

F. M. BUSALD.

MACHINE FOR MAKING DOUBLE FACED CORRUGATED PAPER BOARD.

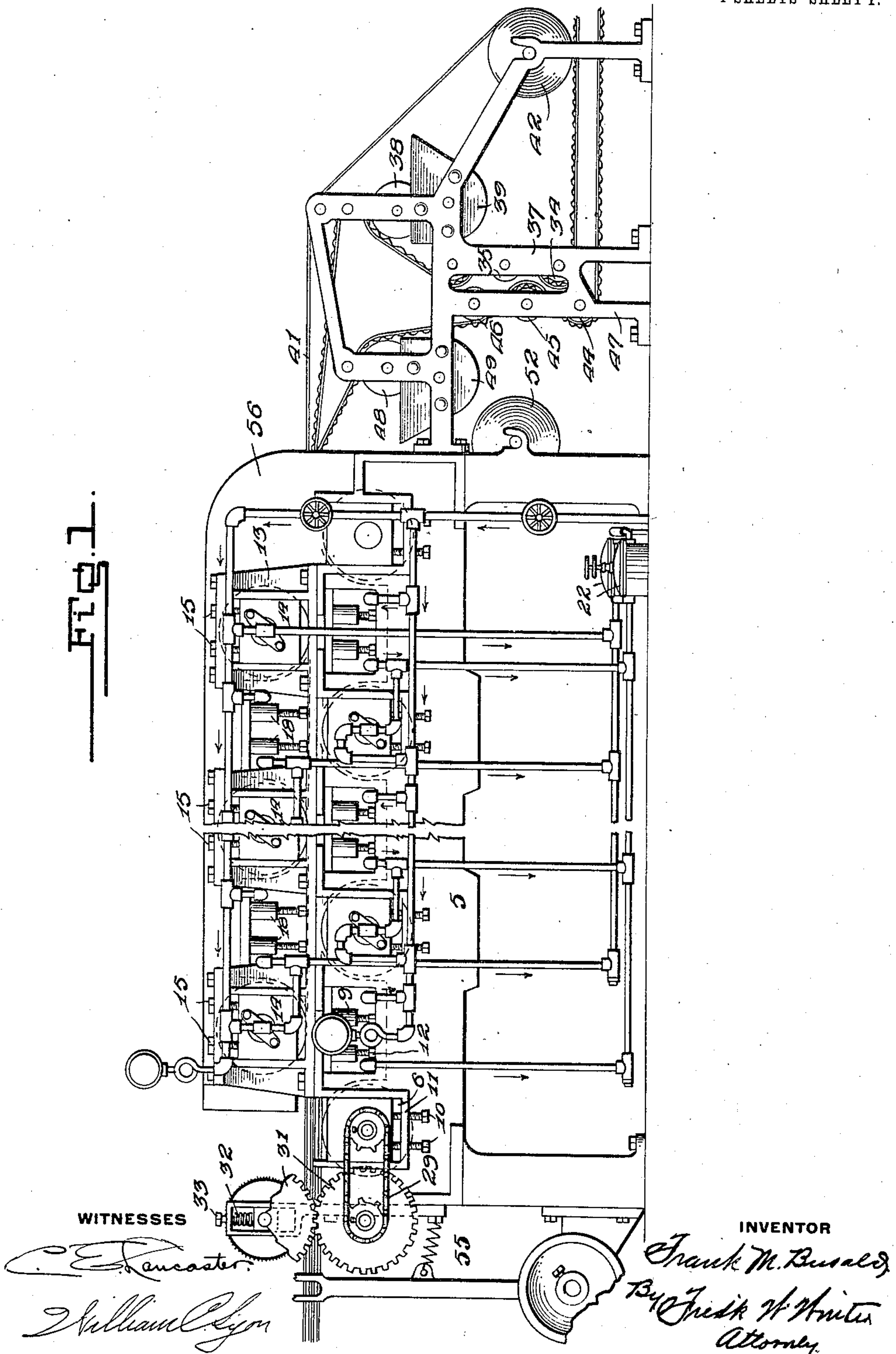
APPLICATION FILED NOV. 12, 1910.

999,627.

Patented Aug. 1, 1911.

4 SHEETS—SHEET 1.

Fig. 1.

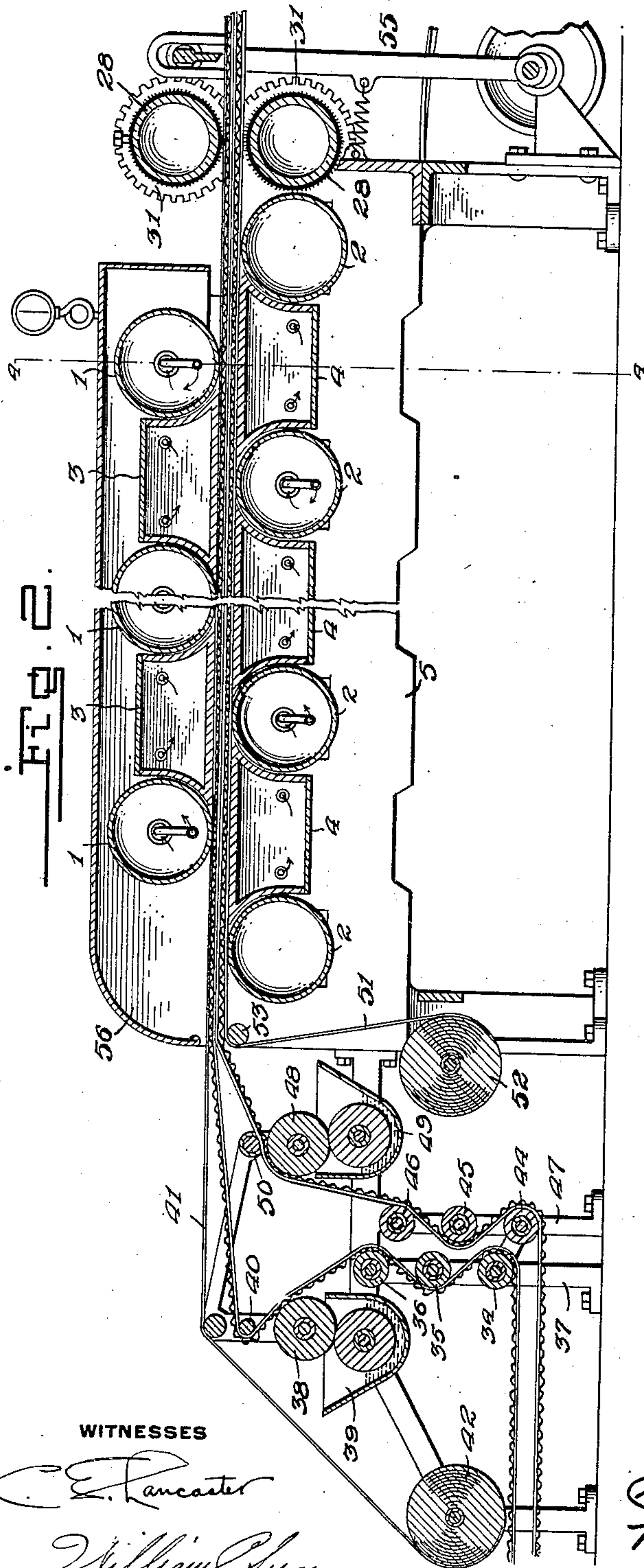


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4 SHEETS—SHEET 2.



WITNESSES  
*C. E. Lancaster*  
*William Lyon*

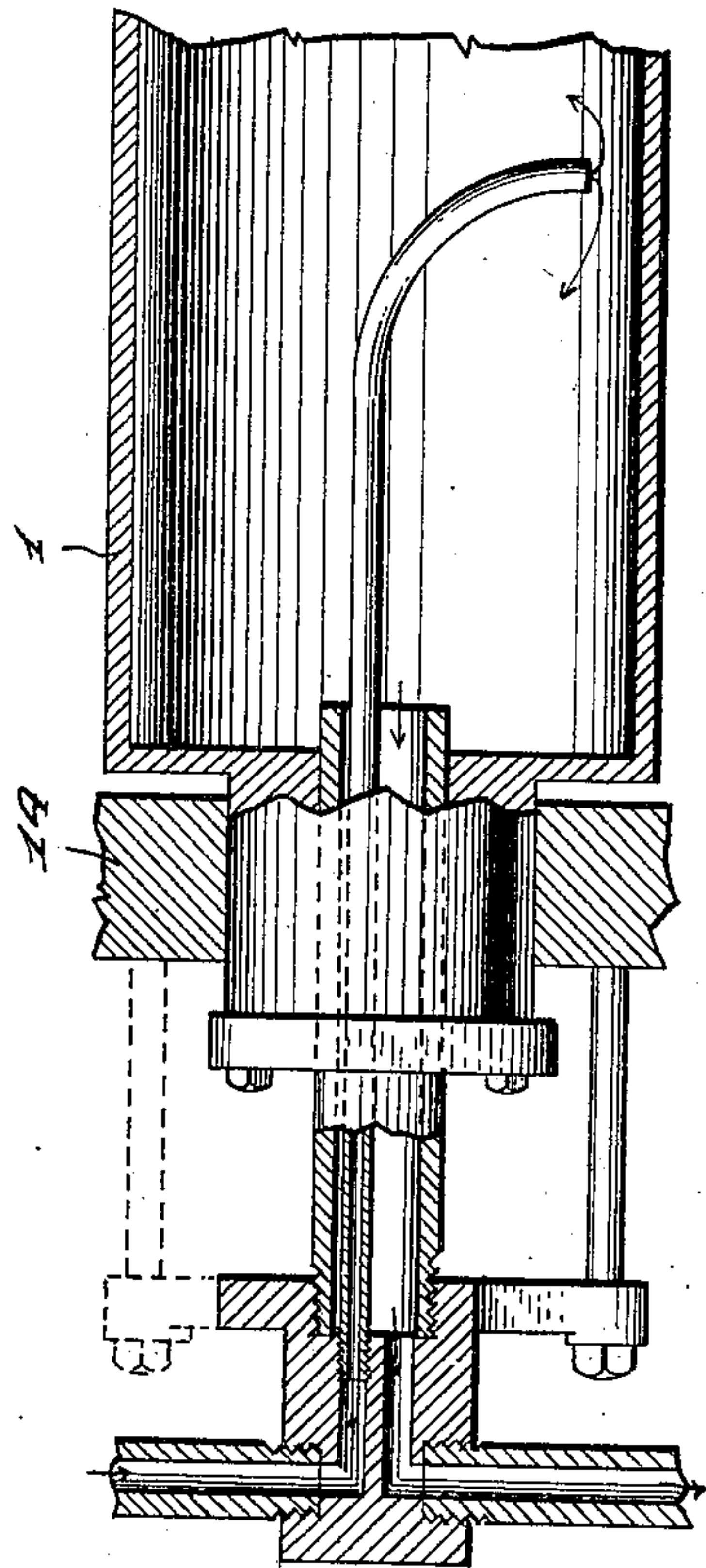


Fig. 6.

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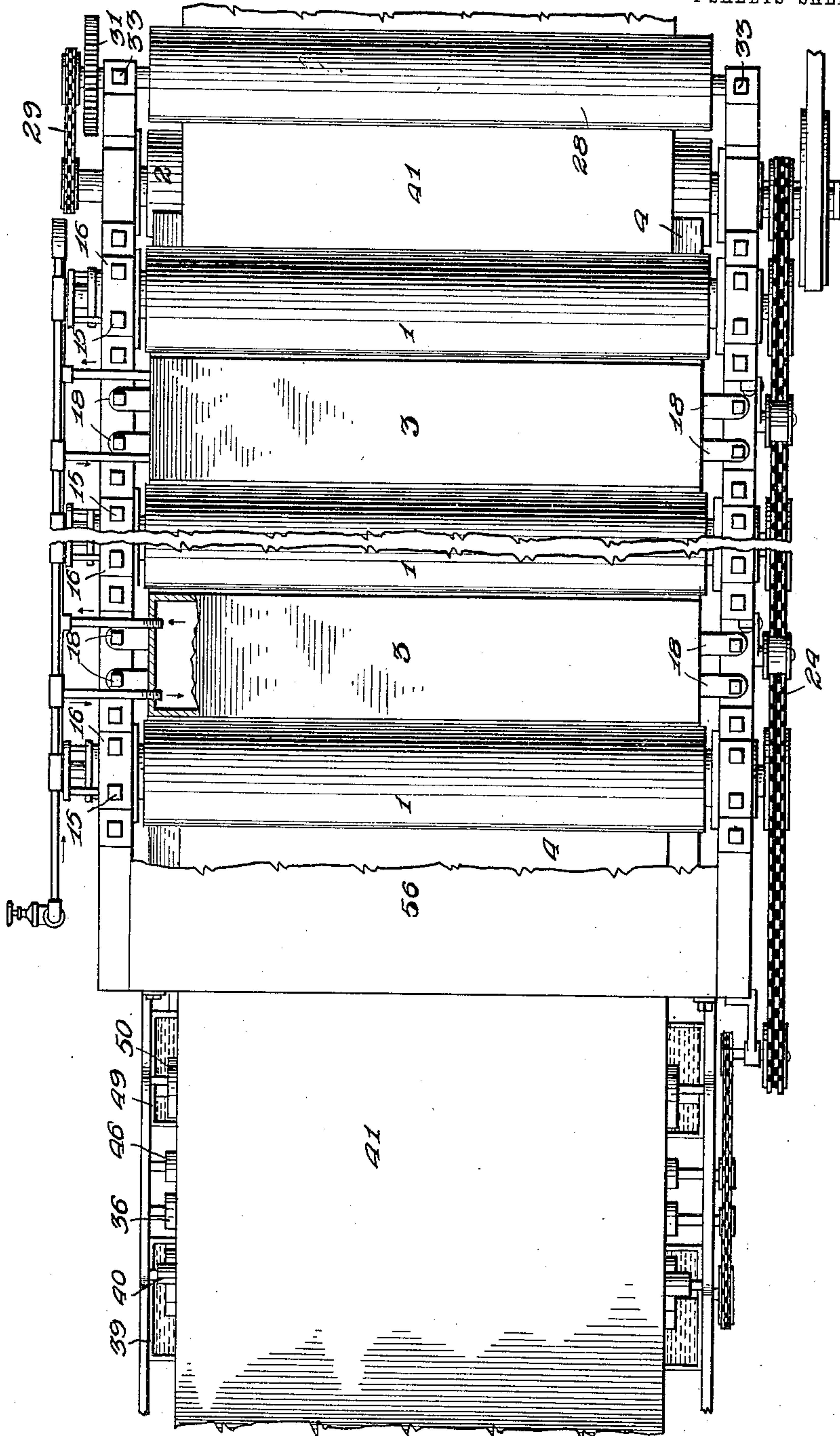
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4 SHEETS—SHEET 3.

Fig. 2.

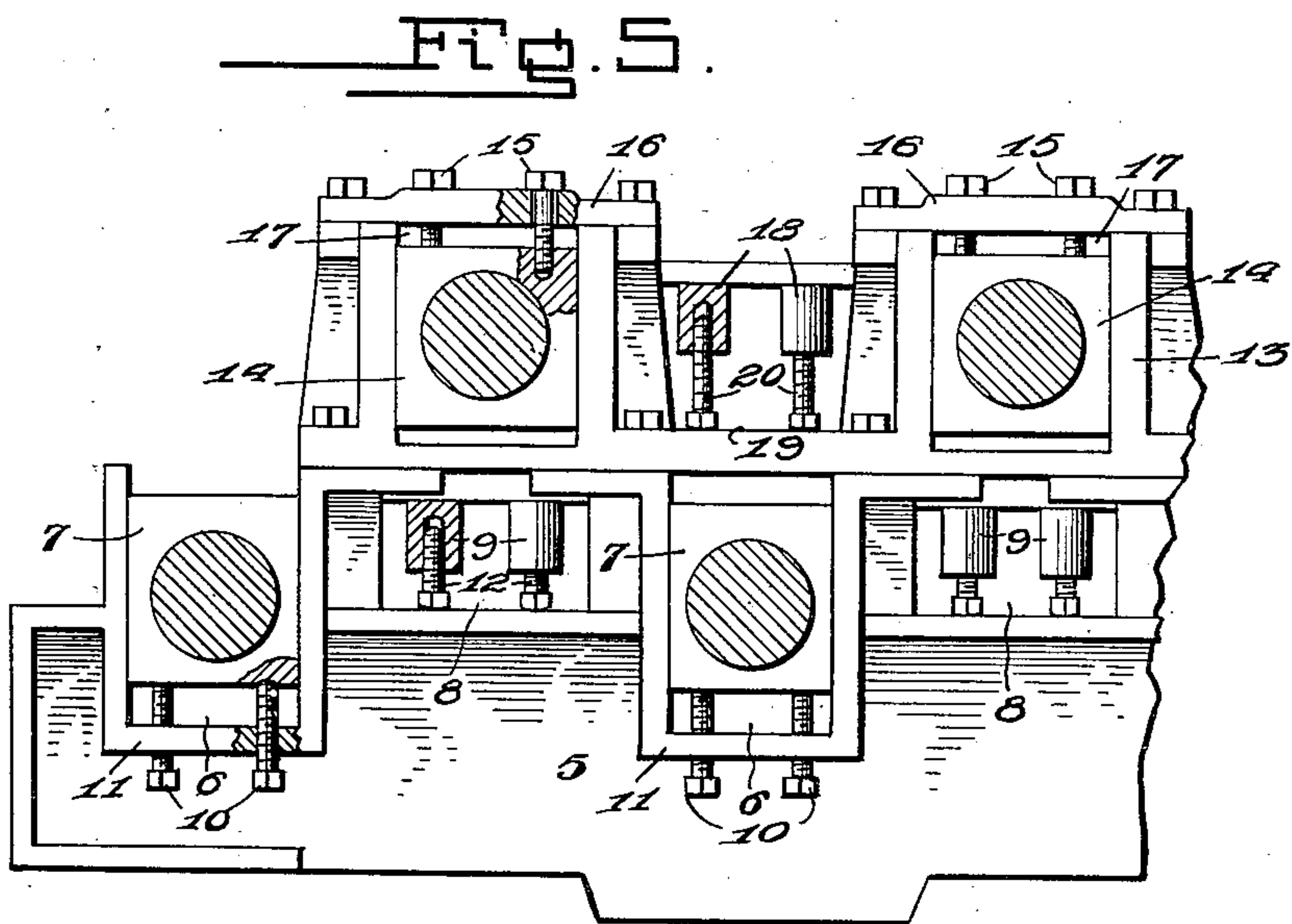
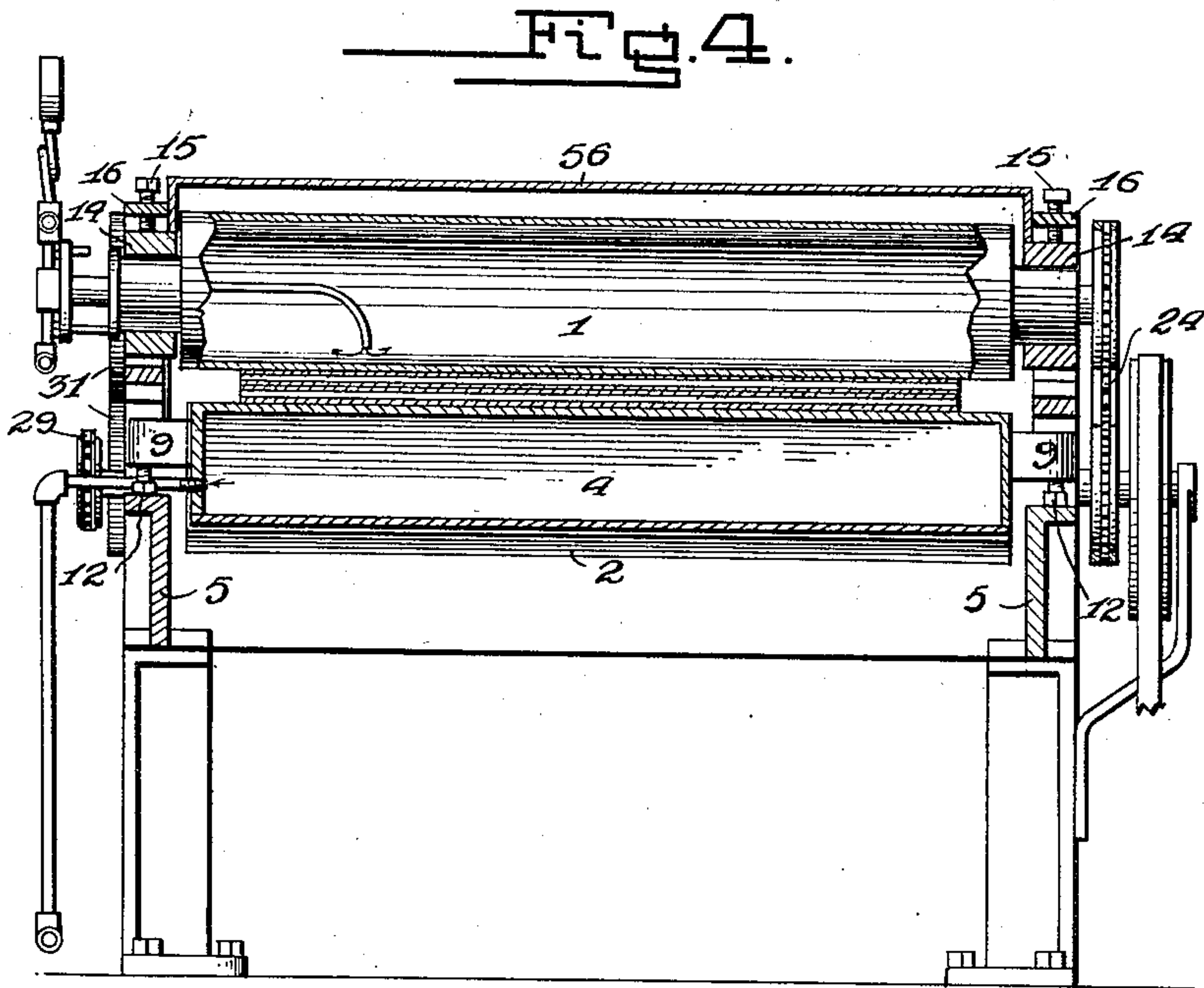


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# UNITED STATES PATENT OFFICE.

FRANK M. BUSALD, OF PITTSBURG, PENNSYLVANIA.

MACHINE FOR MAKING DOUBLE-FACED CORRUGATED PAPER-BOARD.

999,627.

Specification of Letters Patent.

Patented Aug. 1, 1911.

Application filed November 12, 1910. Serial No. 591,985.

*To all whom it may concern:*

Be it known that I, FRANK M. BUSALD, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Machines for Making Double-Faced Corrugated Paper-Board, of which the following is a specification.

This invention relates to a machine for making double faced corrugated paper board, and more particularly to a machine for applying a second facing sheet to single faced corrugated paper for the purpose of making what is known as double faced corrugated paper board.

The invention is an improvement upon the machine illustrated and described in my Patent #956,794 granted May 3rd, 1910.

The object of the present invention is to provide a machine having a larger capacity and a quicker drying action on the paper board than the machine covered by my prior patent, or machines as heretofore constructed and operated.

Generally stated the invention comprises a double set of paper feeding and paste applying devices simultaneously supplying two sheets to a single set of rolls and interposed presser plates which are heated and between which the paper sheets pass in order to dry the paste and cause the adhesion of the facing strips to the corrugating strips.

The invention also comprises series of rolls arranged above and below the course of the paper sheets and series of similarly arranged heated plates between the rolls, a plate being arranged opposite to and co-operating with a roll, whereby the sheets passing through the machine are constantly contacted by a broad flat heating surface and an increased drying effect thereby secured.

In the accompanying drawings Figure 1 is a side elevation of the improved machine; Fig. 2 is a vertical longitudinal section through the same; Fig. 3 is in part a plan view and in part a horizontal section; Fig. 4 is a transverse section on the line 4-4 Fig. 2; Fig. 5 is a vertical sectional view showing the mountings for the roll bearings and the steam boxes or plates; and Fig. 6 is a sectional view through a roll journal.

The improved machine comprises a series of upper rolls 1 and a series of lower rolls 2 arranged as shown in Fig. 2 alternately above and below the course of the sheets

through the machine. Between each adjacent pair of rolls is arranged a drying plate or steam chest, these also being arranged in an upper series of plates 3 and a lower series of plates 4. Any desired number of rolls and plates may be used, depending on the character of the material to be dried. In one machine which has been practically used there have been seven upper rolls and eight lower rolls and six upper drier plates and seven lower drier plates. The number however can be varied as desired.

The lower rolls and drier plates are mounted in side frames 5, which are provided with suitable recesses 6 for receiving the journal boxes 7 of the rolls and other recesses 8 for receiving the end supporting portions 9 of the drier plates. The journal boxes 7 are adjusted vertically by means of bolts 10 working in threaded holes in flanges 11 at the bottoms of the recesses 6, while the presser plates are adjusted by means of bolts 12 entering tapped holes in the projection 9 and having their heads resting upon the bottoms of the recesses 8. The top rolls and drier plates are supported in side frame members 13 which rest upon the side frame members 5. The journal boxes 14 of the upper rolls are suspended by means of bolts 15 from cross pieces 16 bridging the recesses 17 in which the journal boxes 14 are located. The bolts 15 enter tapped holes in the journal boxes 14 so that said journal boxes can be thereby adjusted vertically. The upper drier plates are provided with supporting projections 18 extending into recesses 19 in the side frame members 13, and are vertically adjustable therein by means of bolts 20 entering tapped holes in the projections 18 and having their heads resting upon the bottoms of the recesses 19. The several rolls and presser plates are adjustable independently of each other.

All of the rolls, except the initial and final bottom rolls, and all of the drier plates are preferably heated, such as by making the same hollow and connecting to the same steam pipes or the like. This may be conveniently effected in the same manner as described in my prior patent heretofore referred to, or in any other suitable way, and need not be described in detail. Fig. 1 shows one arrangement of pipes for this purpose, the supply pipe being shown at 21 and two exhaust pipes are shown leading to the steam traps 22. The arrows show the



direction of flow of the steam. The connections to the hollow plates are through the ends thereof, separate supply and exhaust connections being used as shown. The supply and exhaust connections to the rolls both lead through a hollow journal thereof, as shown in Fig. 6. These connections will be understood by those skilled in the art without further description.

By having the rolls and drier plates arranged as shown, that is so that each drier plate is opposite a roll, the sheets of paper passing through the machine are continuously contacted by a broad heated surface, either on the top or on the bottom, said broad heated top and bottom surfaces partly overlapping as shown. Consequently a maximum amount of heat is transmitted to the sheets so that the paste is dried very rapidly, and a comparatively short machine is sufficient to thoroughly dry the paste and cause the sheets to adhere together. As a consequence the machine requires less space and less power to drive than machines as heretofore constructed.

At least one set of rolls is positively driven, and preferably both the upper and lower rolls are so driven. This can be done by any suitable means, such for instance as shown in my prior patent, and is not fully shown herein. It is effected by means of sprocket chains 24 passing over sprocket wheels on the journals of the rolls. These sprocket chains can be driven from any suitable source and obviously will be arranged to drive the upper and lower series of rolls in contrary directions so that both sets of rolls act to feed the sheets through the machine. As various forms of gearing for so driving these rolls will readily suggest themselves to those skilled in the art a detailed description is unnecessary.

At the rear or delivery end of the machine I preferably provide a pair of additional pull out rolls 28, preferably faced with rubber or other means for exerting a strong grip upon the paper board issuing from the drying rolls and plates. These pull out rolls may be driven from any suitable source and by any suitable means, such as sprocket chain 29 connecting the bottom one of rolls 28 with the final roll 2. The two rolls 28 are geared together by spur gears 31 to rotate in unison. These rolls are adjusted to firmly grip the corrugated paper board, which is dry by the time it reaches these rolls and therefore will withstand a very considerable pressure. One of these rolls may be spring pressed toward the other, such as by means of springs 32 whose tension can be adjusted by screws 33.

The space between a drying roll and its cooperating drying plate will be adjusted by the adjusting screws described so that a slight pressure is exerted upon the paper

sheets passing between, so as to hold the several sheets firmly in contact and insure the facing sheet adhering to the corrugated sheet. The pressure is due to the resiliency of the paper sheets and particularly of the corrugated sheet.

The machine is particularly adapted for applying a second facing sheet to a corrugated strip which has already had applied thereon a single facing sheet; and more particularly for simultaneously forming two such double faced strips or sheets. To this end a double set of sheet supplying and paste applying devices are employed. One of the single faced corrugated strips is supplied by feed rolls 34, 35 and 36 mounted in frame 37 and passes over paste roll 38 running in the paste trough or tank 39, thence over guide roll 40, after which there is guided into contact therewith the facing strip 41 coming from the spool or reel 42. The other single faced corrugated sheet is supplied by feed rolls 44, 45 and 46 mounted in frame 47 and passes over paste roll 48 running in paste trough or tank 49 and thence over guide roll 50, after which there is guided thereagainst the bottom facing sheet 51 supplied from spool or reel 52 and passing over guide roll 53. The feed rolls for the corrugated sheets and for the paste rolls are positively driven by any suitable means, such as sprocket chains and gears, while the plain or facing strips are merely drawn from ordinary spools or reels as has heretofore been the practice. Since the devices for driving such feed rolls are well known in the art a detailed description is not necessary. One of the single faced corrugated strips has its second facing strip applied to the top surface while the other has the facing strip applied to its bottom surface, so that by no possibility can paste come between the two corrugated sheets. The two sheets are carried through the machine in contact and in the same manner as a single sheet, and the drying of both is effected simultaneously by the single set of heated rolls and drying plates. As a consequence the output of the machine is materially increased.

The drawings show an oscillating cutter represented generally at 55 and which is or may be the same as described and claimed in my prior patent above referred to. Any suitable form of cutter however may be employed and since the same is not a part of the present invention it is not specifically described or illustrated.

The machine described is of simple construction and is capable of producing a large quantity of double faced corrugated paper board. On account of the double set of sheet supplying and paste applying devices a plurality of sheets are simultaneously formed. The particular arrangement of hot rolls and drying plates supply a maximum



amount of heat, thereby enabling a plurality of sheets to be simultaneously formed, and also enabling the use of a comparatively short machine.

5 If desired a cover 56 may be provided over the rolls and drying plates, said cover being readily removable.

What I claim is:

10 1. In a corrugated paper board facing machine, the combination of two series of rolls arranged one above and the other below the course of the paper, and two series of similarly arranged upper and lower heated plates between the rolls, each plate being  
15 arranged opposite to and cooperating with a roll.

2. In a corrugated paper board facing machine, the combination of two series of upper and lower rolls arranged one  
20 above and the other below the course of the paper, and two series of similarly arranged upper and lower plates between the rolls, each plate being arranged opposite to and cooperating with a roll, said  
25 rolls and plates being hollow and provided with heating connections thereto.

3. In a corrugated paper board facing machine, the combination of a series of upper and a series of lower rolls arranged respec-  
30 tively above and below the course of the paper, a series of similarly arranged plates between each series of rolls, each plate being arranged opposite to and cooperating with a roll, and means for positively driv-  
35 ing both series of rolls.

4. In a corrugated paper board facing machine, the combination of a series of upper and a series of lower rolls arranged respec-  
40 tively above and below the course of the paper, a series of similarly arranged heated plates between each series of rolls, and positively driven pull out rolls at the exit end of the machine and provided with friction faces.

5. In a corrugated paper board facing ma- 45  
chine, the combination of a series of upper and a series of lower rolls arranged respec-  
tively above and below the course of the paper, a series of heated plates between each series of rolls, each plate being arranged  
50 opposite to and cooperating with a roll, and means for independently adjusting each roll and each plate.

6. In a corrugated paper board facing ma-  
chine, the combination of a series of upper 55  
and a series of lower rolls arranged respec-  
tively above and below the path of the paper, a series of plates between each series of rolls, a pair of positively driven pull out  
60 rolls at the exit end of the machine and provided with friction faces, and a double set of paper feeding and paste applying devices.

7. In a corrugated paper board facing ma-  
chine, the combination of a series of upper 65  
and a series of lower rolls arranged respec-  
tively above and below the path of the paper, a series of plates between the rolls of each series, each plate being opposite to  
70 and cooperating with a roll, and positively driven feed rolls at the exit end of the machine.

8. In a corrugated paper board facing ma-  
chine, the combination of a series of upper  
75 and a series of lower rolls arranged respec-  
tively above and below the path of the paper, a series of plates between the rolls of each series, each plate being opposite to  
80 and cooperating with a roll, positively driven feed rolls at the exit end of the machine, and a plurality of sets of paper feeding and paste applying devices.

In testimony whereof, I have hereunto set my hand.

FRANK M. BUSALD.

Witnesses:

F. W. WINTER,

MARY E. CAHOON.