Feb. 5, 1946. J. KRELL 2,394,312

ADDRESS PRINTING MACHINE

Filed Dec. 21, 1939 3 Sheets-Sheet 1

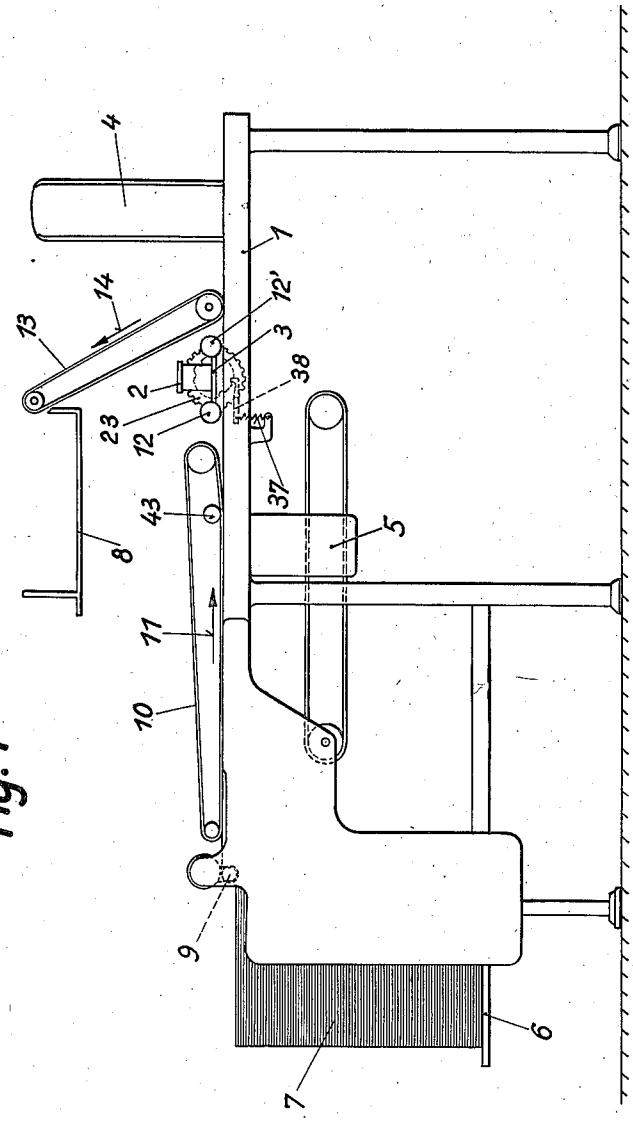


Fig. 1

Inventor:
J. Krell

by Glascock Downing & Seebold
Attorneys.

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ADDRESS PRINTING MACHINE

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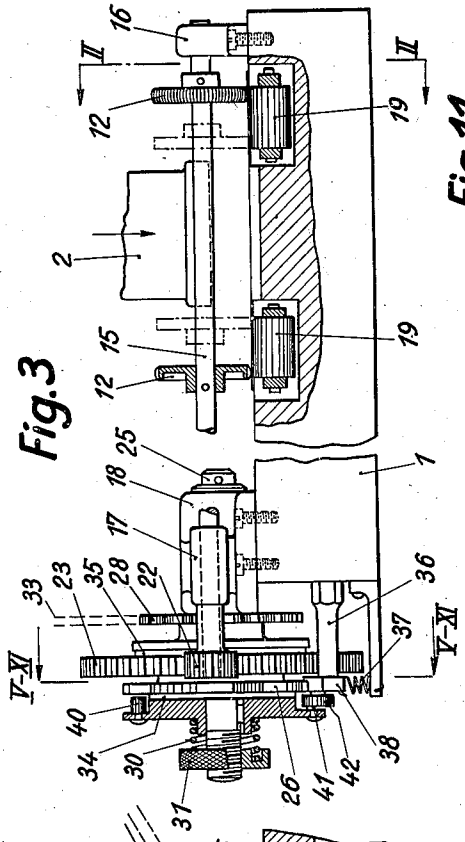


Fig. 3

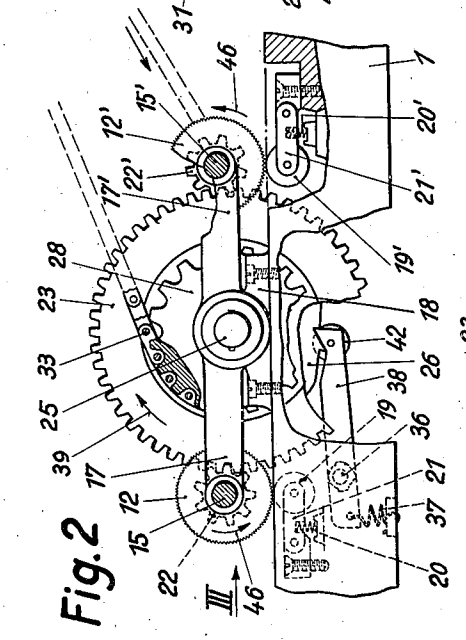


Fig. 2

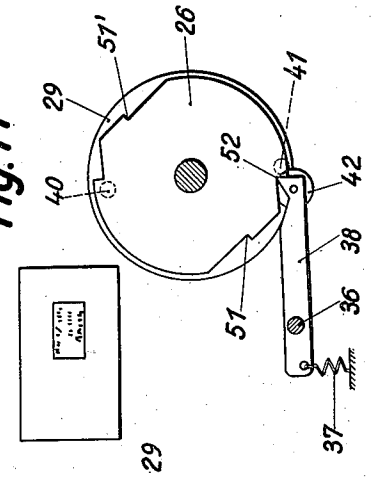


Fig. 11

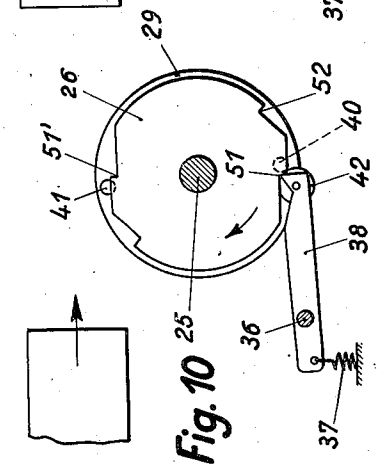


Fig. 10

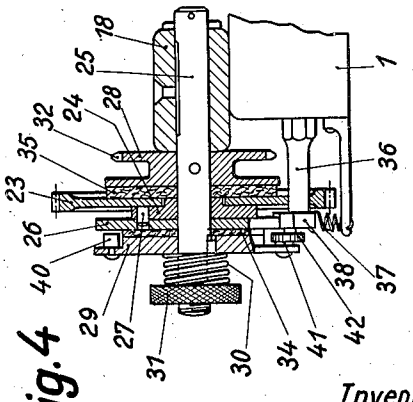


Fig. 4

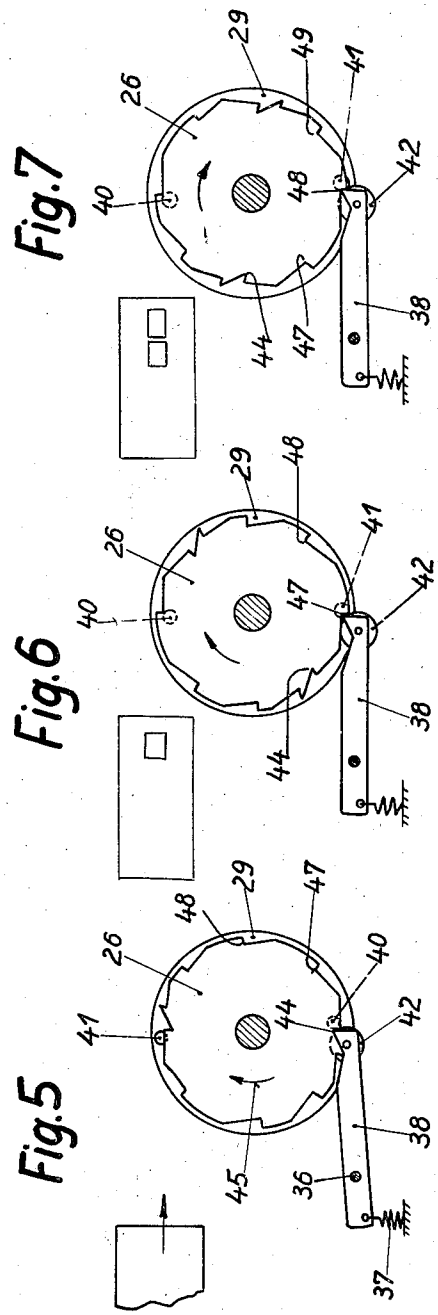
Inventor:
J. Krell

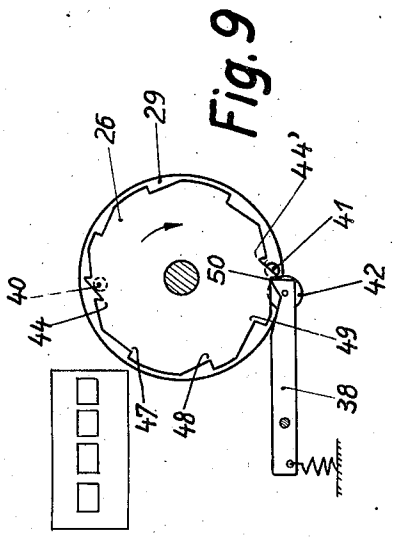
by: Glascock Downing & Seebold
Attorneys.

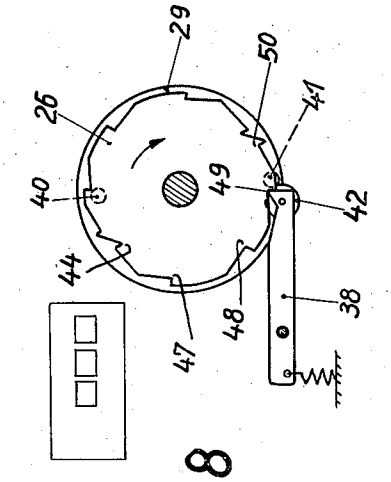
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ADDRESS PRINTING MACHINE

Filed Dec. 21, 1939 3 Sheets-Sheet 3







Inventor:
J. Krell
Glascock Downing & Seebold
Attorneys.

Patented Feb. 5, 1946 2,394,312

UNITED STATES PATENT OFFICE

2,394,312

ADDRESS PRINTING MACHINE

Joseph Krell, Berlin-Zehlendorf, Germany; vested in the Alien Property Custodian

Application December 21, 1939, Serial No. 310,443
In Germany December 22, 1938

3 Claims. (Cl. 74—112)

This invention relates to an address printing machine provided with a device for conveying the pieces or sheets or the like of paper, for instance forms, through the machine intermittently and automatically.

It has already been suggested to make use of endless conveying bands running continuously in the same direction and serving for conveying the sheets etc. to be imprinted to and over the printing place. For holding fast the sheets etc. to be imprinted means holding the papers either only one time or several times are provided and are turned into the path of the said sheets. With these machines the conveying bands which are, in most cases, arranged in pairs cover a part of the sheet to be imprinted so that the sheet can be imprinted only on a part of its surface. But not only the conveying bands, also the holding means reduce the surface available for the print, in that these means take hold of the sheet at the rim thereof whereby printing directly at the rim is rendered impossible. With said older machines there is, thus, the sheet portion available for the printing considerably smaller than the sheet itself, so that it is, first of all, rendered impossible to imprint rim portions of the sheet.

The object of the invention is to provide an arrangement able to render possible to imprint the sheet on any desired place, thus, on the rims, too. Another object of the invention consists therein to increase the safety of service of the machine by combining the means control and the conveying means with one another.

The invention consists especially therein that in front of the printing place, as well as therebehind, a conveying roll gearing or conveying roller gearing is provided and both these gearings are driven synchronously and intermittently.

While the above-mentioned conveying roll gearings or conveying roller gearings serve solely for conveying the piece or sheet of paper, especially forms, to the place below the printing place, there is also provided, according to the invention, another conveying gearing, preferably designed as a conveying band, the purpose of which is to feed the sheets etc. to be imprinted to said printing place.

The improved address printing machine designed according to this invention is distinguished especially also by the feature that firstly every form etc. moved by the conveying gearing over the printing place in portions of any number and any length is provided, if the printing arm forming a member of the machine is repeatedly operated in correspondence with the number of said portions, with a corresponding plurality of imprints following one another in the direction of motion of the form etc., and secondly, when the thus imprinted form leaves the step-wise operating conveying gearing, it is further conveyed out of the machine by another conveying device separately provided for this purpose.

A constructional form of the address printing machine particularly suited for the purpose in view is characterised by the further features that the two conveying gearings are coupled with one another in a particular manner and that a selectively engaging and disengaging clutch forms one of the driving members therefore. In connection therewith a ratchet mechanism may be provided for stopping the conveying roller gearing, the pawl of this mechanism being preferably disengageable in the requisite periods of time with the aid of a control cam. A particularly simple arrangement of the members concerned is obtained by providing the ratchet toothing cooperating with the pawl of the ratchet mechanism and determining the length of the conveying paths of the conveying roller gearing on an exchangeable disk. The applicability of the entire device is still more increased by the provision that the conveying gearings arranged in front of, and behind, the printing place, as well as the intermittently operating driving members, are arranged upon a frame attached reversibly to the table plate of the machine.

The invention is illustrated diagrammatically and by way of example on the accompanying drawings on which Figure 1 is a front-view of the machine, Figure 2 a conveying device operating in an echelon-wise manner, this device being shown partly in front-view and partly in section; Figure 3 is a side view of the conveying device shown in Fig. 2, partly in section; Figure 4 shows the left-hand end of Fig. 3 completely in section, and the Figs. 5–11 are illustrations of a partly recessed or cogged disk in seven different positions, together with certain members co-operating therewith, all as fully described hereinafter.

Referring in the first place to Fig. 1, 1 denotes the table plate of an address printing machine designed according to this invention, and 2 denotes a printing arm located above said plate and being vertically oscillatable in known manner, and moved in this manner by means which, being known, do not form parts of the invention. Attached to the lower face of said arm is a printing cushion 3, which determines the place of the machine where a form or the

like is to be provided with a certain definite imprint. The table is provided with a guide (not shown) for printing blocks, printing plates or the like contained in a store receptacle and being successively withdrawn therefrom, whereafter the respective block etc. is moved past below the arm 2 and finally deposited in another receptacle 5 situated below the table 1.

7 denotes a pile of the forms etc. to be imprinted, and 6 is a stationary plate supporting the pile. Above the table is a plate or box or the like 8 which is to receive the imprinted forms etc. In the constructional form shown by way of example the individual sheets are withdrawn from the pile by means of a suction lifter 9 of any suitable design, and are then further conveyed by means of an endless band 10 in the direction indicated by the arrow 11 whereby they are conveyed to two groups 12 and 12' of conveying rolls, of which the one group is located in front of the printing arm 2 and the other is located therebehind. This part of the machine is so designed that the sheet to be imprinted comes to a standstill below the printing arm at least one time, may be, however, several times, so that it can be imprinted during the pause or pauses. Owing to this manner of operation I have termed the device in question proportionating conveyor. Behind it, there is provided an endless conveying band 13 by which the imprinted sheets are conveyed upwardly to the collecting box 8 in the direction indicated by the arrow 14.

The proportionating conveyor is illustrated separately in the Figs. 2–4 which are drawn to a greatly enlarged scale relatively to Fig. 1. In front of, and behind, the printing place are shafts 15 and 15' supported in bearings 16, 16' and 17, 17' supported in turn on the table 1 of the machine. The bearings 17, 17' are constituted by horizontal arms (Fig. 2) located opposite to one another and supported in common by a bearing 18 (Figs. 3 and 4). To each of the shafts 15, 15' is affixed a roller, or a pair of rolls 12, 12' respectively (Figs. 2 and 3). Below these rolls are housed in cavities of the table 1 pressure rolls 19, 19' which are supported by arms 21, 21' subjected to the action of compressive springs 20, 20' by which they are pressed against said rolls. To the end of each of the shafts 15, 15' is keyed a driving pinion 22, or 22' respectively. Both pinions mesh with a cog-wheel 23 which is rotatably supported upon a shaft 25 supported in turn in the bearing block 18. At a side of the wheel 23 is a hub disk 24 (Fig. 4) which is likewise rotatably supported upon said shaft 25, and laterally from said disk is provided a ratchet wheel 26 that is coupled with the said disk by means of an eccentrically arranged pin 27. The members 23, 24 and 26 are located between two disks 28 and 29, of which the first is firmly connected with the shaft 25 by means of a pin, as shown in Fig. 4, whereas the other disk 29. is axially shiftable upon said shaft and coupled therewith merely by means of feather and groove. The disk 29 is subjected to the action of a compressive spring 30 located upon the outer end of the shaft 25 and retained in place by means of a knurled nut 31 by which the tension of said spring can be adjusted. Between the disks 26 and 29 is a layer of felt 34 and between the disks 23 and 28 is a layer of felt 35. The just described arrangement and combination of parts constitutes a friction clutch, by the intermediary of which the rotation of the disk 28 is transmitted to the cog-wheel 23. The spring 30 is so adjusted that the driven member 23, or 26 respectively, can be prevented from further rotations without any damage to the machine when the shaft 25 and the members connected with it continue to rotate. The disk 28 is provided with a toothing 32 with which a driving chain or another driving member may mesh.

At the rim of the table 1 is a projecting stationary horizontal arm 36 (Figs. 2 and 4) on which is supported a ratchet pawl 38 (Figs. 5–11) which is subjected to the action of a tensible spring 37. The pawl 38 lies within the range of the ratchet toothing of the disk 26. If the pawl 38 is, for instance, in the position shown in Fig. 2 and the shaft 25 and the parts connected with it are rotated in the direction indicated by the arrow 39, the disk 26 and the cog-wheel 23 coupled with it will be prevented from rotation. These parts can partake in the rotation only if the pawl 38 has been disengaged from the recess of the disk 26 with which it had been in engagement at the time being. For this purpose the disk 29 is provided with two cams 40, 41 located opposite the disk 26, and within the range of these cams is a roll 42 arranged laterally at the pawl 38. The cam 40 lies nearer to the axis of the shaft 25 than the cam 41 so that both cams describe two circles of different diameter.

The drive of the disk 28 is accommodated to the drive of the printing arm 2. It is suited to the object in view to provide also for a certain definite relation between the drive of the disk 28 and the drive of the gripper or suction lifter 9, so that the proportionating conveyor is supplied with another form in certain definite periods of time.

The band conveyors 10 and 13 run preferably continuously. As each sheet or form to be imprinted comes temporarily to a standstill prior to being seized by proportionating conveyor, the band conveyor 10 is provided with a pressure roller 43 or an equivalent member which is adjustable in the direction of motion of the sheet or form, so that a sufficiently large gap with respect to the proportionating conveyor according to the respective sheet or form can be provided for, in order to prevent the sheet or form from being upset by the proportionating conveyor when its front edge pushes upon the shaft of this conveyor while this shaft is at a standstill at the time being.

The manner of operation of the machine is as follows:

It may be supposted that a form comprising four portions (for instance a debit-note, a payment-certificate, a receipt, and an entry-certificate) is to receive an imprinted address upon each of said portions, the wording being the same on all portions.

The forms thus to be imprinted are assembled as a pile 7 which is placed upon the supporting plate 6. While the machine is in operation the forms are withdrawn successively from said pile by means of the suction gripper 9 and delivered to the band conveyor 10 by which the forms are further delivered to the rolls 12 of the proportionating conveyor. The ratchet friction gearing inserted into the drive of the conveying rolls 12 and 12' is so designed and controlled that the rolls come to a standstill in the same moment in which the form contacts with them. Fig. 5 shows the position of the parts concerned in that moment. In this position the pawl 38 engages

the particularly deep recess 44 of the ratchet disk 26. The cam 40 provided at the disk 29 which rotates continually in the direction indicated by the arrow 45 contacts, while it continues to rotate, with the roll 42 and lifts the pawl 38 out of the recess 44, whereby the locking of the disk 26 and, thus, also of the cog-wheel 23 is broken. Now also this wheel is rotated in the direction of the arrow 45, i. e. of the arrow 39, Fig. 2, whereby also the rolls 12 and 12' are turned in the direction of said arrow 46. The form lying in front of the conveying rolls 12 is seized by them and moved below the printing arm. This forward feed of the forms lasts until the recess 47 following the recess 44 is being engaged by the pawl 38. Fig. 6 shows this position of the ratchet disk 26. By reason of this new locking of the disk 26 the cog-wheel 23 and the conveying rolls 12, 12' have been brought to a standstill. Also the form now positioned below the printing arm, i. e. on the printing place, is there at a standstill. While this takes place, the first imprint is effected by the printing arm and the printing block attached to it being moved down upon the form, and immediately thereafter said arm and said block are again lifted.

While the printing takes place the cam 41 of the disk 26 has approached the roll 42 of the pawl 38. When the printing arm with the block commences to rise, the cam 41 presses upon the roll 42 and lifts the pawl out of the recess 47, whereby the ratchet disk 26 and with it the cog-wheel 23 and the conveying rolls 12, 12' are rotated. The form now seized by these rolls is conveyed further until the pawl 38 has entered into the next recess 48. when these members will be in the position illustrated in Fig. 7. In this position the conveyance of the form is again interrupted. and in this pause another imprint is effected by the printing arm etc., this second imprint being made on the second portion of the form. While this takes place the cam 40 has again approached the roll 42 of the pawl 38. The depth of the recess 48, combined with the slight distance between the cam 40 and the axle, is, however, so slight, that the cam 40 moves past the pawl 38 without lifting it out of the recess. The roll 42 of the pawl 38 will be lifted out of the recess in question only again by the cam 41, i. e. after a complete revolution of the cam disk 29. The ratchet disk 26 gets now from the position Fig. 7 into the position Fig. 8. In this position the pawl 38 has engaged the recess 49 of the disk 26 and the members coupled in the manner described with the disk 26. viz. the cog-wheel 23 and the conveying rolls 12. 12' are at a standstill. and these rolls hold the form fast upon the printing place. Now the printing arm is depresed for the third time so as to produce an imprint upon the third portion of the form. When thereafter the printing arm has again been raised the cam 41 now contacting with the larger diameter presses upon the roll 42 and lifts the pawl out of the recess 49. The ratchet 26 and the members coupled with it in the manner described are further moved until the pawl 38 has entered into the recess 50. as shown in Fig. 9. By the rotation of the rolls 12, 12' the form has again been advanced by so much that its fourth portion lies below the printing arm, and while the form has now again come to a standstill, the fourth imprint is effected by means of the descending arm which instantly thereafter returns into its former, i. e. upper position. After the cam disk 29 has made another revolution the cam 41 presses again upon the roll 42 whereby the pawl 38 will be lifted out of the recess 50.

The drive of the conveying rolls 12, 12' brought about by the just described procedures is utilised for delivering the imprinted forms out of the proportionating conveyor. The conveying time requisite for the deliverance can be shorter so that after a conveying rotation which is shorter than the preceding conveying rotations, the pawl 38 engages the recess 44' particularly provided for the purpose in view. This recess pertains to the second group of the recesses of the ratchet disk. These receses correspond with those already described in preceding paragraphs of this specification, the only difference being that they are staggered relatively to them by 180°. The position of the rachet disk corresponds, therefore, with the position shown in Fig. 5. Owing to the pawl 38 entering more deeply the roll 42 is now located within the range of action of the cam 40 so that the pawl is lifted out of the recess 44 already after a further semi-rotation of the cam disk 29.

In the period of time determined by this further semi-rotation a fresh form must be conveyed to the conveying rolls 12.

As with the above described constructional form of the address printing machine there has been assumed that four imprints are to be made on the form, the feed for the printing block is so designed that a fresh feed, or an actuation of the fresh printing block takes place only after the printing arm has been four times depressed.

The form coming from the proportionating conveyor is taken hold of by the band conveyor 14 and is delivered into the box 8.

From the preceding description of the improved address printing machine appears that the control of the proportionating conveyor is determined essentially by the shape and the number of the recesses of the ratchet disk, wherefrom results that the manner of operation of the machine can be accommodated also to other conditions, for instance to the production of another number of imprints upon a form, and I am now going to describe a constructional form in which only one imprint is made on a form. In this case the ratchet disk is designed in the manner shown in Figs. 10 and 11. From these figures, it appears that a smaller number of recesses is provided in this case, viz. only two rests 51 and 52, the recess 51 corresponding with the deeper rest 44 of the first described constructional form, whereas the recess 52 has a smaller depth, as have also the recesses 47, 48, 49 and 50 of said first-described constructional form. The form is conveyed to the rolls 12 of the proportionating conveyor in the already described manner. In the moment in which the form contacts with the rolls 12 these latter are at a standstill, because the pawl 38 engages the recess 51 of the ratchet disk 26 (Fig. 10). The cam 40 of the continually rotating disk 29 lifts the pawl 38 out of the recess 51 when it depresses the roll 42 whereby the proportionating conveyor is rotated so that the rolls 12 take hold of the form and move it below the printing arm. The proportionating conveyor comes to a standstill as soon as the ratchet pawl 38 engages the recess 52 of the ratchet disk, as shown in Fig. 11. While the proportionating conveyor is at rest, the printing arm is depressed and instantly thereafter raised, so that an imprint is produced on the form. After half a revolution of the disk 29 the cam 41 depresses the roll 42 whereby the pawl 38 is disengaged from the recess 52, in consequence whereof the proportionating conveyor

is rotated so that the rolls 12, 12' discharge the imprinted form out of the machine. The proportionating conveyor remains in operative position until the pawl 38 engages the second recess 51 of the ratchet disk 26.

It has, as regards the just described further constructional form of the machine, been assumed that the ratchet disk is provided with two recesses. It is, however, a matter of course that the invention is not restricted to this number of recesses of said disk. The design and arrangement and combinations of the members concerned may also be such a one that one complete revolution of the ratchet disk is requisite for every passage of a form, whereby, of course, another subdivision of the disk 29 would become necessary.

As the conveying members of the proportionating conveyor lie completely outside of the range of the printing arm, and as said members are provided in front of the printing place, as well as therebehind, an imprint can be produced on the form on any desired place thereof with the aid of a suitably designed control. If the rim zones of the form are to receive imprints and if, for this purpose, it is necessary to conduct the form eccentrically with respect to the printing place, the conveying rolls may be laterally shifted upon the shafts 15, 15', as is indicated in Fig. 3. If a still longer shifting of said rolls is desired then counter rollers 19 which are suitably longer in their axial direction may be used.

The machine can be employed if a continuous sheet of paper instead of individual sheets or forms is to be used. In this case, under circumstances, the separate band conveyors may be dispensed with, in which case attention is to be paid solely to the condition to provide for some slack with respect to the winding off and winding on of the continuous sheet so as to render possible an intermittent feed at the printing place.

In the construction form shown by way of example the proportionating conveyor is designed as a double conveying roll gearing. Also if rollers would be employed instead of rolls, the advantage of rendering it possible to imprint the form on any desired place could be realised. This advantage could, however, be obtained also if a thrust gearing or a gripper gearing permitting an intermittent feed of the sheet or form to be imprinted would be used.

With the constructional form shown and described has been assumed that the direction of feed extends in the longitudinal direction of the table, as does also the direction of feed of the printing blocks. The proportionating conveyor might, anyhow, be arranged also in such a manner that it conveys the sheets or forms to be imprinted transversely to the direction of the table, or of the printing blocks respectively. In order to provide for a convenient changeability of the members concerned for accommodating them to the various applications the proportionating conveyor is, according to a particular constructional form of the machine, arranged on a separate base plate or on a frame which corresponds to a bed at the table plate of the machine. If another conveying direction of the proportionating conveyor necessitates also a corresponding re-adjustment of the feed conveyor and of the discharge conveyor, this will become particularly easy if these additional conveyors are designed as self-contained additional devices.

I claim:

1. In an intermittent drive mechanism, a rotatable element provided with a plurality of peripheral recesses of varying depths; a spring-pressed, pivoted detent bearing against the periphery of said element and adapted to be pressed into said recesses and prevent rotation of said element when in said recesses; a plurality of rotatable cams adapted to travel in a plurality of radially spaced paths, respectively, said paths being concentric with said rotatable element, and to rock said detent to move it from said recesses to the portions of the periphery of the rotatable element intermediate the recesses; means to constantly rotate said cams; and means to rotate said element when said detent is in contact with said intermediate portions of its periphery, the periods during which the rotatable element is prevented from rotating, by the detent, being dependent upon the depth of said recesses and the length of the radius of the path of each cam.

2. In an intermittent drive mechanism, for conveying sheets, the combination of a driven shaft; a disk loose on said shaft, and having a plurality of recesses in its periphery; a spring-pressed, pivoted detent bearing against the periphery of said disk; a second disk keyed on said shaft, for axial movement relative to and rotation with said shaft; means urging said second disk axially of said shaft to effect a yielding connection between said disks, whereby the second disk intermittently rotates the first disk, the parts being so designed and related that when the first disk is rotated its periphery travels over the detent until the detent enters one of said recesses, when the rotation of the first disk is thereby interrupted; means on said second disk adapted to remove said detent from the recesses, and thereby release the first disk for rotation.

3. In an intermittent drive mechanism, for conveying sheets, a pinion; a shaft on which said pinion is loosely mounted; a disk pinned on said shaft adjacent said pinion; means for rotating said shaft; a ratchet wheel loose on said shaft, fixed to said pinion, and provided with a periphery having a plurality of recesses; a second disk splined on said shaft adjacent said ratchet wheel, the two disks being on opposite sides of said pinion, respectively; adjustable pressure means on the shaft urging the second disk toward the first disk, thereby clutching the ratchet wheel and pinion to the said disks, so that the rotation of the disks by the shaft rotates the ratchet wheel and pinion, intermittently; a spring-pressed pawl cooperating with the periphery of the ratchet wheel, and adapted to periodically prevent rotation of the wheel and pinion when the pawl is received into said recesses, said pawl being provided with a roller; and cams on said second disk co-operating with said pawl roller to release the pawl from the recesses in the periphery of the ratchet wheel, the parts being so designed and related that the periphery of the ratchet wheel moves over the pawl which periodically drops into the recesses and is removed therefrom by the said cams, thereby allowing the pinion to rotate when the pawl is on the periphery and arresting the rotation of the pinion when the pawl is in any one of the recesses.

JOSEPH KRELL.