O. OEHRING.

POSITIVE FEEDING DEVICE FOR PAPER STRIPS OR THE LIKE.

APPLICATION FILED DEC. 22, 1908.

950,754. Patented Mar. 1, 1910.

2 SHEETS—SHEET 1.

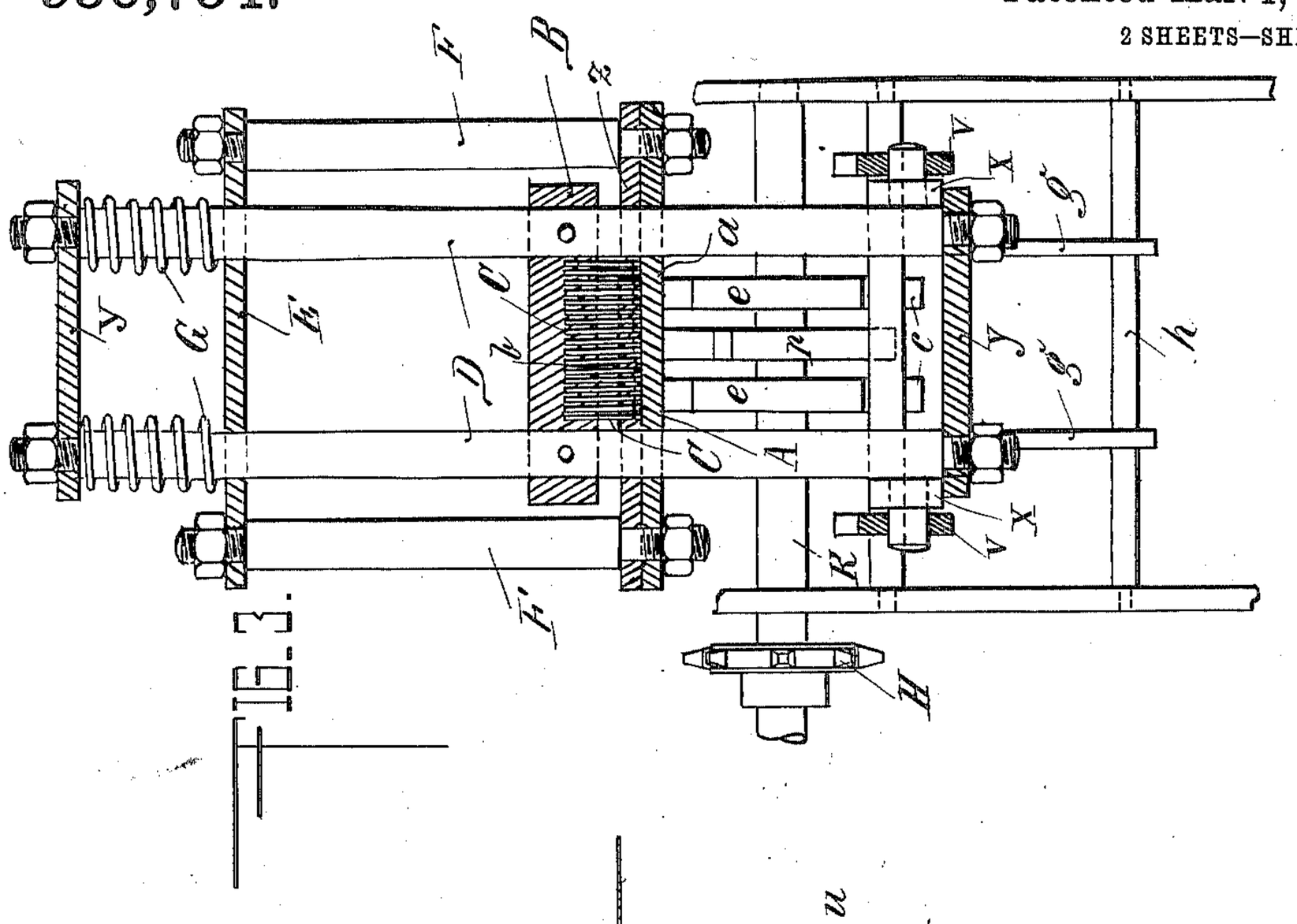

FIG. 3.

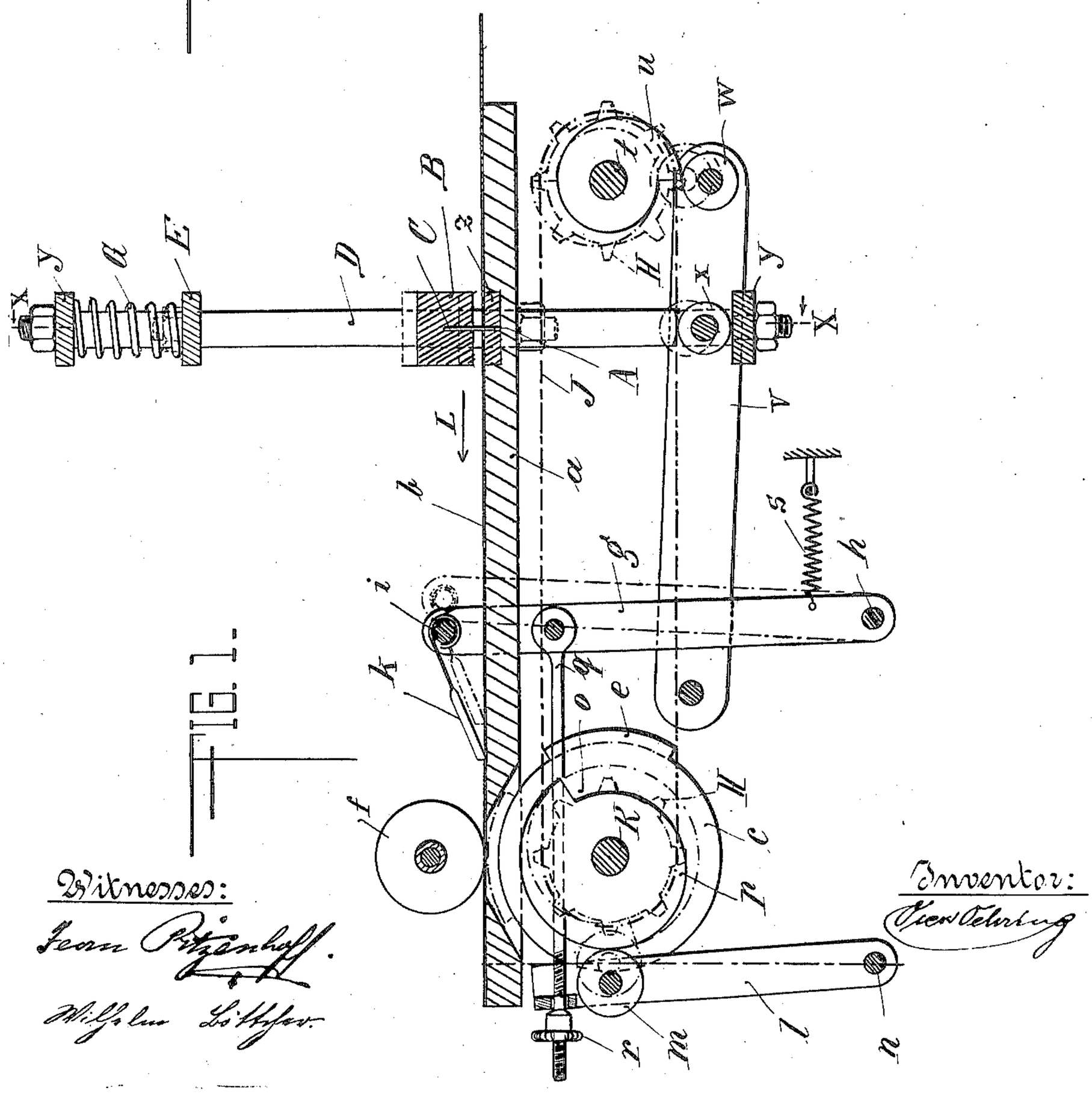

FIG. 1.

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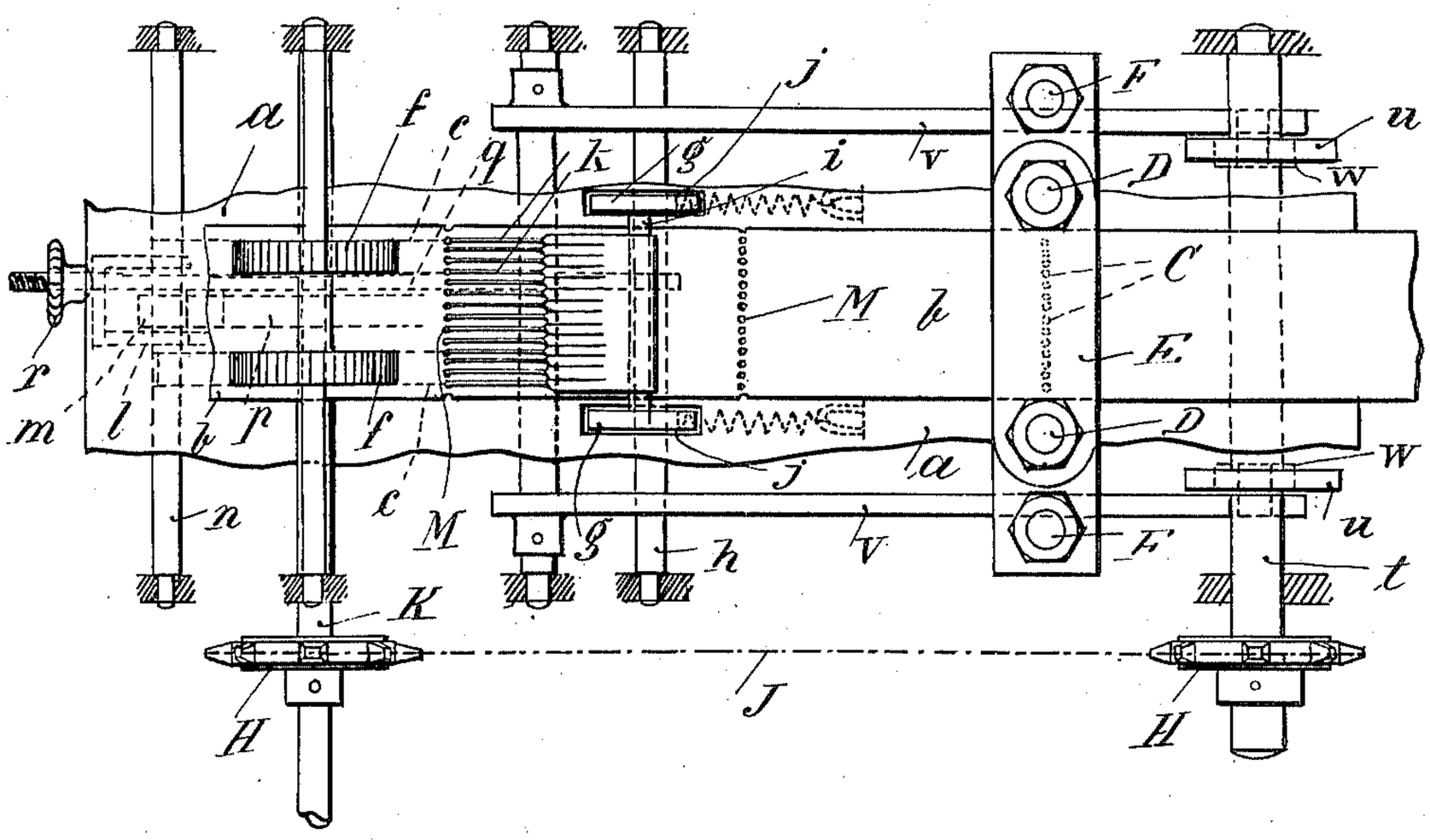
2 SHEETS—SHEET 2.

FIG. 2.



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POSITIVE FEEDING DEVICE FOR PAPER STRIPS OR THE LIKE.

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Application filed December 22, 1908. Serial No. 468,838.

To all whom it may concern:

Be it known that I, OSCAR OEHRING, a subject of the German Emperor, and residing in Berlin, Germany, have invented certain new and useful Improvements in Positive Feeding Devices for Paper Strips or the Like, of which the following is a full and clear specification, which is illustrated in the accompanying drawings and the novelty of which is more clearly pointed out in the annexed claims.

In apparatus for printing and perforating paper strips of considerable length the feeding of the strip is usually obtained by intermittently operating feeding rolls. This manner of feeding has the great disadvantage that the imprint, and more so the perforations, will not be made uniformly at equal distances, such as are necessary for producing tickets of any kind, stamps, or the like, which, of course, should all be of uniform size. The reason for this is that the strip is apt to slip between the feeding rolls, caused partly by stretching of the strip, owing to the pressure of the feeding rolls, and partly through changes in temperature, or also through wear of the feed-rolls. It is obvious that when a paper strip of great length is thus fed through the machine the small errors which might occur at each feeding stroke of the machine will accumulate during the passing of the paper strip through the machine and cause considerable differences in the distances of the perforations or the print; moreover, in case it should be found in machines of the character described above that the paper strip is not exactly fed at the distances desired, it cannot be adjusted otherwise than by removing the feed rolls, and substituting rolls which will feed the exact distance desired. In the present invention all these disadvantages are overcome by providing, in addition to the feeding rolls, an independent feeding device which, however, will be exactly timed and coöperate with the feeding rolls. This additional feeding device is adapted to rectify, at each feeding stroke, errors which might occur in the feeding of the strip by the rolls. Thereby a very exact and uniform transport of the strip is obtained, and thus the perforations to be made in the strip, or the printing on it, will be at equal distances. This is of great importance in cases in which stamps or tickets of any kind are distributed in so-called "vending machines", in which the paper strip is inserted in a large roll, and which feed the strip at equal distances.

I have illustrated in the accompanying drawings, as an example, how my invention may be reduced to practice.

In these drawings Figure 1 is a side view of a feeding and perforating apparatus. Fig. 2 is a plan view thereof, and Fig. 3 is a transverse section on the line X—X in Fig. 1.

The paper strip *b*, which is to be perforated (or, in case a printing device is attached to the machine, to be printed), is fed by means of feeding rolls *c*, *c* on feeding table *a*. Feed rolls *c*, *c*, however, operate only with a part of the circumference; that is to say, only with the portions *e*, *e*, which, when the rolls revolve, contact with rolls *f*, *f*, yieldingly disposed above the table. Rolls *f*, *f* are disposed so that they may be moved toward rolls *c*, *c* only a certain distance, so that after the operative portions of rolls *c* are out of engagement with rolls *f* the paper strip which is fed between these will then be free.

On a shaft *h*, journaled in the machine frame, are fixed arms, *g*, *g*, one on either side of the paper strip, which are connected at their upper ends through a cross rod *i* on which a suitable number of yieldingly movable fingers *k* are disposed, which bear yieldingly against the paper strip *b*. Slots *j*, *j* are provided in table *a*, through which arms *g*, *g* protrude and in which they may oscillate. On a shaft *n*, also journaled in the machine frame, is fixed an arm *l*, provided, at its upper end, with contact roll *m*, which bears against snail cam *p*. This cam is mounted together with transport rolls *c* on the same shaft K. Arms *g*, *g* are further connected with each other by a rod which serves as a pivot for a connecting rod *q*, the other end of which is threaded and disposed in a hole provided at the upper end of arm *l*. By means of thumb nut *r*, provided on rod *q*, the distance between arms *g* and *l* may be regulated. Two springs *s*, suitably fas-

tened—at one end to the machine frame and at the other end to arms *g*—are provided which tend to hold roll *m* permanently in contact with snail cam *p*. In the machine frame is further journaled shaft *t*, which bears two snail cams *u*, with which contact rolls *w* are in engagement, which rolls are mounted on arms *v*, suitably pivoted in the machine frame at the other ends. Each of these arms is also provided with a contact roll *x*, which rests on cross bar *y*, to which reference will be made later on.

Transverse to the longitudinal axis of feeding table *a* is disposed a die plate *z*, which is countersunk in the table so that its surface is flush with the latter. In die plate *z* is provided a row of holes A, running transverse to the paper strip, which holes cooperate with punches C fastened in punch head B. Head B is fixed to guide rods D disposed vertically to table *a* and connected at their corresponding ends with cross bars *y*, *y* to form a rigid frame therewith.

On table *a* are fixed, in vertical position, supports F, which are connected at their upper ends by a cross bar E. This bar, together with die *z*, forms a guide for rods D, to which the punch head B is fastened. Between the upper ends of rods D and cross bar E are disposed, on each rod D, compression springs G, which tend to lift rods D, together with the punches fastened thereon and together with arm *v*, which rests with roll *x* on the lower cross bar *y*, as described before. Thus it will be seen contact rolls *w* will always be kept in contact with their snail cams *u*.

On shafts K and *t* are also mounted sprocket wheels H, H, which are connected by a chain J, indicated in dot and dash lines. The machine may be driven from shaft K by any suitable means, not shown in the drawing.

It is obvious that instead of using a punching device a printing device of any suitable kind well known in the art may be operated by the vertical reciprocating frame, or, a separate printing device, operated in the same manner as described, may be used conjointly with the punching device. This, however, does not pertain to the subject matter of my invention, and I have therefore omitted illustration and description thereof, and merely shown the punching device to illustrate means which require the feeding of paper strips intermittently and at uniform intervals.

The operation of the device described above is as follows: The paper strip *b* to be perforated is, at the beginning, perforated twice, at the distance in which the following perforations should be made, in order to allow the fingers *k*, at the beginning of the operation, to engage in the perforations. If now the machine is operated from shaft K, in the direction indicated by the arrows in Fig. 1, the elevated portions *e*, *e* of feed rolls *c* will press the paper strip which has been placed between rolls *f* and *c* against rolls *f*, and will feed it in the direction indicated by the arrow L until the elevated portions *e* have passed. In the meantime, owing to the action of springs *s*, contact roll *m* has dropped from the highest to the lowest point of the snail cam *p*, and has thereby thrown arms *g*, together with fingers *k*, back against the feeding direction. If now snail cam *p* continues to revolve it will gradually lift roll *m* and cause arms *g* to move forward in the feeding direction. Thereby fingers *k* will engage in the perforations of paper strip *b* and will shift it forward to a fixed point (the paper strip then being free between rolls *f* and *c*). If the machine continues to operate snail cams *u* now commence to depress arms *b*, thereby depressing rods D, and with them punch head B. Punches C will thus perforate the paper strip (and in case a printing device is attached to the machine the printing is done at the same time). It will be seen that during the perforating period roll *m* is in contact with the concentric portion of snail cam *p*, and the elevated portions *e* of feed rolls *c* are out of engagement with feed rolls *f*, so that at that time the paper strip will be at rest. On further rotation of snail cams *u* contact rolls *w* will drop from the highest to the lowest point of the snail cam through the tension of compression springs G, which will, in turn, cause the lifting of the punches from the table, and the freeing of the paper strip from the punches. The timing of the device is so that now the elevated portions of feed rolls *c* will come again into engagement with rolls *f*, and thus take hold of the paper strip and feed it forward, as described above. Subsequently the fingers *k* will be thrown back against the feed direction and engage in the next row of perforations and again adjust the feeding of the paper strip to the proper distance, independent of the feed rolls, as described above.

It is obvious that (of course within certain limits at each stroke) no matter to which point the feeding rolls may have fed the strip, the following fingers *k* will engage the strip in the perforations during their forward stroke and carry the perforated line to a fixed point which is determined so that the portions of the strip which are next to be operated upon will be in proper line with the operating device, in this particular instance with the punches, and the perforations will be made at equal distances from each other, irrespective of the slight errors caused by defective feeding rolls, at each stroke.

By adjusting thumb screw *r* the point to which the paper strip should be fed by fin-

gers *k* may be exactly defined, so that thus the distances at which the perforations are made in the strip will always be equal.

I claim:

1. In a machine for feeding paper strips or the like, having perforations at predetermined intervals, the combination with a fixed feeding table, and feeding rolls adapted to intermittently feed a paper strip for a portion of an interval; of reciprocating feeding arms having fingers adapted to yieldingly engage said strip at each perforation during the forward stroke of the arms in the feeding direction, subsequently to the feeding by said rolls to positively feed said strip the remainder of the interval between two perforations independently of said rolls.

2. In a machine for feeding paper strips or the like, having perforations at predetermined intervals, the combination with a fixed feeding table and feeding rolls adapted to intermittently feed a paper strip for a portion of an interval; of reciprocating feeding arms and a snail cam for operating said arms, said arms having fingers adapted to yieldingly engage said strip at each perforation during the forward stroke of the arms in the feeding direction subsequently to the feeding by said rolls, to positively feed said strip the remainder of the interval between two perforations independently of said rolls.

3. In a machine for feeding paper strips or the like, having perforations at predetermined intervals, the combination with a fixed feeding table, and feeding rolls adapted to intermittently feed a paper strip for a portion of an interval; of reciprocating feeding arms having fingers adapted to yieldingly engage said strip at each perforation during the forward stroke of the arms in the feeding direction, subsequently to the feeding by said rolls to positively feed said strip the remainder of the interval between two perforations independently of said rolls, and means for adjusting the length of the feeding stroke of said arms.

4. In a machine for feeding paper strips or the like, having perforations at predetermined intervals, the combination with a fixed feeding table and feeding rolls adapted to intermittently feed a paper strip for a portion of an interval; of reciprocating feeding arms and a snail cam for operating said arms, said arms having fingers adapted to yieldingly engage said strip at each perforation during the forward stroke of the arms in the feeding direction subsequently to the feeding by said rolls, to positively feed said strip the remainder of the interval between two perforations independently of said rolls, and means for adjusting the length of the feeding stroke of said arms.

In testimony whereof I have set hereunto my hand in the presence of two witnesses.

OSCAR OEHRING.

Witnesses:

HENRY HASPER,

WOLDEMAR HAUPT.