

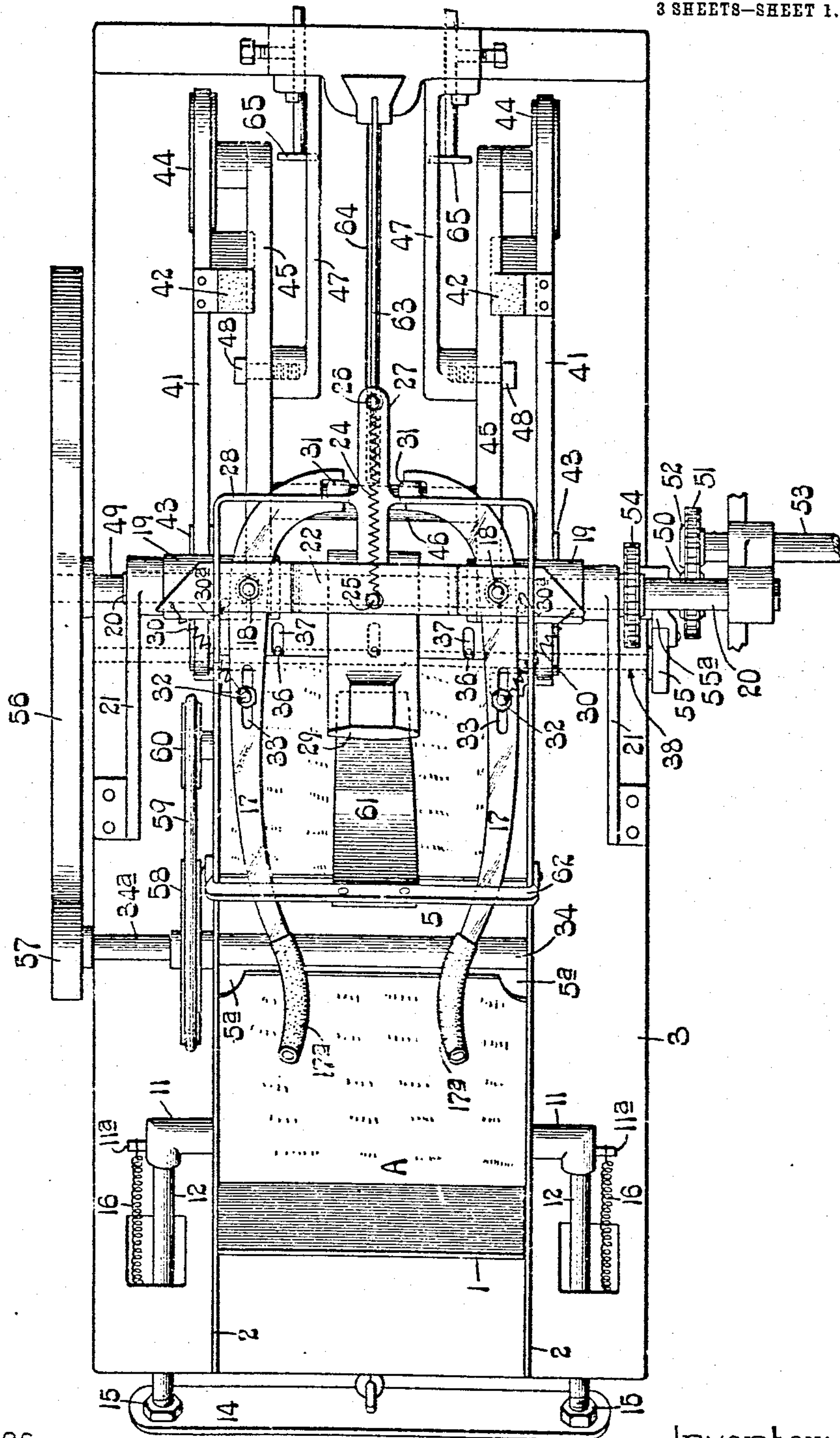
J. RANZ.  
SHEET FEEDING MECHANISM.  
APPLICATION FILED MAR. 23, 1908.

899,133.

Patented Sept. 22, 1908.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses  
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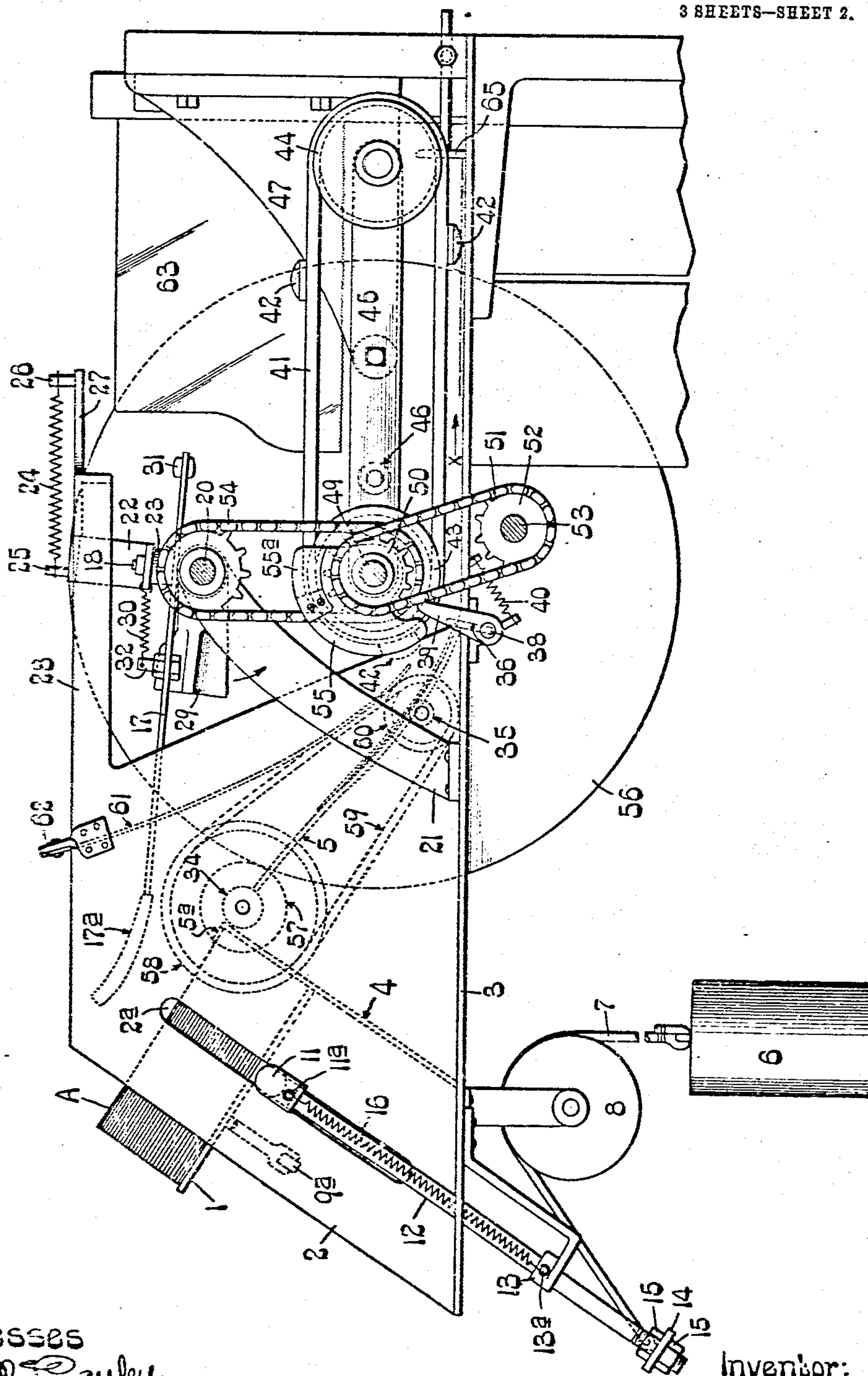
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3 SHEETS—SHEET 2.

Fig. 2.



Witnesses  
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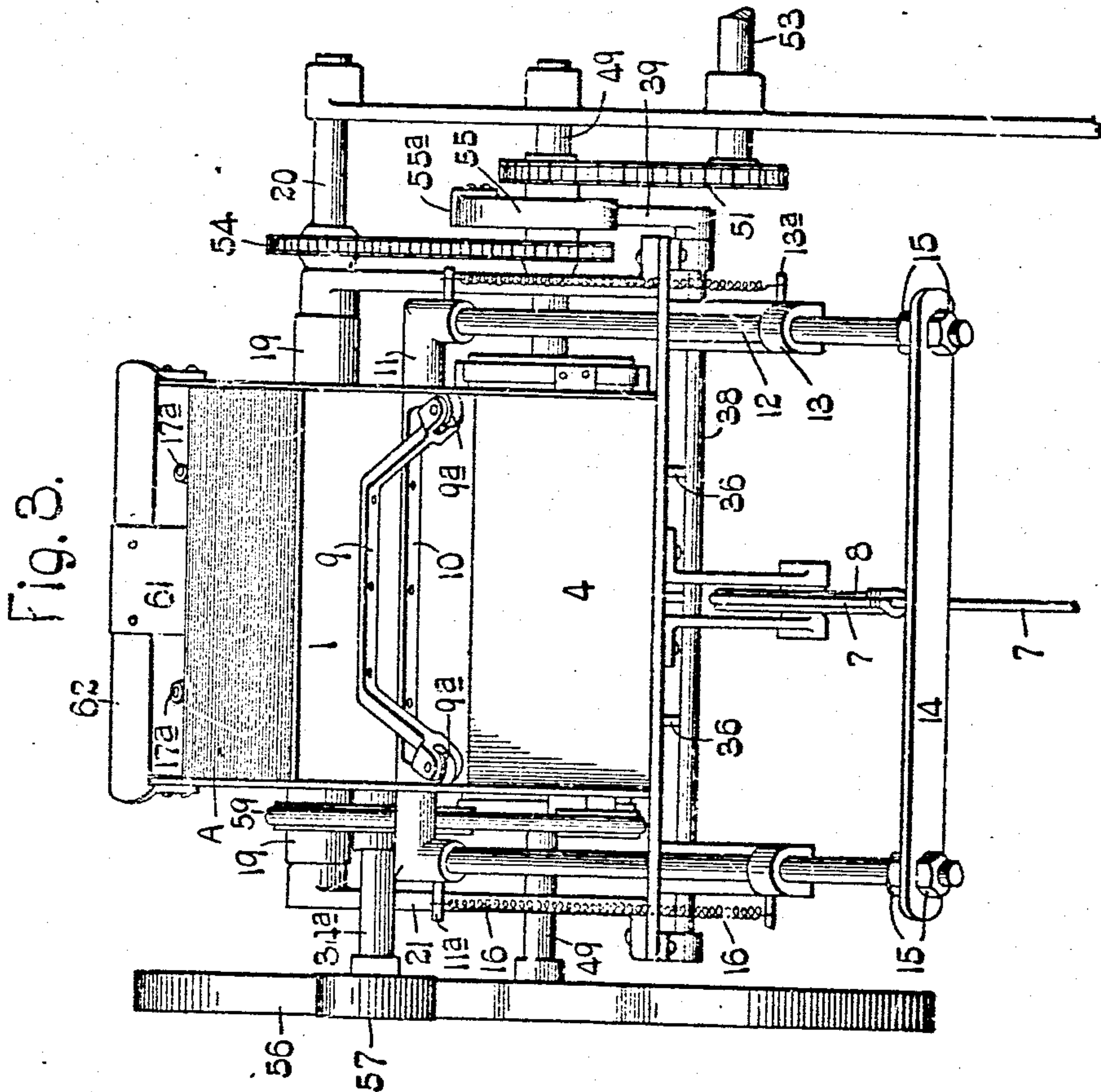
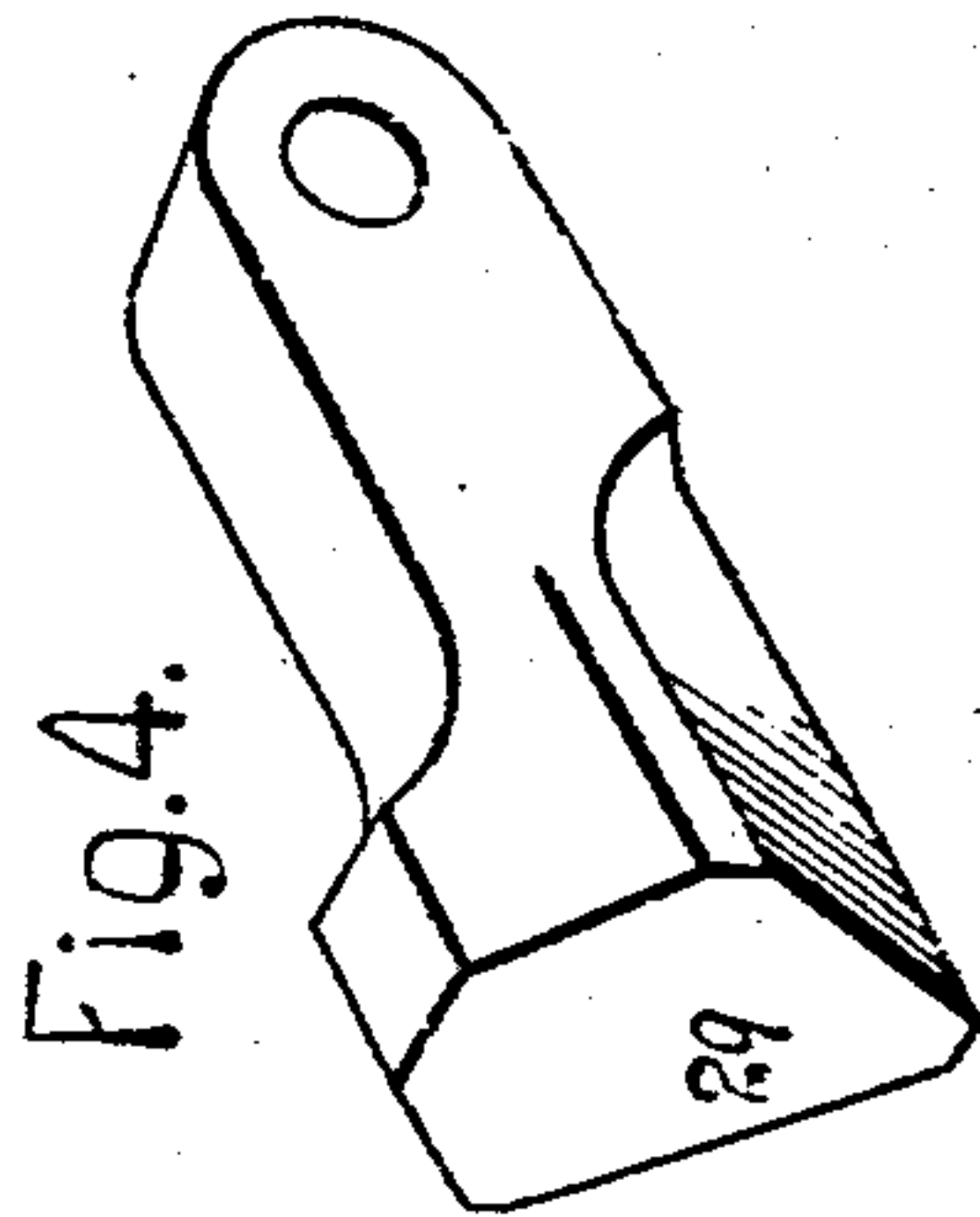


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3 SHEETS—SHEET 3.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## SHEET-FEEDING MECHANISM.

No. 899,133.

Specification of Letters Patent.

Patented Sept. 22, 1908.

Application filed March 23, 1908. Serial No. 422,718.

*To all whom it may concern:*

Be it known that I, JACOB RANZ, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and  
5 useful Improvement in Sheet-Feeding Mechanism, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same. reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view of a sheet feeding mechanism constructed in accordance  
15 with my invention; Fig. 2 is an elevation of the righthand side of said mechanism; Fig. 3 is a front elevation of said mechanism; and Fig. 4 is a detail perspective view of the cam that is used for actuating the pick-up  
20 arms.

This invention relates to sheet feeding mechanisms, such as are used in connection with folding machines or printing machines for automatically removing sheets from a  
25 pile and feeding them to mechanism that subsequently acts on the sheets.

One object of my invention is to provide means of novel construction for automatically removing the topmost sheet of a pile of  
30 sheets.

Another object of my invention is to provide mechanism of novel construction for feeding said sheets away from the pile and into position to be operated on by other  
35 mechanism, such, for example, as a folding or printing mechanism. And still another object of my invention is to provide a novel support which raises automatically as the sheets are removed therefrom.

Referring to the drawings which illustrate the preferred form of my invention, 1 designates a support upon which a pile of sheets A is mounted. Said support is preferably inclined downwardly toward the rear of the  
45 machine, as shown in Fig. 2, and is arranged between side pieces 2 that project upwardly from a table 3, the rear edge of the support 1 bearing against an inclined partition or wall 4 so that the front and side edges of the pile  
50 A are embraced by the partition 4 and side pieces 2, respectively. An inclined guideway or chute 5 is arranged between the side pieces 2 at the rear of the oppositely inclined

partition 4 and said guideway is provided at its upper end with fingers 5<sup>a</sup> that project  
55 forwardly over the pile of sheets A so as to bear upon the topmost sheet of the pile. Means is provided for automatically moving the support 1 upwardly as the sheets are removed therefrom so that the topmost  
60 sheet of the pile will always be clamped against the projecting fingers 5<sup>a</sup> on the guide 5, and in the construction herein shown, said means consists of a weight 6 connected to a cable 7 that passes over a pulley 8 and  
65 is fastened to a member which is connected to the support 1. A bracket 9 is connected to the underneath side of the support and said bracket is provided with downwardly projecting legs that carry rollers 9<sup>a</sup> which  
70 bear upon the inside faces of the side pieces 2 so as to prevent the support 1 from tilting laterally. A bar 10 that is connected to the underneath side of the support 1 projects laterally through inclined slots 2<sup>a</sup> in the  
75 side pieces 2 and said bar is provided at its ends with elbows 11 that are fastened to inclined rods 12 which project downwardly and pass through stationary guides 13 on the underneath side of the table 3. A cross bar  
80 14 is adjustably connected to the ends of said rods 12 by means of nuts 15, as shown in Figs. 2 and 3, and the cable 7 to which the weight 6 is connected is fastened to an eye on said cross bar 14.

From the foregoing it will be obvious that the weight 6 forces the support 1 upwardly and thus holds the topmost sheet of the pile A in intimate engagement with the projecting fingers 5<sup>a</sup> on the inclined guide 5, the support raising automatically as the sheets are removed therefrom. The weight of the pile of sheets on the support 1 acts to a certain extent to counterbalance or offset the weight of the propelling member 6 which raises the  
95 support so that as the sheets are removed from the pile, and the weight on the support 1 is thus gradually reduced, the propelling member 6 tends to force the topmost sheet of the pile more firmly against the clamping  
100 fingers 5<sup>a</sup>. To compensate for this tendency of the propelling member to increase the pressure on the topmost sheet as the pile diminishes I employ contraction springs 16 which have their upper ends connected to laterally  
105 projecting pins 11<sup>a</sup> on the elbows of the bar



10 and their lower ends connected to later-  
ally projecting pins 13<sup>a</sup> on the stationary  
guideways 13, as shown in Fig. 3. Conse-  
quently as the pile of sheets diminishes and  
5 the support 1 moves upwardly the tension  
of the springs 16 will be increased and thus  
compensate for the gradual reduction in the  
weight of the pile so that the topmost sheet  
of a small pile will be clamped against the  
10 fingers 5<sup>a</sup> with approximately the same pres-  
sure as the topmost sheet of a large pile.

The means for removing the topmost sheet  
of the pile consists of a pair of pivotally  
mounted pick-up arms 17 which have their  
15 front ends arranged over the pile of sheets  
on the support 1, as shown in Figs. 1 and 2,  
the front ends of said arms being provided  
with friction tips 17<sup>a</sup> that may be formed of  
rubber, leather or any other suitable ma-  
20 terial that will obtain a purchase on the top-  
most sheet of the pile when the tips are  
forced into engagement with same. Said  
arms 17 are moved downwardly to cause the  
friction tips to engage the topmost sheet of  
25 the pile and the front ends of said arms are  
then moved towards each other to draw the  
corner portions of the sheet out of engage-  
ment with the clamping fingers 5<sup>a</sup> and also  
form a loop in the central portion of the sheet  
30 in practically the same manner that a person  
does when he picks up a sheet with his  
thumb and first finger. The front ends of  
the arms 17 are thereafter moved upwardly  
to lift the topmost sheet bodily away from  
35 the pile and the arms are then separated so  
as to release said topmost sheet and permit  
it to straighten out and fall onto the inclined  
guideway 5 down which it travels to feeding  
mechanism hereinafter described. Each of  
40 the arms 17 is pivotally connected by a bolt  
18 to a sleeve 19, and the sleeves for both  
arms are loosely mounted on a shaft 20 that  
is journaled in standards 21 on the table 3.  
The two sleeves 19 are connected together  
45 by a cross-bar 22 and the bolts 18, which  
form the pivots for the arms 17, also serve as  
the connecting means for said bar and sleeves,  
the bar 22 being spaced away from the sleeves  
19 by means of fillers or blocks 23 through  
50 which the bolts 18 pass, as shown in Fig. 2.  
A contraction spring 24, which is connected  
at its front end to a pin 25 on the bar 22 and  
at its rear end to a pin 26 on a stationary  
stop 27, operates to hold said bar against  
55 the front end of said stop and thus retain  
the arms 17 in the elevated position shown  
in Fig. 2. In the construction herein shown  
the stop 27 is carried by a yoke-shaped mem-  
ber 28 that projects rearwardly from the side  
60 pieces 2.

The pick-up arms 17 are forced toward  
each other and also moved downwardly into  
engagement with the pile of sheets on the  
support 1 by means of a cam 29 secured to  
65 the shaft 20 which is rotated continuously

by mechanism hereinafter described, and  
each arm 17 is connected to one end of a con-  
traction spring 30 that moves the front end  
of the arm outwardly away from its coöper-  
ating arm so as to release the topmost sheet 70  
after the cam 29 has passed out of engage-  
ment with the rollers 31 on the rear ends of  
the arms 17, the outward movement of the  
arm being limited by a stop 30<sup>a</sup>. The shaft  
20 revolves in the direction indicated by the 75  
arrow in Fig. 2, and as the wedge-shaped cam  
29 strikes the rollers 31 on the rear ends of  
the arms 17 it forces the front ends of said  
arms downwardly so that the friction tips  
17<sup>a</sup> engage the topmost sheet of the pile. 80  
Thereafter the wedge-shaped cam 29 passes  
upwardly between the rollers 31 and rocks  
the arms 17 on their pivots 18 so that their  
front ends approach each other and as the  
friction tips are then in engagement with the 85  
topmost sheet of the pile the central portion  
of the sheet will be crimped and its corners  
will be drawn out of engagement with the  
clamping fingers 5<sup>a</sup>. The cam 29 is approxi-  
90 mately diamond-shaped in cross section, as  
shown in Fig. 4, and after the central portion  
thereof has passed out of engagement with  
the rollers 31 the spring 24 will raise the  
front ends of said arms and the springs 30  
95 will gradually separate the arms so that the  
topmost sheet is picked up from the pile and  
dropped onto the inclined guide 5. In view  
of the fact that the cam 29 operates to swing  
the arms 17 downwardly and also operates  
100 to force said arms towards each other, I use  
springs 30 that have sufficient tension to pre-  
vent the arms from moving toward each  
other when the cam 29 first engages the roll-  
ers on said arms, the arms remaining sepa-  
105 rated and also moving with the cam 29 until  
the front ends thereof come into contact with  
the topmost sheet of the pile so that further  
downward movement is prevented. I pre-  
fer to provide means for varying the tension  
110 of the springs 30, and in the construction  
herein shown said means consists of a stud or  
bolt 32 adjustably mounted in an elongated  
slot 33 in the arm and having the front end  
of the spring 30 connected thereto, the rear  
115 end of said spring being connected to the  
cross-bar 22. By moving the stud 32 to-  
wards the front end of said slot I increase the  
tension of the spring 30 and diminish the ten-  
sion by moving the stud toward the rear end  
120 of the slot.

Rollers 34 and 35 are arranged in the in-  
clined guideway 5 adjacent the upper and  
lower ends thereof to help the sheets travel  
down said guideway, and at the lower end of  
the guideway are stop fingers 36 which arrest 125  
the downward movement of the sheets.  
These stop fingers 36 project upwardly  
through elongated slots 37 in the guideway 5  
and are carried by a shaft 38 provided at its  
130 righthand end with an arm 39 that is acted



on intermittently by a rotating cam so as to rock said shaft and thus depress the stop fingers 36, thereby releasing the sheet which contacts with said fingers and permitting it to move into position to be engaged by the mechanism which feeds it to the apparatus that subsequently acts on the sheet. The shaft 38 is rocked in the opposite direction to restore the stop fingers to normal position by means of a spring 40 connected at one end to the table 3 and at its opposite end to a laterally projecting pin on the shaft, as shown in Fig. 2.

The means which feeds the sheet to the mechanism that subsequently acts on it, consists of a pair of endless belts or chains 41 arranged adjacent the sides of the table 3 and at the rear of the stop fingers 36, each of said belts being provided with a plurality of contact devices 42 that engage the sheets and feed them rearwardly in the direction indicated by the arrow X in Fig. 2. Each belt or chain 41 passes over a drive pulley 43 and an idler 44 and the idlers and drive pulleys for both belts are carried by a frame which consists of two side pieces 45 and a cross brace 46 that connects said side pieces together, the side pieces being adjustably connected to stationary brackets 47 by means of screws 48. The drive pulleys 43 for both belts are secured to a shaft 49 which is journaled in the front ends of the side pieces 45 of said frame, and said shaft is provided with a sprocket wheel 50 that receives a sprocket chain 51 which passes over a sprocket wheel 52 on the main drive shaft 53 of the machine so that continuous rotary movement is imparted to the shaft 49. The movement of shaft 49 is transmitted to the shaft 20 by means of a sprocket chain 54 which passes over sprocket wheels connected to said shafts, and the shaft 49 is provided with a cam 55 that coöperates with the arm 39 on the rock shaft 38 to depress the stop fingers 36. Preferably, the cam 55 is so constructed that extensions 55<sup>a</sup> of different lengths can be connected thereto so as to vary the period of time which the stop fingers 36 are held depressed and thus enable sheets of different dimensions to be operated on.

The shaft 49 is provided at its lefthand end with a friction disk 56 that engages a friction disk 57 of smaller diameter on the lefthand end of the shaft 34<sup>a</sup> to which the roller 34 is connected, and said shaft 34<sup>a</sup> is provided with a grooved pulley 58 that receives a belt 59 which passes around a pulley 60 connected to the shaft of the roller 35 so that continuous rotary movement will be imparted to both of said rollers and thus cause the sheets to travel down the guideway 5 to the stop fingers 36 and thence to the feeding belts 41. The contact devices 42 on the feeding belts preferably consist of leather, rubber or some other suitable material that will

obtain a firm grip on the sheets and the pressure of said contact devices on the sheets can be varied by loosening the screws 48 and tilting the front end of the belt-carrying frame so as to bring the contact devices closer to or further away from the top surface of the table 3.

Preferably, a finger or guide 61 formed of sheet metal is arranged over the guideway 5 so as to deflect the sheets downwardly onto the guideway 5 in case the pick-up arms should raise the sheets too high, said guide 61 being connected to a cross-bar 62 that is secured to the side pieces 2.

I have herein shown my improved feeding mechanism in combination with a folding machine but it will, of course, be understood that it could be used for feeding sheets to a printing machine, ruling machine and various other kinds of machines. Furthermore, while I have shown sprocket chains, belts and friction disks for driving the various shafts of the apparatus it will, of course, be understood that said shafts could be driven by means of gears or any other suitable mechanism. The only portion of the folding machine that I have illustrated in the drawings is the reciprocating blade 63 that moves downwardly through a slot 64 in the table 3 so as to fold or double a sheet that has been fed underneath same by the belts 41, the sheet being positioned relatively to said folding blade by means of adjustable stops 65 which engage the rear edge of the sheet and hold it stationary while the feeding belts 41 continue to travel.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an apparatus of the character described, a support adapted to hold a pile of sheets, pick-up arms, means for moving said pick-up arms toward the pile and relatively to each other to cause them to engage the topmost sheet of the pile, lift it bodily from the pile and thereafter release it, and means for carrying said sheet to mechanism which subsequently acts on it; substantially as described.

2. In an apparatus of the character described, an inclined support adapted to hold a pile of sheets, pick-up arms, means for moving said pick-up arms downwardly and relatively to each other to cause them to engage the topmost sheet of the pile, lift it bodily from the pile and thereafter release it, and a guideway onto which the sheet drops after it has been released by said pick-up arms; substantially as described.

3. In an apparatus of the character described, an inclined support adapted to hold a pile of sheets, pick-up arms, means for moving said pick-up arms toward the pile and relatively to each other to cause them to engage the topmost sheet of the pile, lift it



bodily from the pile and thereafter release it, a guideway onto which the sheet drops after it has been released by said pick-up arms, and feeding mechanism which acts on the sheet after it has left said guideway; substantially as described.

4. In an apparatus of the character described, a support adapted to hold a pile of sheets, a pair of pivotally mounted pick-up arms, means for forcing said arms downwardly to engage the topmost sheet of the pile, and thereafter toward each other to crimp or ruffle up said topmost sheet, and means for raising said arms to bodily lift said topmost sheet from the pile; substantially as described.

5. In an apparatus of the character described, a support adapted to hold a pile of sheets, rockable bearings, pivotally mounted pick-up arms carried by said bearings, and a rotating cam adapted to engage said arms and rock the bearings so as to move the arms downwardly into engagement with the topmost sheet of the pile and thereafter move the arms together so that they will ruffle up said topmost sheet; substantially as described.

6. In an apparatus of the character described, a support adapted to hold a pile of sheets, a pair of pivotally mounted pick-up arms, rockable bearings to which said arms are connected, and a rotating cam adapted to engage said arms and move them downwardly into engagement with the topmost sheet of the pile and thereafter move them together so that they will crimp or ruffle up said topmost sheet, and means for elevating said arms so as to lift the topmost sheet from the pile, said cam being so formed that it permits said pick-up arms to move away from each other after the topmost sheet has been removed from the pile; substantially as described.

7. In an apparatus of the character described, a pair of pick-up arms, rockable bearings to which said arms are pivotally connected, springs for holding the front ends of said arms separated, a rotating cam adapted to engage the rear ends of said arms so as to force the front ends of same downwardly into engagement with the topmost sheet of a pile and thereafter move said front ends toward each other to crimp or ruffle up said topmost sheet, and yielding means for raising said arms so as to lift said topmost sheet from the pile; substantially as described.

8. In an apparatus of the character described, a pair of pivotally mounted pick-up arms, adjustable yielding means for holding the front ends of said arms separated, means for engaging the rear ends of said arms so as to force the front ends thereof down into engagement with the topmost sheet of the pile and thereafter move said front ends toward

each other to crimp or ruffle up the topmost sheet, and means for causing said arms to move upwardly and release said sheet; substantially as described.

9. In an apparatus of the character described, a rotating shaft, a pair of bearings loosely mounted on said shaft and each provided with a pivotally mounted pick-up arm, a bar connecting said bearings together, a wedge-shaped member connected to said shaft and adapted to engage the rear ends of said pick-up arms so as to force them downwardly into engagement with the topmost sheet of the pile, and thereafter move the arms together to crimp or ruffle up said topmost sheet, and a spring connected to said bar and to a stationary device for elevating said arms so as to lift the topmost sheet from the pile; substantially as described.

10. In an apparatus of the character described, a rotating shaft, a supporting frame loosely mounted on said shaft, a pair of pick-up arms pivotally connected to said frame, springs connected to said arms and said frame to hold the front ends of the arms separated, a cam connected to said shaft and adapted to engage the rear ends of said arms so as to depress the front ends of same and move them toward each other, and yielding means for returning said frame and arms to their normal positions; substantially as described.

11. In an apparatus of the character described, a table, a frame arranged above said table and normally occupying a stationary position, a driven shaft mounted in said frame and provided with rollers, idlers carried by said frame, a pair of belts or chains passing over said driven rollers and their co-operating idlers and provided with contact devices which engage a sheet and feed it over the table, and means for adjusting said frame to vary the positions of said contact devices relatively to the table; substantially as described.

12. In an apparatus of the character described, a support adapted to hold a pile of sheets, an inclined guideway arranged at the rear of said support, means for ruffling up the topmost sheet of the pile and depositing it on said guideway, stop fingers located at the lower end of said guideway, means for depressing said stop fingers intermittently below the surface of said guideway to permit the sheets to leave the guideway, and belts or chains provided with contact devices which engage the sheets and move them to mechanism which subsequently acts on them; substantially as described.

13. In an apparatus of the character described, a support adapted to hold a pile of sheets, a chute arranged at the rear of said support, means for removing the sheets from said pile and depositing them in said chute, stop fingers arranged at the lower end of said chute, a rock shaft to which said stop fingers



are connected, an adjustable cam for rocking  
said shaft to depress the stop fingers and per-  
mit the sheets to leave the chute, and feeding  
belts or chains provided with contact devices  
5 which engage the sheets and feed them away  
from the chute; substantially as described.

In testimony whereof I hereunto affix my

signature in the presence of two witnesses,  
this twentieth day of March, 1908.

JACOB RANZ.

Witnesses:

F. R. CORNWALL,  
GEORGE BAKEWELL.