A. KENT.

SHEET FEEDING MACHINE.

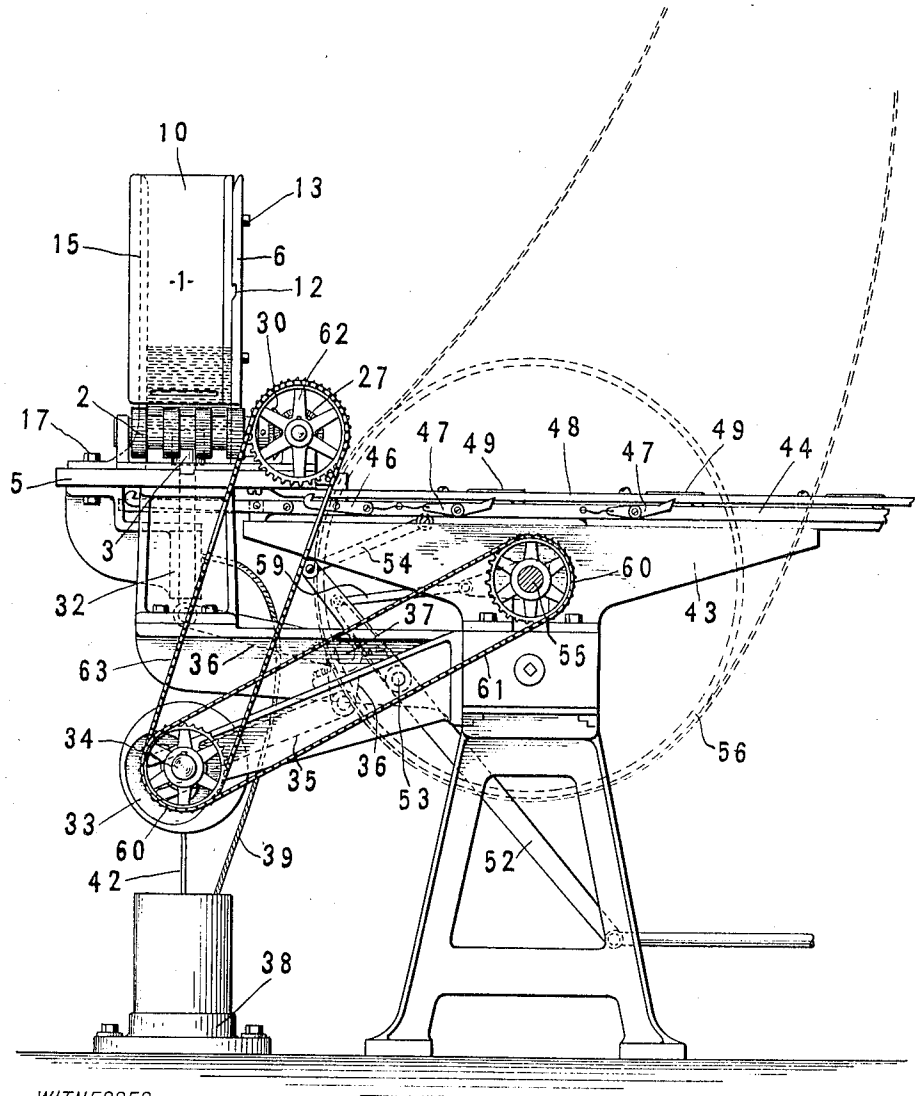
APPLICATION FILED NOV. 20, 1907.

920,154.

Patented May 4, 1909.

7 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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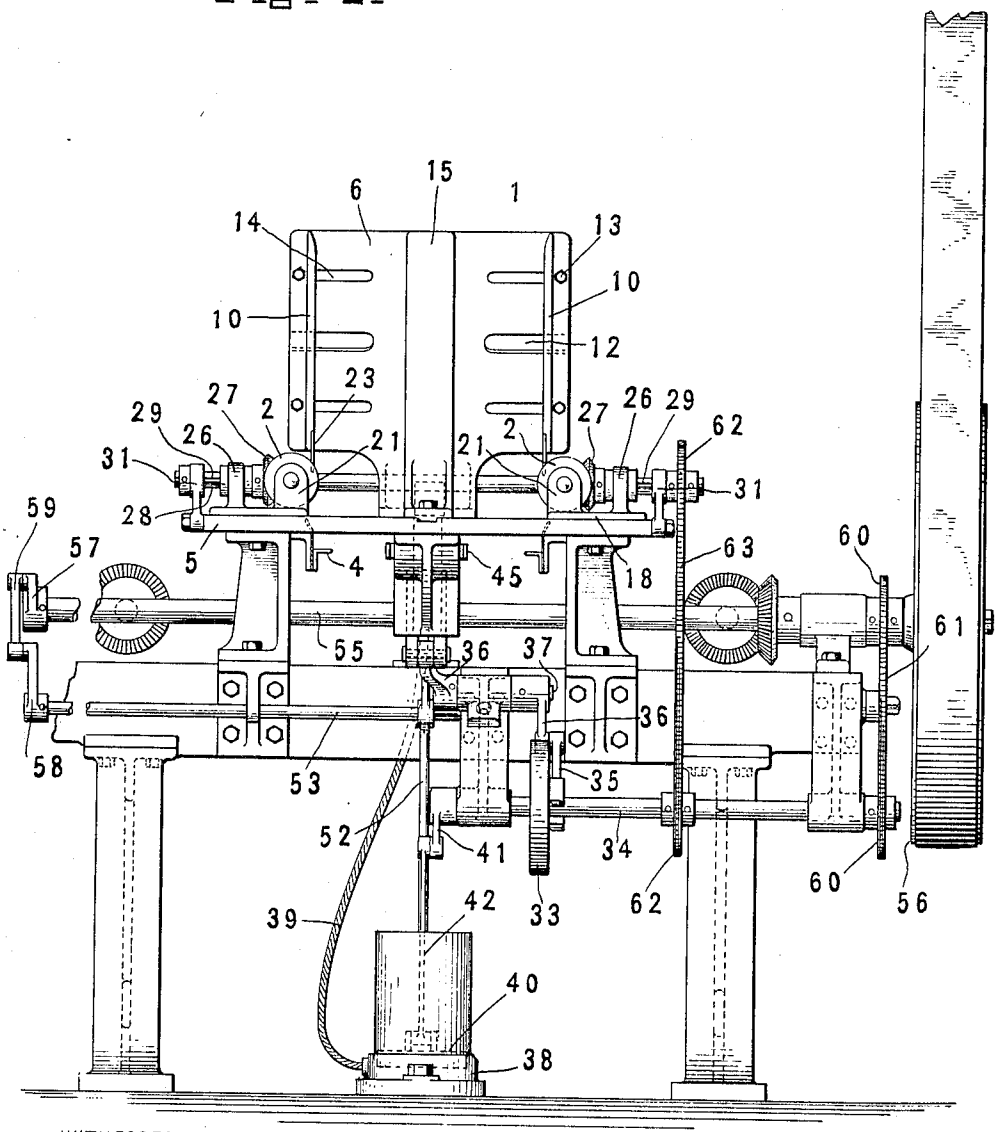
7 SHEETS—SHEET 2.

Fig. 2.



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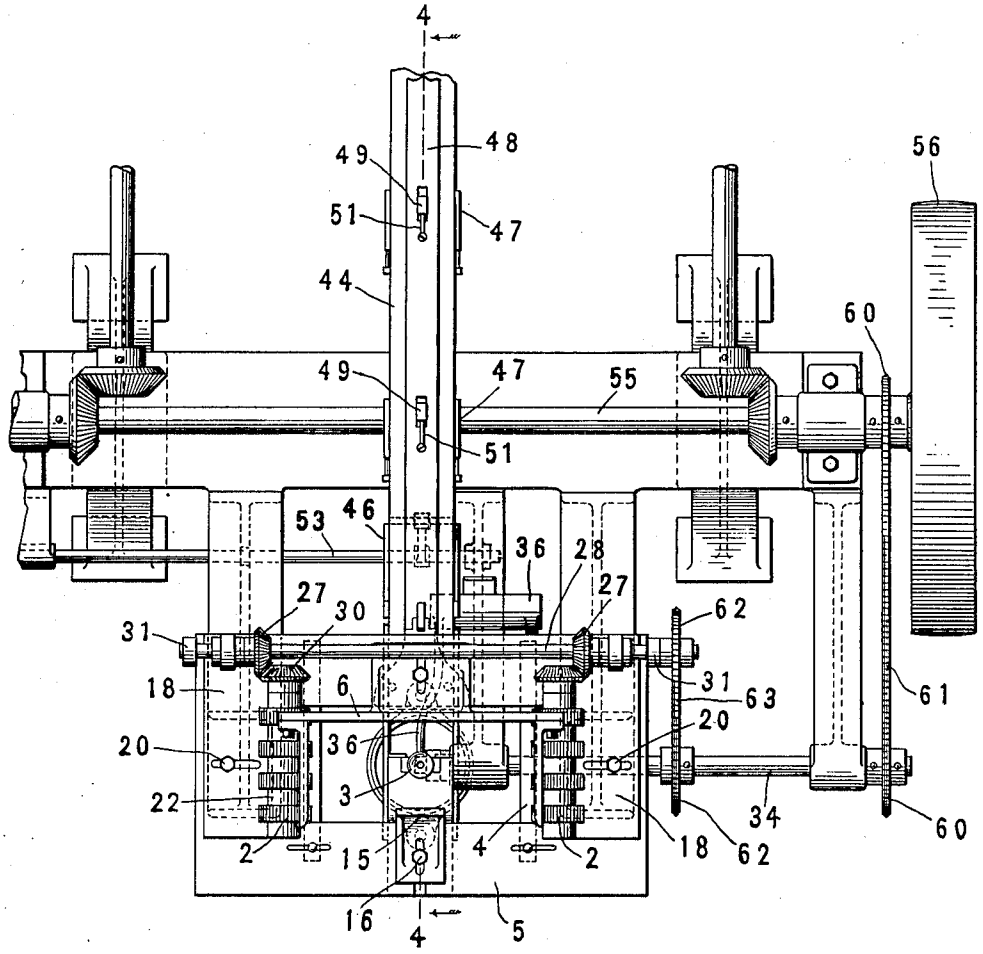
7 SHEETS—SHEET 3.

Fig. 3.



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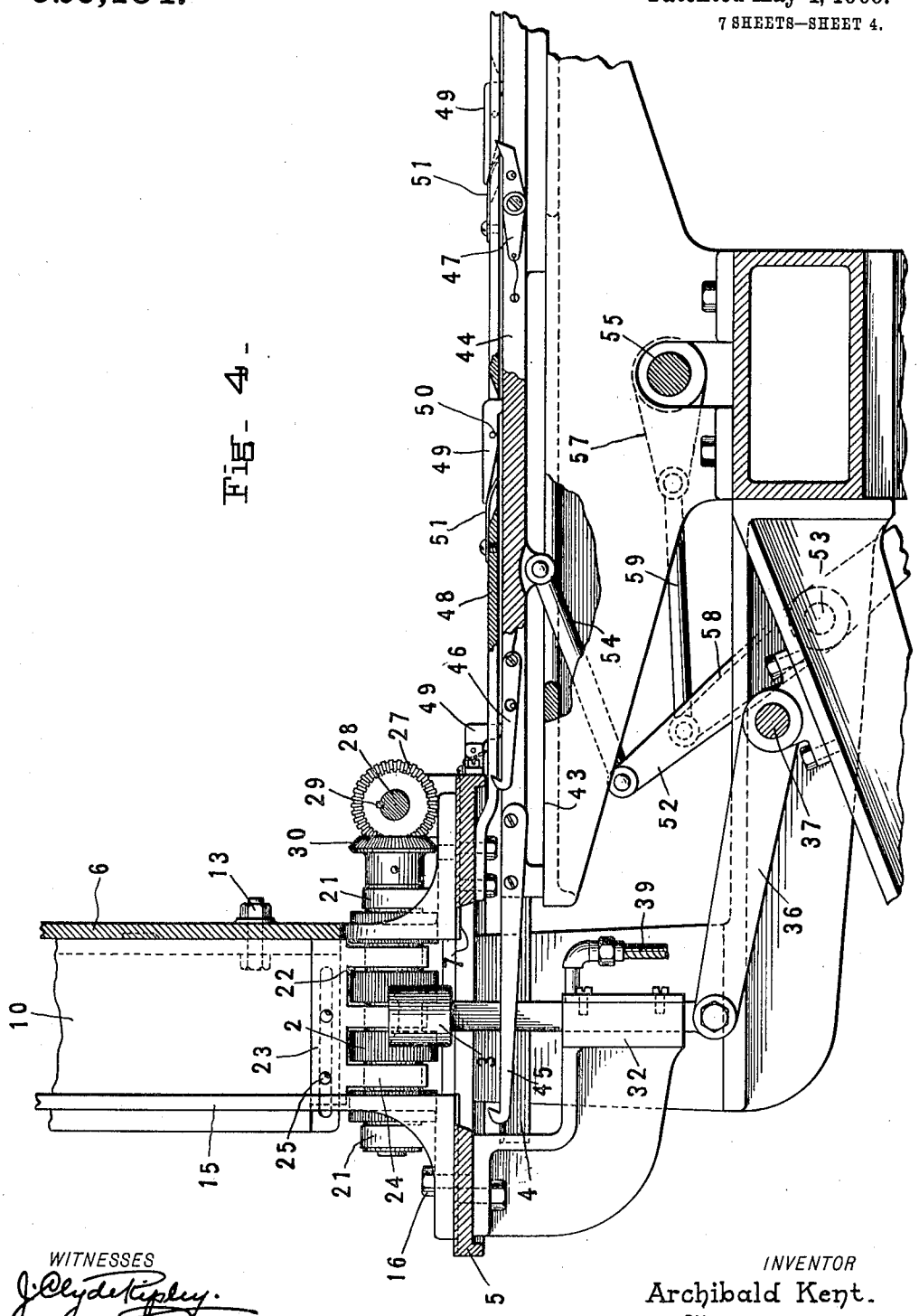
7 SHEETS—SHEET 4.

Fig. 4.



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7 SHEETS—SHEET 5.

Fig. 5.

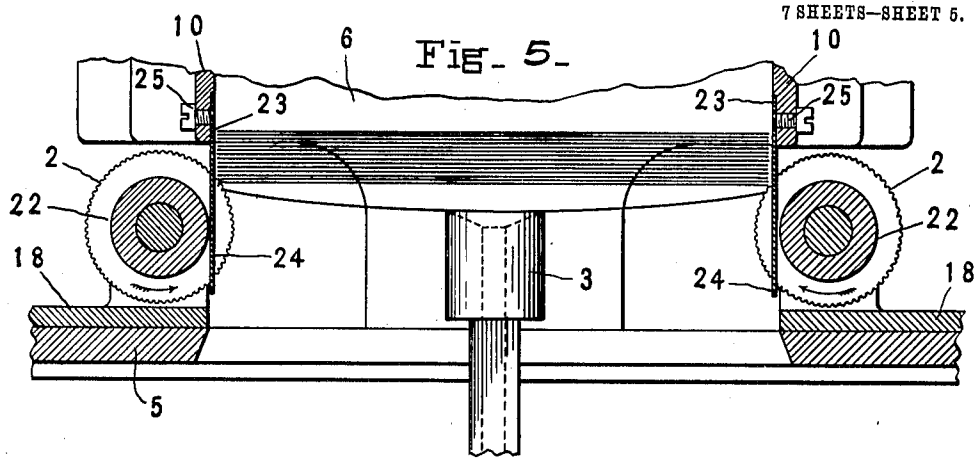
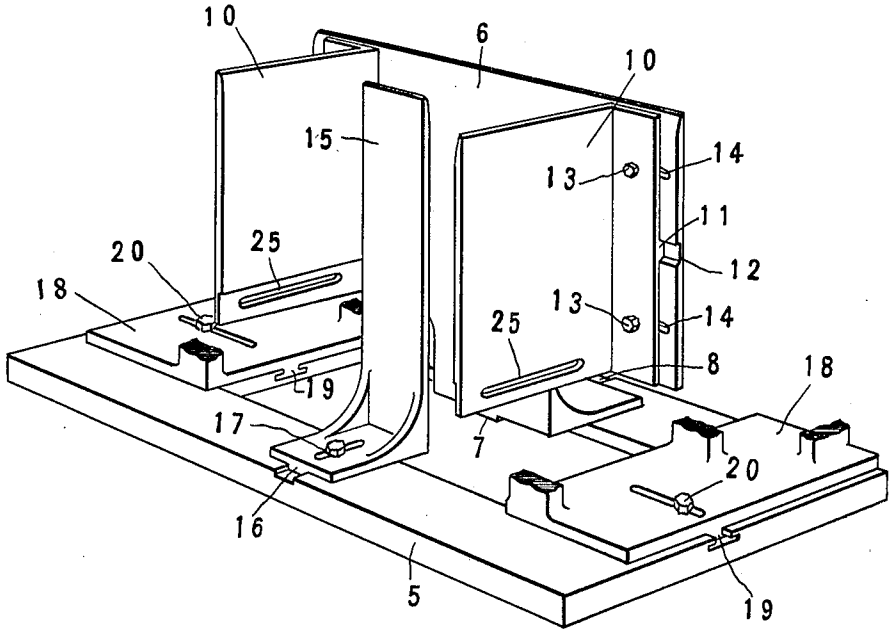


Fig. 6.



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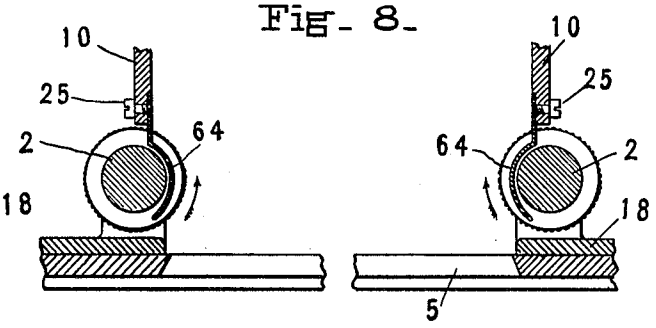
7 SHEETS—SHEET 6.

Fig. 8.



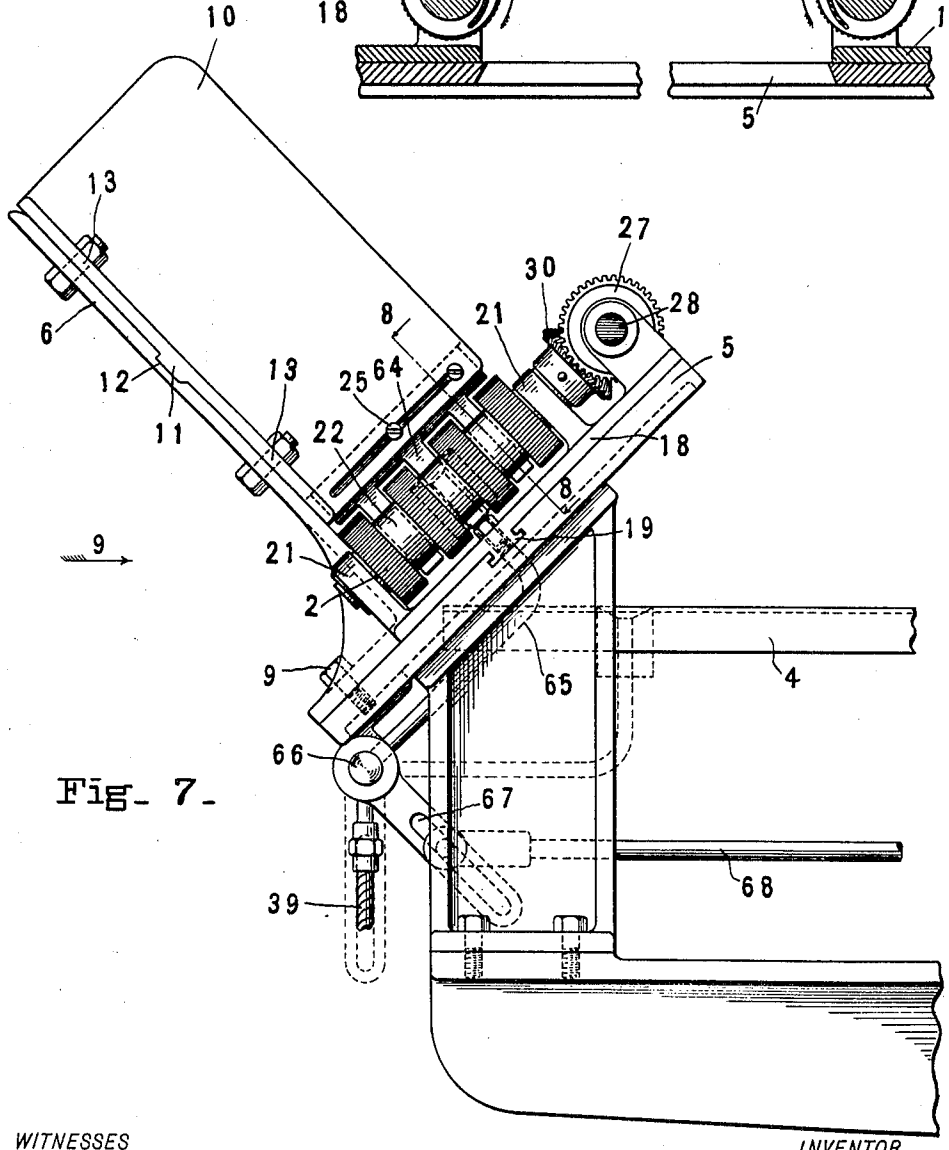


Fig. 7.

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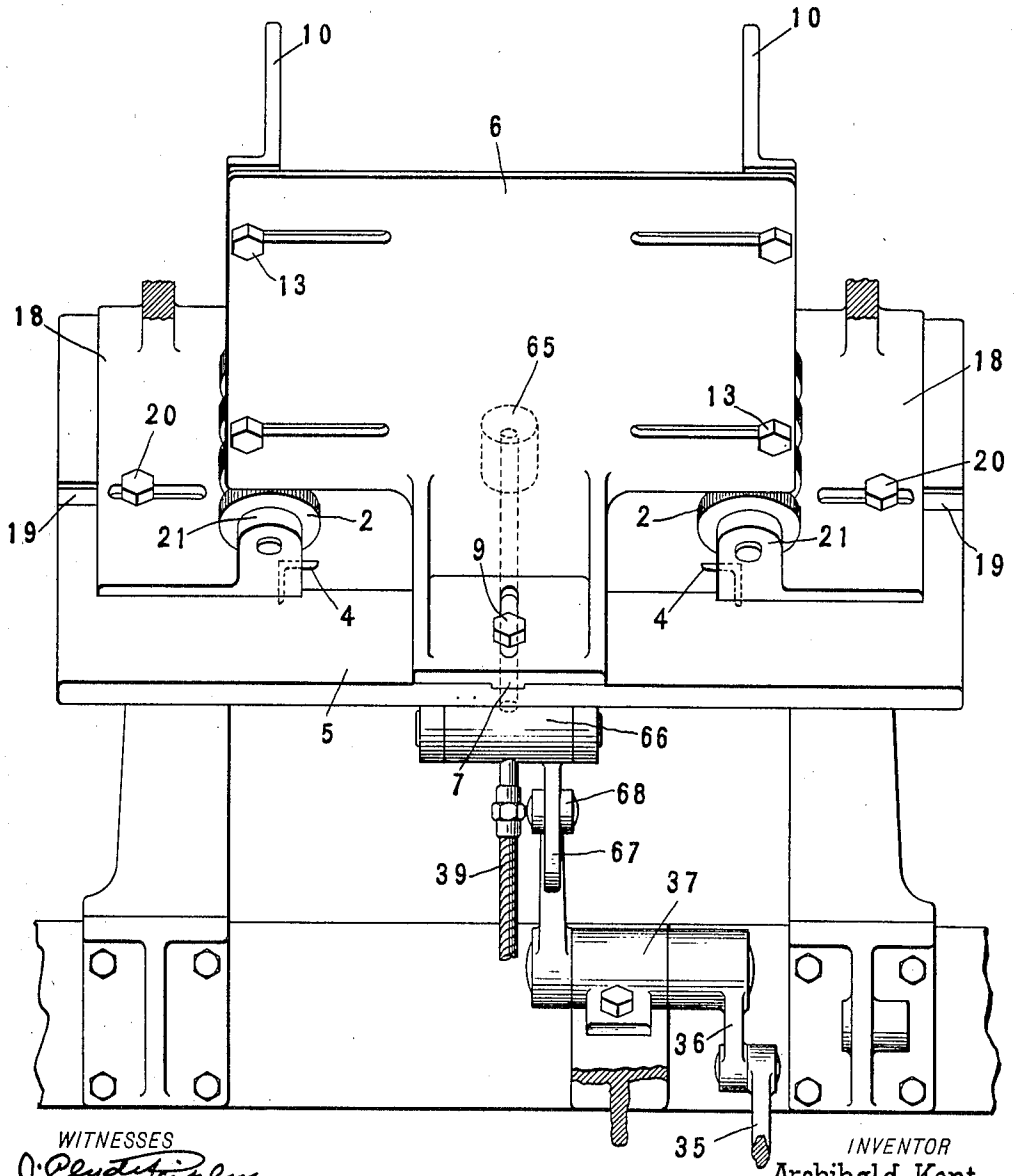
920,154.

Patented May 4, 1909.

7 SHEETS—SHEET 7.

Fig. 9.



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UNITED STATES PATENT OFFICE.

ARCHIBALD KENT, OF NEW YORK, N. Y.

SHEET-FEEDING MACHINE.

No. 920,154. Specification of Letters Patent. Patented May 4, 1909.

Application filed November 20, 1907. Serial No. 402,941.

To all whom it may concern:

Be it known that I, ARCHIBALD KENT, a citizen of the United States of America, and a resident of the borough of Brooklyn, county of Kings, city of New York, and State of New York, have invented certain new and useful Improvements in Sheet-Feeding Machines, of which the following is a specification.

The present invention relates to sheet feeding devices, and has more particularly, though not exclusively, reference to means for separating a blank of sheet metal, cardboard, or the like from a stack of blanks.

The chief object of the invention is to effect a proper separation of the blanks, so as to prevent more than one blank being fed at a time.

The main feature of the invention consists in providing suitable means for seizing and removing the outermost blank from a hopper in combination with an agitating device which opposes the action of the means for seizing the blank to the extent of preventing the removal of more than one blank at a time from the said hopper. The agitator employed preferably consists of a pair of rolls which are given a rotation in an inward direction. These rolls restrict the mouth of the hopper and are corrugated or otherwise roughened. Suitable means are employed for seizing and removing the outermost blank, consisting in this instance of a sucker which engages with the face of the blank and imparts a flex thereto sufficient to bring the blank past the rolls which restrict the mouth of the hopper.

The invention further consists in means for adjusting the size of the hopper and for adjusting the position of the rolls to correspond to the adjustment made of the hopper.

Other features of construction, combination of parts and arrangement of elements will appear as the specification proceeds.

In the accompanying drawings the invention is shown in a concrete and preferred form, but changes of construction may of course be made without departing from the legitimate and intended scope of the invention.

In the said drawings:—Figure 1 is a side elevation of a sheet feeding machine which may, and in the present instance does, form a part of a body forming machine. Fig. 2 is a front elevation of the structure shown in Fig. 1. Fig. 3 is a plan view of the parts shown in Figs. 1 and 2. Fig. 4 is a longitudinal sectional view, with parts broken away, taken on the line 4—4 of Fig. 3. Fig. 5 is a detail view of the rolls which restrict the mouth of the hopper, the sucker being shown in the act of seizing a sheet. Fig. 6 is a perspective view, partly broken away, of means for adjusting the hopper and the rolls. Fig. 7 is a side elevation of the hopper and adjacent parts showing a modification. Fig. 8 is a sectional view taken on the line 8—8 of Fig. 7. Fig. 9 is a view looking in the direction of the arrow 9 of Fig. 7.

Similar characters of reference indicate corresponding parts in the several views.

1 indicates a hopper which may be of any suitable construction adapted to hold blanks.

2 indicates a pair of opposed rolls located at the mouth of the hopper so as to restrict the same. A sucker 3 is utilized to engage with the outermost blank and to force it past the rolls which restrict the mouth of the hopper and to deposit it on the ledges 4 from which point it is carried forward by any suitable mechanism.

In the present instance the hopper is composed of a plurality of walls which are adjustable to hold different sizes of blanks. In the preferred form 5 indicates a bed plate on which is mounted the main wall 6 of the hopper provided with a tongue 7 fitting in the slot 8 of the said bed plate and adjustable longitudinally of the machine. A bolt and slot connection 9 is utilized to hold the wall in the position to which it has been adjusted. Mounted on this main wall are the side wings 10, each having a tongue 11 sliding in the groove 12 on the main wall, and having further the bolts 13 extending into the slots 14 of the main wall. By this means the wings are adjustable transversely. If desired a fourth wall 15 may be utilized which is mounted on the bed plate 5 by means of the tongue and groove connection 16 and bolt and slot connection 17.

Mounted upon the bed plate 5 are the brackets 18 having the tongue and groove connection 19 and the slot and bolt connection 20. These brackets are thus adjustable transversely of the machine and carry the bearings 21 for supporting the rolls 2 which restrict the mouth of the hopper. The rolls as here shown are provided with circumferential grooves 22 which virtually have the effect as if a number of separate rolls were employed on each side. The surfaces of these

rolls are roughened or as shown in the present instance corrugated and are given a rotation in an inward direction thereby separating the blanks and opposing the action of the sheet seizing means to the extent of preventing the removal of more than one blank at a time. In order to prevent these rolls from moving the blanks sidewise out of the hopper suitable guides as 23 are employed, the said guides having the fingers 24 extending into the grooves 22 of the rolls. These guides are adjustably mounted on the wings 10 by means of the pin and slot connection 25, so that when the main wall is adjusted the guides can be adjusted to maintain their proper relation with the grooves of the rolls. The brackets 18 further carry the bearings 26 which support the bevel gears 27 adapted to slide on the shaft 28 by reason of the keys 29. These bevel gears 27 engage the bevel gears 30 on the end of the rolls 2. Thus when the brackets 18 are adjusted the transmission mechanism for operating the rolls 2 is likewise adjusted to correspond to the position of the rolls. The shaft 28 is supported in the fixed bearings 31 mounted on the bed plate 5.

The sucker or sheet seizing means 3 in this instance slides in the guides 32 and is operated from the cam 33 mounted on the cam shaft 34 by means of the lever 35 and bell crank 36 having a fixed pivot at 37. The sucker may be of any suitable construction, but, in the preferred form and, as herein disclosed, the sucker is in constant communication with the closed end of the cylinder 38 by means of the flexible connection 39. The piston 40 working in this cylinder is operated from the cam shaft 34 by means of the crank 41 and piston rod 42. The movement of the sucker and the operation of the piston are so timed one with reference to the other that the said piston begins its movement away from the closed end of the cylinder substantially at the moment the sucker engages with the blank. Thus when the sucker is traveling up to engage with a blank the piston is exhausting the air from the cylinder out through the mouth of the sucker. The piston having reached its lowermost point at the moment the sucker engages with the blank a partial vacuum is produced in the sucker, flexible connection and cylinder. This construction is advantageous because of its simplicity, no valves being needed.

Sliding on the ways 43 is the reciprocating carriage 44. This reciprocating carriage is provided with an unyielding hook 45 which comes directly underneath the hopper and, together with the ledges 4, receives the blank from the sucker. The reciprocating carriage is further provided with fingers 46 and 47 which are adapted to advance the sheet to successive positions with each forward stroke of the reciprocating carriage. These fingers are yielding so as to pass under the sheet on the return stroke. Superposed above the reciprocating carriage is a stationary guide 48 spaced a sufficient distance from the reciprocating carriage to allow the sheet to pass between. This stationary guide is provided with the spring fingers 49 pivoted at 50 and normally held down against the reciprocating carriage by means of the spring 51. As the sheet advances these fingers yield and when the reciprocating carriage returns these fingers drop in position behind the sheet and prevent it from following the return motion of the carriage. The reciprocating carriage is driven in any suitable manner as by means of the lever 52, pivoted on the rock shaft 53, and link 54.

The transmission mechanism is in this instance constructed as follows: 55 indicates a main shaft to which motion may be imparted through the pulley 56. The rock shaft 53 is operated from the shaft 55 by means of the two cranks 57 and 58 and link 59. The motion is imparted from the main shaft 55 to the cam shaft 34 by means of the sprocket-wheels 60 and chain 61. From the cam shaft 34 the motion is transmitted to the shaft 28 by means of the sprocket-wheels 62 and chain 63.

The operation is as follows: A stack of blanks is placed in the hopper so as to rest against the rolls 2. The rotation of these rolls in an inward direction tends to agitate the blanks and to separate them, thereby opposing the action of the sheet seizing means to the extent of preventing the removal of more than one blank at a time. The guides 23 prevent the rolls from moving the blanks sidewise out of the hopper. The sucker or sheet seizing means rises and engages with the face of the outermost blank. At this time the piston 40 has reached its lowermost position and begins its upward motion. The suction thus created causes the sucker to flex the blank sufficiently to draw it past the rolls restricting the mouth thereof and to place it upon the hooks 45 of the reciprocating carriage and on the ledges 4. The reciprocating carriage then acts to progress the sheet while the fingers 49 serve to prevent the sheet from moving backward on the return stroke of the carriage.

In Figs. 7, 8, and 9 a modified construction of hopper is shown. The hopper is here in an inclined position so that the main wall 6 tends to sustain the greater part of the weight of the blanks. In this instance the fourth wall 15 may of course be omitted if desired. In this construction the guides 64 are shown curved instead of straight. Furthermore the sucker 65 is mounted on the pivot 66 and is given an oscillating motion by means of the slotted lever 67 and the connection 68. This oscillating motion serves to deposit blanks on the ledges 4 as in the construction shown in the other figures.

What is claimed is:

1. In a sheet feeding device, a blank holding hopper, means for seizing a sheet and for removing it from the hopper, and an agitator adapted to oppose the action of the sheet seizing means to the extent of preventing the removal of more than one blank at a time.

2. In a sheet feeding device, a blank holding hopper, means for seizing the sheet and for removing it from the hopper, and a rotatable agitator adapted to oppose the action of the sheet seizing means to the extent of preventing the removal of more than one blank at a time.

3. In a sheet feeding device, a blank holding hopper, means for seizing a sheet and for removing it from the hopper, and an agitator restricting the mouth of the hopper and against which the blanks rest, adapted to oppose the action of the sheet seizing means to the extent of preventing the removal of more than one blank at a time.

4. In a sheet feeding device, a blank holding hopper, means for seizing a sheet and for removing it from the hopper, and a rotatable agitator restricting the mouth of the hopper and against which the blanks rest, adapted to oppose the action of the sheet seizing means to the extent of preventing the removal of more than one blank at a time.

5. In a sheet feeding device, a blank holding hopper, means for seizing a sheet and for removing it from the hopper, a pair of rotatable members restricting the mouth of the hopper and against which the blanks rest, and means for rotating said members in an inward direction thereby opposing the action of the sheet seizing means to the extent of preventing the removal of more than one blank at a time.

6. In a sheet feeding device, a blank holding hopper, means for seizing a sheet and for removing it from the hopper, a pair of rotatable members having roughened surfaces restricting the mouth of the hopper and against which the blanks rest, and means for inwardly rotating the said members thereby opposing the action of the sheet seizing means to the extent of preventing the removal of more than one blank at a time.

7. In a sheet feeding device, a blank holding hopper, means for seizing a sheet and for removing it from the hopper, a pair of rotatable members having corrugated surfaces restricting the mouth of the hopper and against which the blanks rest, and means for inwardly rotating the said members, thereby opposing the action of the sheet seizing means to the extent of preventing the removal of more than one blank at a time.

8. In a sheet feeding device, a blank holding hopper, means restricting the mouth of the hopper against which the blanks rest, means for engaging with the outermost blank so as to flex the latter sufficiently to carry it past the means restricting the mouth of the hopper, and means for actuating the restricting means so as to oppose the action of the means for engaging with the outermost blank, thereby preventing the removal of more than one blank at a time.

9. In a sheet feeding device, a blank holding hopper, rotatable members restricting the mouth of the hopper against which the blanks rest, means for engaging with the outermost blank so as to flex the latter sufficiently to carry it past the rotatable means aforesaid, and means for inwardly rotating the rotatable members so as to oppose the action of the sheet seizing means to the extent of preventing the removal of more than one blank at a time.

10. In a sheet feeding device, a blank holding hopper, and a pair of rolls having corrugated surfaces, restricting the mouth of the hopper, the corrugations of the rolls being disposed parallel to the axis of said rolls.

11. In a sheet feeding device, a blank holding hopper, means for removing a blank from the hopper, and a pair of rotatable rolls having corrugated surfaces restricting the mouth of the hopper.

12. In a sheet feeding device, a blank holding hopper, a pair of rolls restricting the mouth of the hopper against which the blanks rest, means for engaging with the outermost blank so as to flex the latter sufficiently to carry it past the rolls aforesaid, and means for rotating the rolls in an inward direction to prevent the removal of more than one blank at a time.

13. In a sheet feeding device, a blank holding hopper, a pair of rolls having roughened surfaces restricting the mouth of the hopper and against which the blanks rest, means for engaging with the outermost blank so as to flex the latter sufficiently to carry it past the rolls aforesaid, and means for rotating the rolls in an inward direction to prevent the removal of more than one blank at a time.

14. In a sheet feeding device, a blank holding hopper, a pair of corrugated rolls restricting the mouth of the hopper and against which the blanks rest, means for engaging with the outermost blank so as to flex the latter sufficiently to carry it past the rolls aforesaid, and means for rotating the rolls in an inward direction to prevent the removal of more than one blank at a time.

15. In a sheet feeding device, a blank holding hopper, inwardly rotatable means restricting the mouth of the hopper, against which the blanks rest, and means for engaging with the outermost blank so as to flex the latter sufficiently to carry it past the rotatable means aforesaid, and means for preventing the rotatable means from moving the blanks sidewise out of the hopper.

16. In a sheet feeding device, a blank holding hopper, a pair of rolls restricting the

mouth of the hopper against which the blanks rest, means for engaging with the outermost blank so as to flex the latter sufficiently to carry it past the rolls aforesaid, and means for rotating the rolls in an inward direction to prevent the removal of more than one blank at a time, and means for preventing the rolls from moving the blanks sidewise out of the hopper.

17. In a sheet feeding device, a blank holding hopper, a pair of rolls having roughened surfaces restricting the mouth of the hopper and against which the blanks rest, means for engaging with the outermost blank so as to flex the latter sufficiently to carry it past the rolls aforesaid, and means for rotating the rolls in an inward direction to prevent the removal of more than one blank at a time, and means for preventing the rolls from moving the blanks sidewise out of the hopper.

18. In a sheet feeding device, a blank holding hopper, a pair of corrugated rolls restricting the mouth of the hopper and against which the blanks rest, means for engaging with the outermost blank so as to flex the latter sufficiently to carry it past the rolls aforesaid, and means for rotating the rolls in an inward direction to prevent the removal of more than one blank at a time.

19. In a sheet feeding device, the combination of a hopper, an agitator located at the mouth of the hopper comprising a pair of opposed rolls having circumferential grooves and rotating in an inward direction, and guides extending into said grooves to prevent the rolls from moving the blanks sidewise out of the hopper.

20. In a sheet feeding device, a blank holding hopper, a pair of rolls having circumferential grooves restricting the mouth of the hopper, and guides extending into the grooves aforesaid.

21. In a sheet feeding device, a hopper comprising walls adjustable longitudinally and transversely, rolls restricting the mouth of the hopper, bearings carrying said rolls transversely adjustable to correspond to the adjustment of the walls.

22. In a sheet feeding device, a hopper comprising walls adjustable longitudinally and transversely, rolls restricting the mouth of the hopper and having circumferential grooves, bearings carrying said rolls adjustable transversely to correspond to the adjustment of the walls, and guides, carried by the walls and adjustably mounted thereon, extending into the grooves of the rolls.

23. In a sheet feeding device, a hopper whose walls are adjustable, a pair of opposed rolls located in said hopper adjustable toward and away from each other, a shaft extending at right angles to the rolls, and adjustable transmission mechanism on the said shaft for imparting motion to the rolls.

24. In a sheet feeding device, a blank holding hopper, longitudinally corrugated rolls having circumferential grooves and mounted to restrict the mouth of the hopper.

Signed at New York city this 19 day of November 1907.

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Witnesses:
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