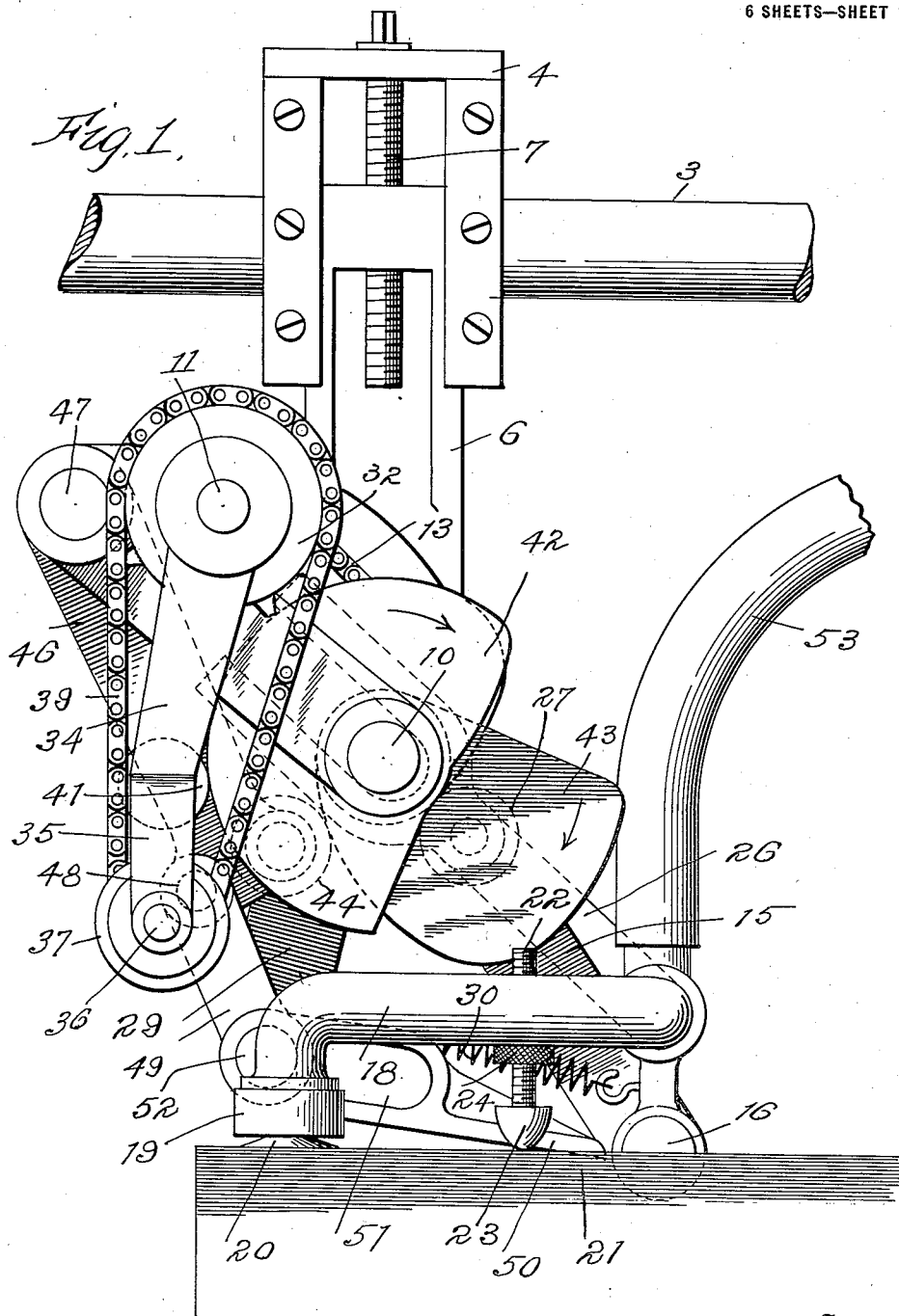


C. E. CHRISTOPHEL.
PNEUMATIC SHEET FEEDER.
APPLICATION FILED NOV. 16, 1917.

1,304,262.

Patented May 20, 1919.
6 SHEETS—SHEET 1.

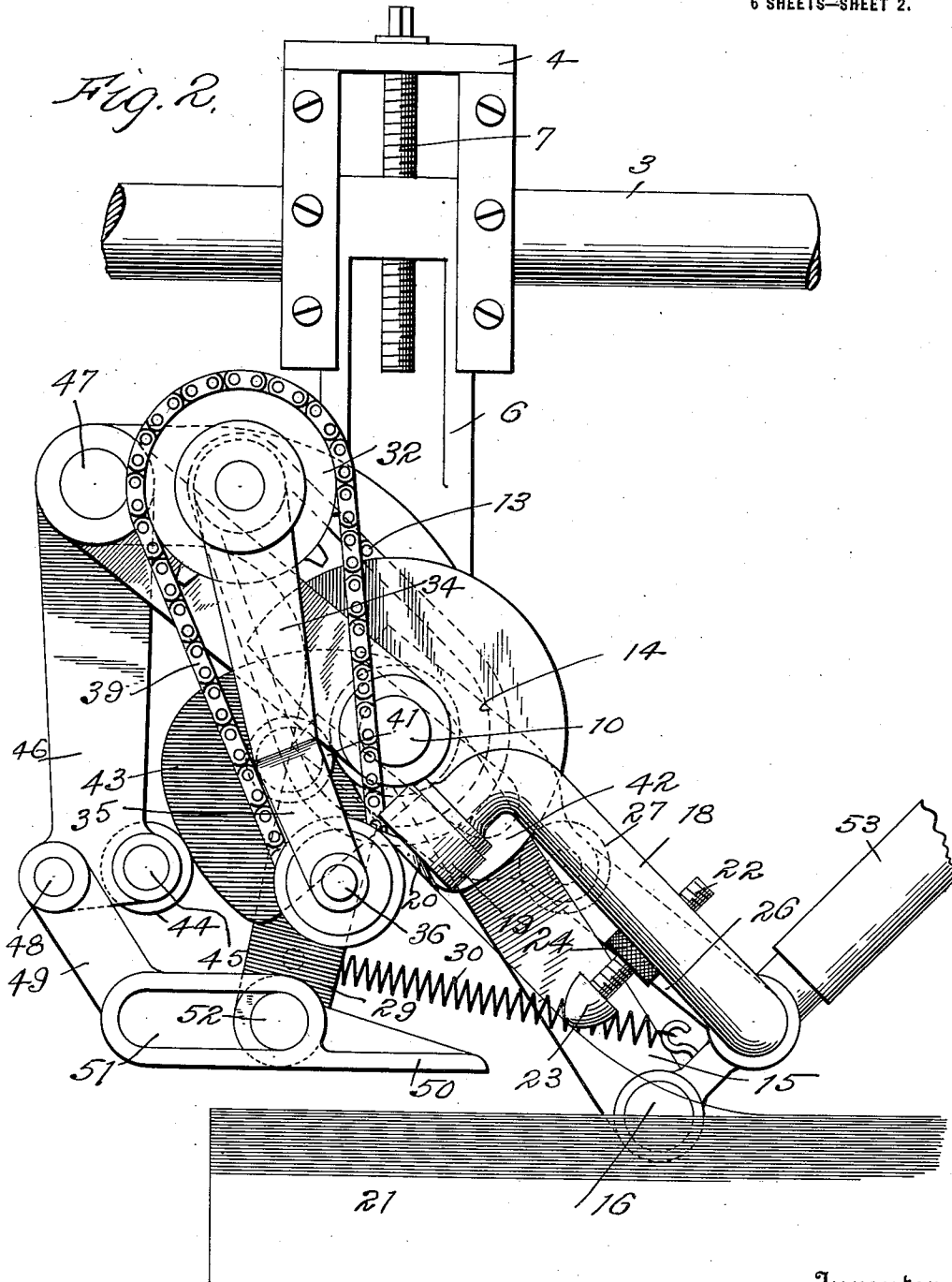


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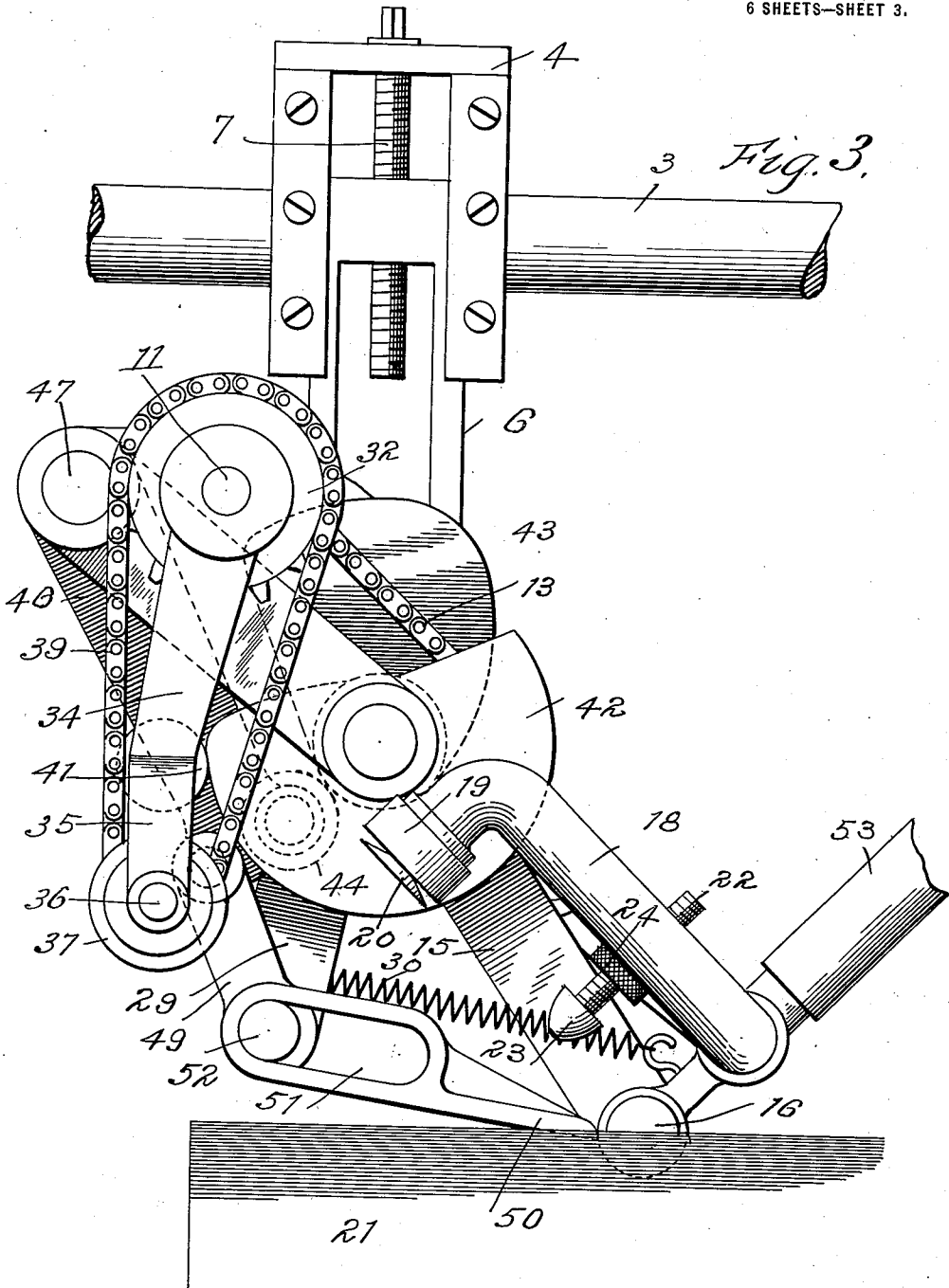


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6 SHEETS—SHEET 3.

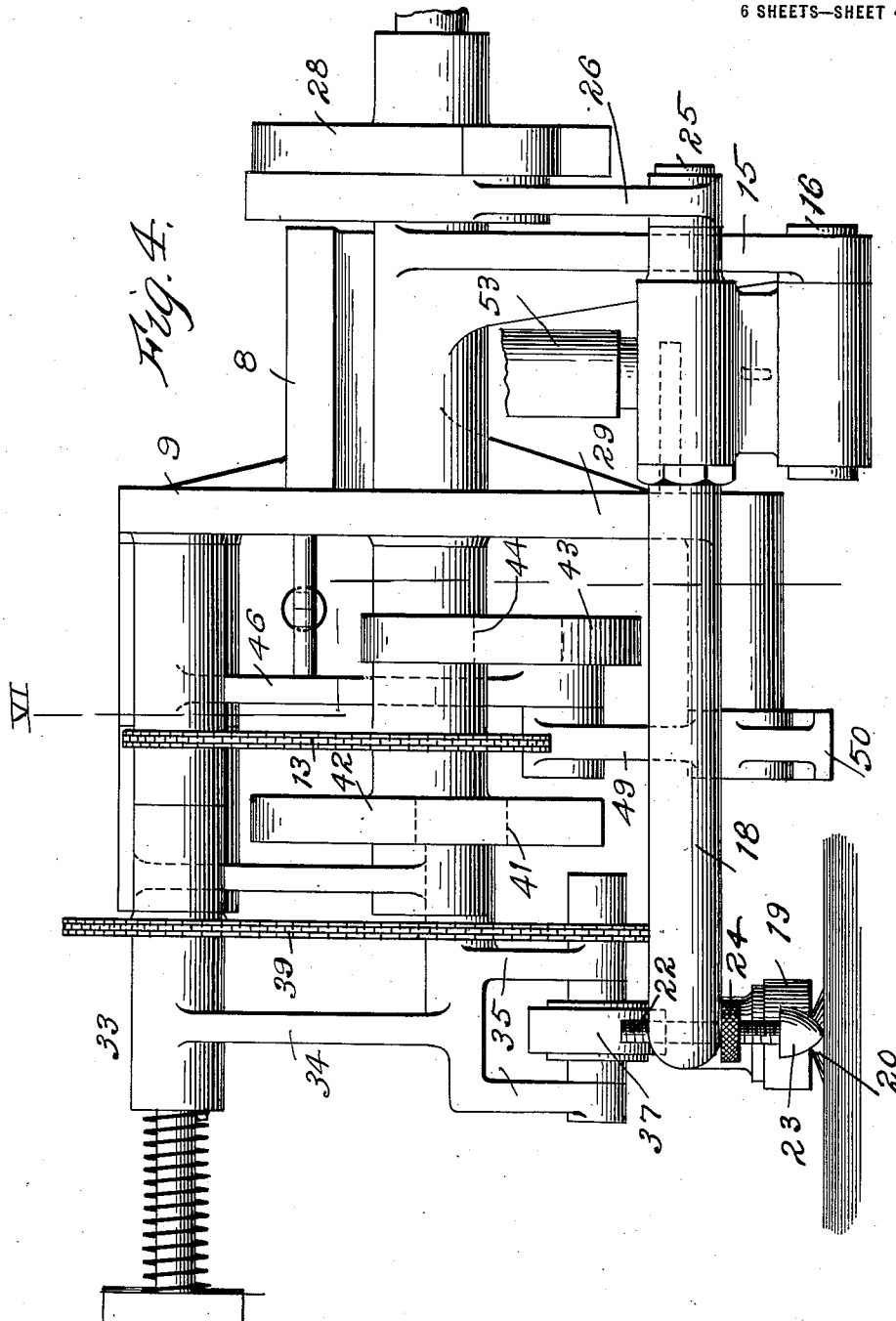


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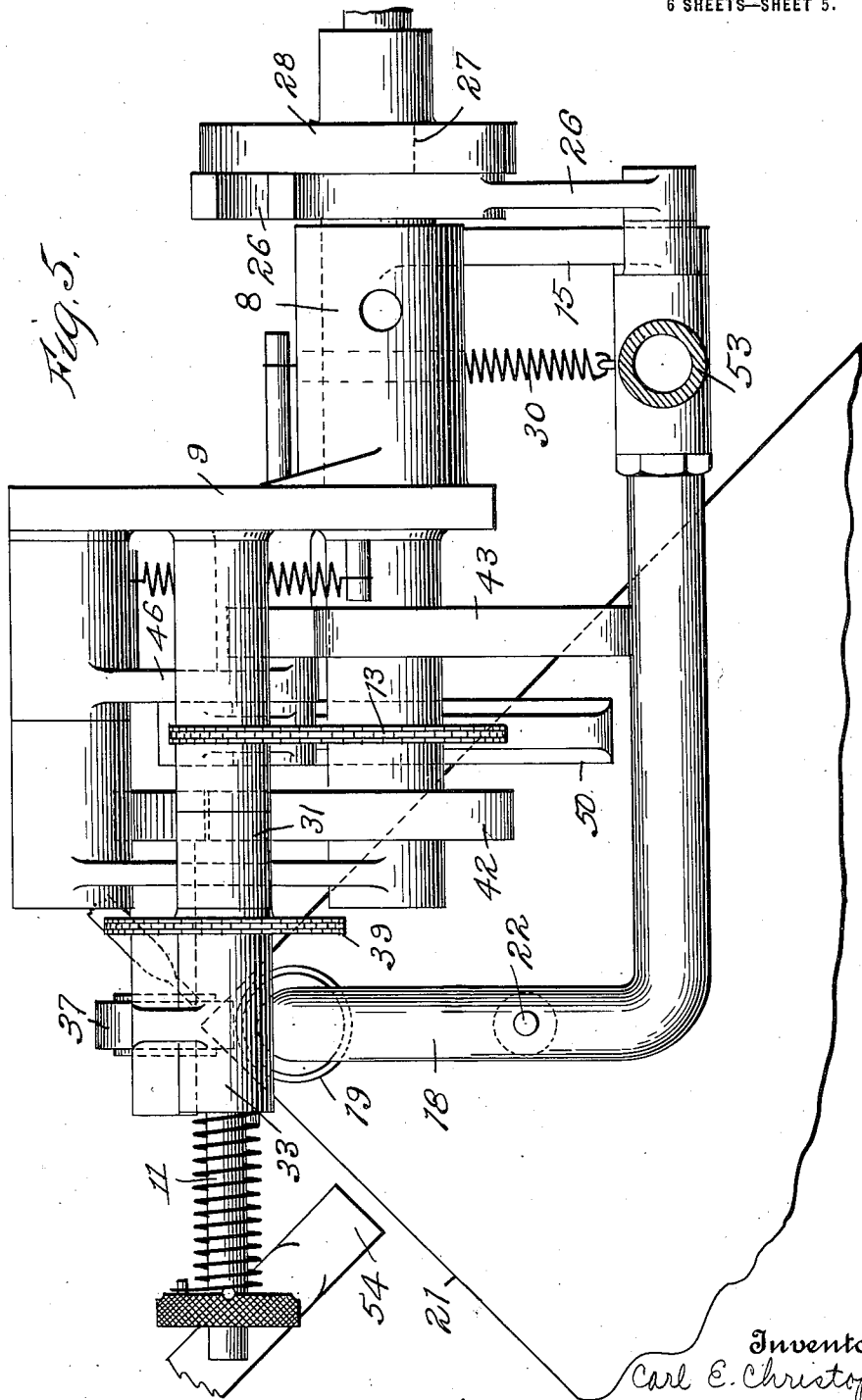
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6 SHEETS—SHEET 5.

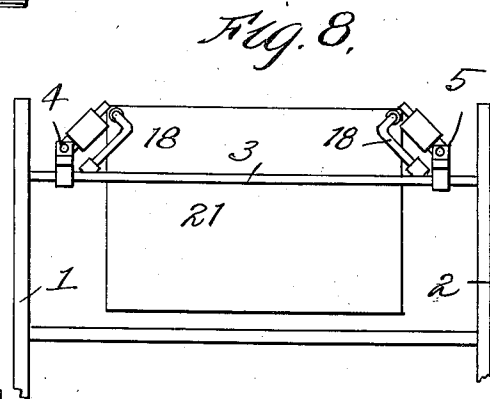
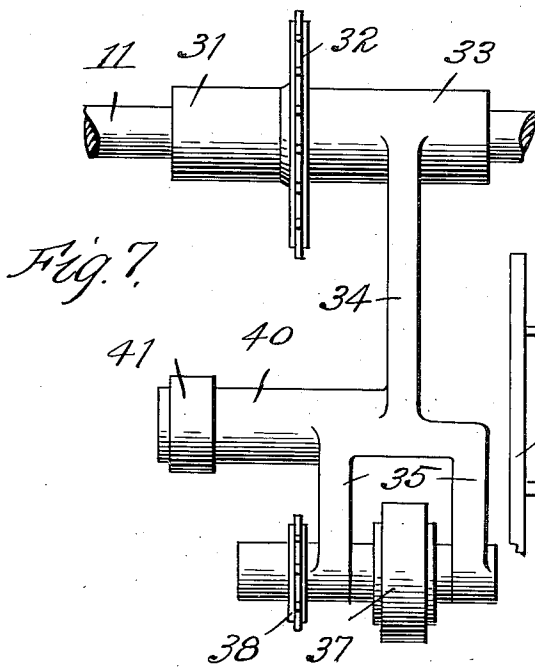
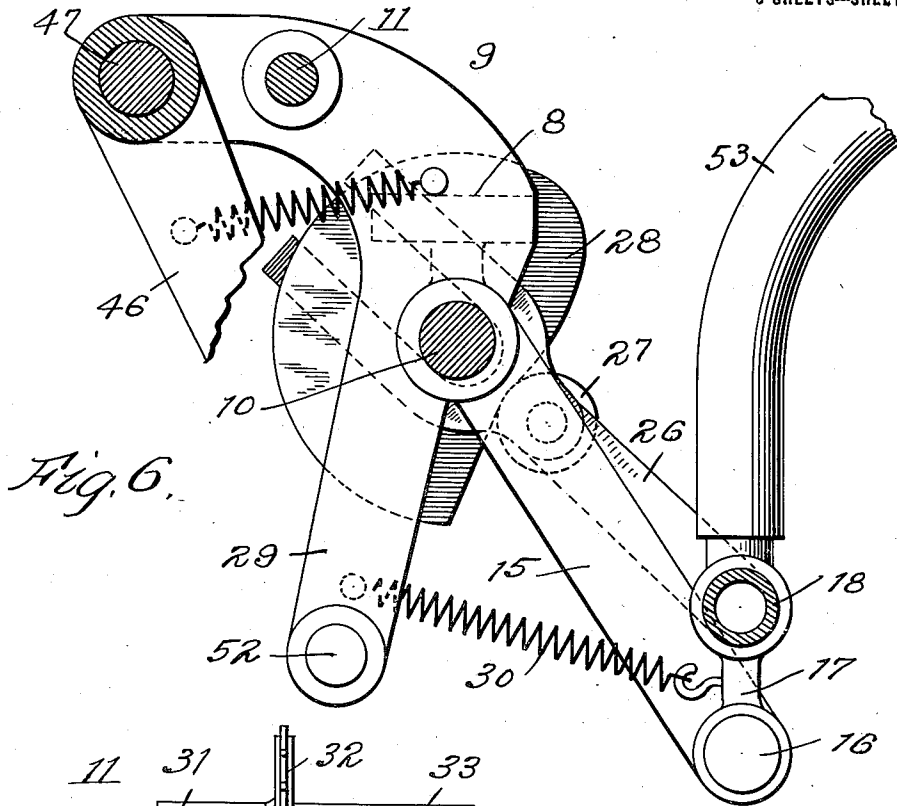


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6 SHEETS—SHEET 6.



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UNITED STATES PATENT OFFICE.

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PNEUMATIC SHEET-FEEDER.

1,304,262.

Specification of Letters Patent.

Patented May 20, 1919.

Application filed November 16, 1917. Serial No. 202,338.

To all whom it may concern:

Be it known that I, CARL E. CHRISTOPHEL, a subject of the German Emperor, residing at Pearl River, county of Rockland, and State of New York, have invented certain new and useful Improvements in Pneumatic Sheet-Feeders, of which the following is a specification.

This invention relates to sheet-feeding machines and has for its primary object to provide an improved construction, combination and arrangement of parts in sheet-separating means with a view to enhancing the efficiency of the sheet-feeding operation by rendering it more speedy and accurate. Other and more specific objects of invention will appear in the specification and be pointed out in the appended claims, reference being had to the accompanying drawings exemplifying my invention in a preferred embodiment.

In the drawings,—

Figure 1 is a side elevation of the preferred embodiment of my improved sheet separating mechanism, parts being broken away;

Fig. 2 is a similar view with the parts shown in different positions;

Fig. 3 is a similar view showing an advanced stage of the operation;

Fig. 4 is a front elevation of the same, parts being broken away;

Fig. 5 is a top plan view of the same, parts being broken away and parts shown in section;

Fig. 6 is a side elevation of the main bracket or support, parts being broken away and parts shown in section (see section line VI—VI, Fig. 4);

Fig. 7 is a rear elevation of the excess sheet removing device;

Fig. 8 is a diagrammatic plan view of a feeding machine showing relative disposition of sheet-separating devices.

Referring first to Fig. 8, side frames 1 and 2 of a feeding machine are connected by a transverse bar 3 which carries laterally spaced guides 4 and 5 within which are adjustably mounted suitable slides 6 such as shown in Figs. 1, 2 and 3. A screw 7 journaled in the guide 4 is threaded into the upper end of the slide 6, the lower end of said slide being attached to a table 8 (see Fig. 6) which carries a bracket or support 9. Journaled within the bracket or support

9 is a cam shaft 10 while above and to the left of said cam shaft, according to Fig. 6, is journaled a second shaft 11 which carries a sprocket wheel 12 about which passes an endless chain 13 by means of which power is delivered to said sprocket wheel 12 from a larger sprocket wheel 14 which is keyed to the cam shaft 10. The bracket or support 9 is provided with a depending arm 15 provided at its lower end with a laterally projecting pin 16 upon which is journaled a lever arm 17 which carries a suction pipe 18 which, as shown in Fig. 1, extends rearwardly and is provided with a downwardly deflected extremity 19 which carries a sucker 20 adapted to operate upon a pile of sheets 21. Threaded into the suction pipe 18 is the shank 22 of a finger 23 which is adapted to depress the upper sheets of a pile whenever the suction pipe is lowered. A check nut 24 is provided for maintaining this finger in adjusted position. As shown best in Figs. 4 and 5, the suction pipe 18 is provided in one end with a laterally projecting stud 25 upon which is journaled one end of a cam lever 26 which carries a cam roller 27 which runs on a cam 28 keyed to the cam shaft 10. The other end of said cam lever 26 is bifurcated to straddle the cam shaft 10 for maintaining the cam roller 27 in suitable relation to the cam 28. A second depending arm 29 on the bracket or support 9 has secured thereto one end of a spring 30, the other end of said spring being connected to the lever arm 17 which carries the suction pipe. The tension of this spring retains the roller 27 in running contact with the cam 28. As shown in Fig. 7, the shaft 11 has keyed thereto the hub 31 of a sprocket 32. Freely journaled on the shaft 11 is the hub 33 of a cam arm 34 having a bifurcated lower extremity 35 within which is journaled a shaft 36. Keyed to the shaft 36 is a sheet engaging roll 37 which is rotated by means of a sprocket 38 which is also keyed to said shaft. A sprocket chain 39 connects the sprockets 32 and 38 to transmit power from one sprocket to the other. The cam arm 34 is provided with a lateral projection 40 on which is journaled a cam roller 41, said cam roller being adapted to follow a cam 42 which is of a somewhat similar shape to the cam 28 and is likewise keyed to the cam shaft 10. A third cam 43 is keyed to the cam shaft 10 and is adapted to operate

a cam roller 44 which is journaled on a pin 45 carried by the lower end of a cam lever 46 which is journaled on a pin 47 carried by an upper rearwardly projecting portion of the bracket or support 9. A pin 48 serves to pivotally support an arm 49 of a clamping foot 50, said clamping foot being provided with an elongated slot 51 within which is disposed a laterally projecting pin 52 carried by the lower end of the arm 29 of the bracket or support 9. A flexible hose or pipe 53 connects up with the suction pipe 18, suitable mechanism (not shown) being provided for producing suction in said pipe 18. A blow pipe 54 may be disposed as shown in Fig. 5 for introducing a blanket of air beneath the lifted sheets. The operation of my mechanism will now be readily understood and briefly described is as follows:

20 According to Fig. 1, the cam roller 27 has just reached the innermost run of the cam 28 so that the suction pipe 18 is lowered until the sucker 20 rests upon the top sheet of the pile 21. At this moment the clamping foot 50 rests upon the top of the pile, together with the pressure finger 23, the cam roller 44 for operating said clamping foot being near the inner run of the cam 43. Cam roller 41 on the other hand is traveling on the outer run of the cam 42 so that the roll 37 is in its rearmost position. As the several parts assume the positions shown in Fig. 2, it will be seen that the cam roller 27 has mounted to the outer run of cam 28 with the result that the sucker 20 together with one or more upper sheets of the pile is raised. Just before this, however, the cam roller 44 has mounted to the outer run of cam 43 and caused the clamping foot 50 to be drawn rearwardly over the pin 52 while, at the same time, swinging it upwardly to clear the pile and into a position which is outside the lateral edges of the pile. Immediately after the suction pipe 18 has assumed its uppermost position, the cam roller 41 follows to the inner run of cam 42, thus permitting the roll 37 to move forwardly until it comes into engagement with the under surfaces of the excess sheets which may have been lifted by the sucker 20. The continuous rotation of the roll 37 effects the displacement of all sheets but the uppermost which is firmly retained by the sucker 20. Immediately after the excess sheets have dropped from the sucker 20 the cam roller 44 has again followed to the inner run of cam 43 as shown in Fig. 3 and caused the clamping foot 50 to secure all sheets but the separated one. This operation is repeated as long as the machine is in operation.

I claim:

1. In a machine of the character described, a sheet-engaging suction device movable into engagement with the top of a pile of sheets, and away from said pile, a swinging arm, a

friction wheel journaled in the outer end of said swinging arm and movable by the swing of said arm into engagement with excess sheets carried from the pile by said suction device, and a sheet-depressing finger carried by said suction device. 70

2. In a machine of the character described, a support, a sheet-engaging suction device oscillatably carried by said support to move into engagement with the top sheet of a pile and away from said pile, an arm oscillatably carried by said support, a friction member mounted in the outer end of said arm and movable into engagement with excess sheets lifted from the pile by said suction device, and a clamping foot having a combined sliding and oscillatory movement on said support. 75

3. In a machine of the character described, a support, a suction device oscillatably mounted on said support, a shaft journaled in said support, means operated by said shaft for oscillating said suction device, an excess sheet-removing device mounted to swing into and out of operatable relation to said suction device when the latter is away from the pile of sheets, means operated by said shaft for imparting this swinging movement, a clamping foot having a combined reciprocatory and oscillatory movement on said support, and means operated by said shaft for imparting these movements to the clamping foot. 80

4. In a machine of the character described, a support, a sheet suction device oscillatable about an axis, an arm oscillatable about another axis, an excess sheet-removing device mounted in the outer end of said arm to move into and out of coöperating relation to said suction device, a cam shaft journaled in said support, cams on said cam shaft for operating said suction device and excess sheet-removing device respectively, cam arms driven by said cams and connected respectively to said suction device and excess sheet-removing device, a clamping foot pivotally mounted on said support and reciprocable on its pivot, a cam arm to which said clamping foot is pivotally connected, and a cam on said cam shaft for oscillating the last-mentioned cam arm. 85

5. In a machine of the character described, a support, a sheet-suction device oscillatable on said support, a rotary shaft journaled in said support, means operated by said shaft for oscillating said suction device, an oscillatory arm, a friction wheel journaled in the outer end of said arm, and means operated by said shaft for oscillating said arm and rotating said friction wheel, said means being adapted to move said friction wheel into and out of coöperative relation with said sheet suction device. 90

6. In a sheet-feeding machine, a sheet-engaging suction device movable about an 130

axis into engagement with the top of a pile and away from said pile, a rotary sheet-engaging wheel movable about an axis toward and away from said suction device in raised position, a clamping foot movable from above and beyond the lateral limits of said pile down into engagement with said pile, and a sheet-depressing finger movable with said suction device into engagement with said pile.

7. In a machine of the character described, a bracket or support, a cam shaft journaled therein, a sheet-engaging suction device oscillatably journaled in said bracket or support, a cam lever for oscillating said suction device, another shaft journaled in said support or bracket, an arm oscillatable about an axis coincident with the second mentioned shaft, a sheet-engaging roll journaled in said arm and having driving connections with the second mentioned shaft, said roll being adapted to engage the under-surfaces of sheets raised from the pile by said suction device, and cams on said cam shaft for operating said cam levers.

8. In a machine of the character described, a bracket or support, a cam shaft journaled therein, a sheet-engaging suction device oscillatably journaled in said bracket or support, a cam lever for oscillating said suction device, another shaft journaled in said support or bracket, an arm oscillatable about an axis coincident with the second-mentioned shaft, a sheet-engaging roll journaled in said arm and having driving connections with the second mentioned shaft, said roll being adapted to engage the under-surfaces of sheets raised from the pile by said suction device, cams on said cam shaft for operating said cam levers, a clamping foot reciprocally and pivotally mounted on said bracket or support, said clamping foot being provided with a cam arm, and a cam on said cam shaft for imparting a combined reciprocatory and pivotal movement to said clamping foot.

9. In a machine of the character described, a bracket or support provided with a de-

pending arm, a suction pipe pivotally mounted in said depending arm and provided with a sheet-engaging sucker, a cam lever for oscillating said suction pipe, a cam shaft journaled in said bracket or support, a cam keyed thereto for operating said cam lever, a second shaft journaled in said bracket or support and receiving power from said cam shaft, a cam arm swinging about the axis of said second shaft, a cam on said cam shaft for operating said cam arm, and a rotary sheet-engaging instrumentality journaled in said cam arm and receiving power from said second shaft, the oscillatory movement of said cam arm being adapted to move said instrumentality into and out of engagement with the under-surfaces of sheets lifted by said sucker.

10. In a machine of the character described, a bracket or support provided with a depending arm, a suction pipe pivotally mounted in said depending arm and provided with a sheet-engaging sucker, a cam lever for oscillating said suction pipe, a cam shaft journaled in said bracket or support, a cam keyed thereto for operating said cam lever, a second shaft journaled in said bracket or support and receiving power from said cam shaft, a cam arm swinging about the axis of said second shaft, a cam on said cam shaft for operating said cam arm, a rotary sheet-engaging instrumentality journaled in said cam arm and receiving power from said second shaft, the oscillatory movement of said cam arm being adapted to move said instrumentality into and out of engagement with the under-surfaces of sheets lifted by said sucker, a second depending arm carried by said bracket or support and provided with a laterally projecting pin, a clamping foot provided with an elongated slot for pivotally and slidably mounting said clamping foot on said pin, a swinging arm on which said clamping foot is pivotally mounted, and a cam on said cam shaft for oscillating the last mentioned oscillating arm.

CARL E. CHRISTOPHEL.