the cutter.

4. A machine of the character described, including a head, an adjusting screw adjustably extending into said head and having an opening therein, a presser rod extending into the opening in the adjusting screw, and resilient means housed in the screw and normally acting on the presser rod.

In testimony whereof we affix our signatures.

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ALBERT P. KOMOW.