

(No Model.)

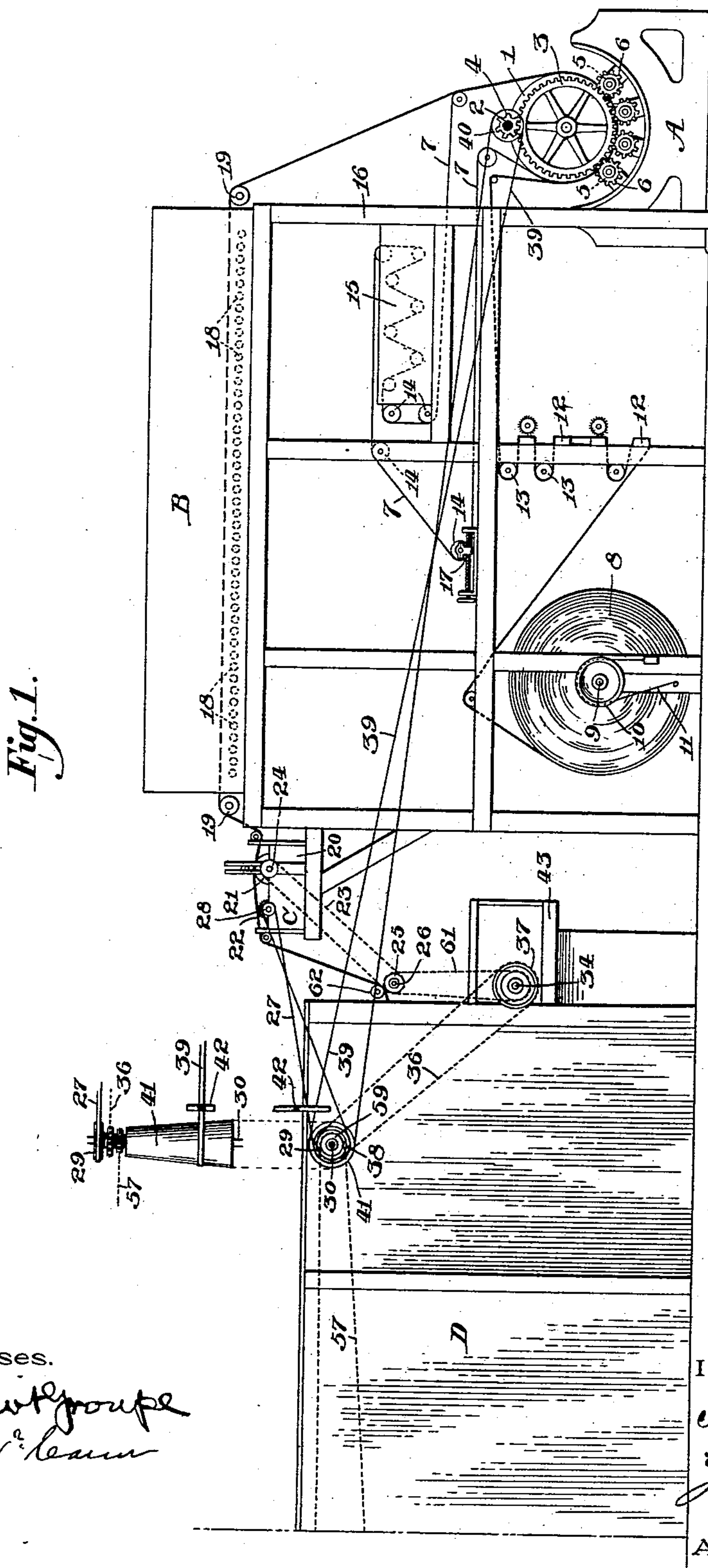
3 Sheets—Sheet 1.

J. DUNLAP.

# MACHINE FOR PRINTING AND FINISHING PILE FABRICS.

No. 563,024.

Patented June 30, 1896.



Witnesses.

Andrew & group  
J. H. M<sup>r</sup>. Leann

Inventor.

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(No Model.)

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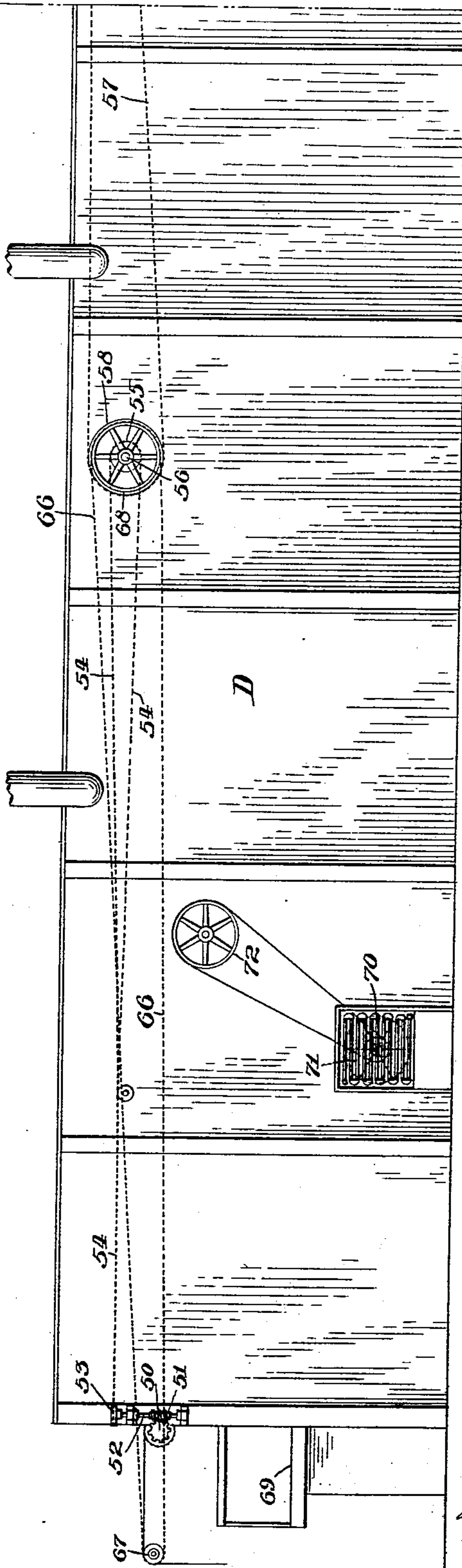
J. DUNLAP.

MACHINE FOR PRINTING AND FINISHING PILE FABRICS.

No. 563,024.

Patented June 30, 1896.

Fig. 1<sup>a</sup>.



Witnesses.

Andrew Grouse  
J. H. McCann

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(No Model.)

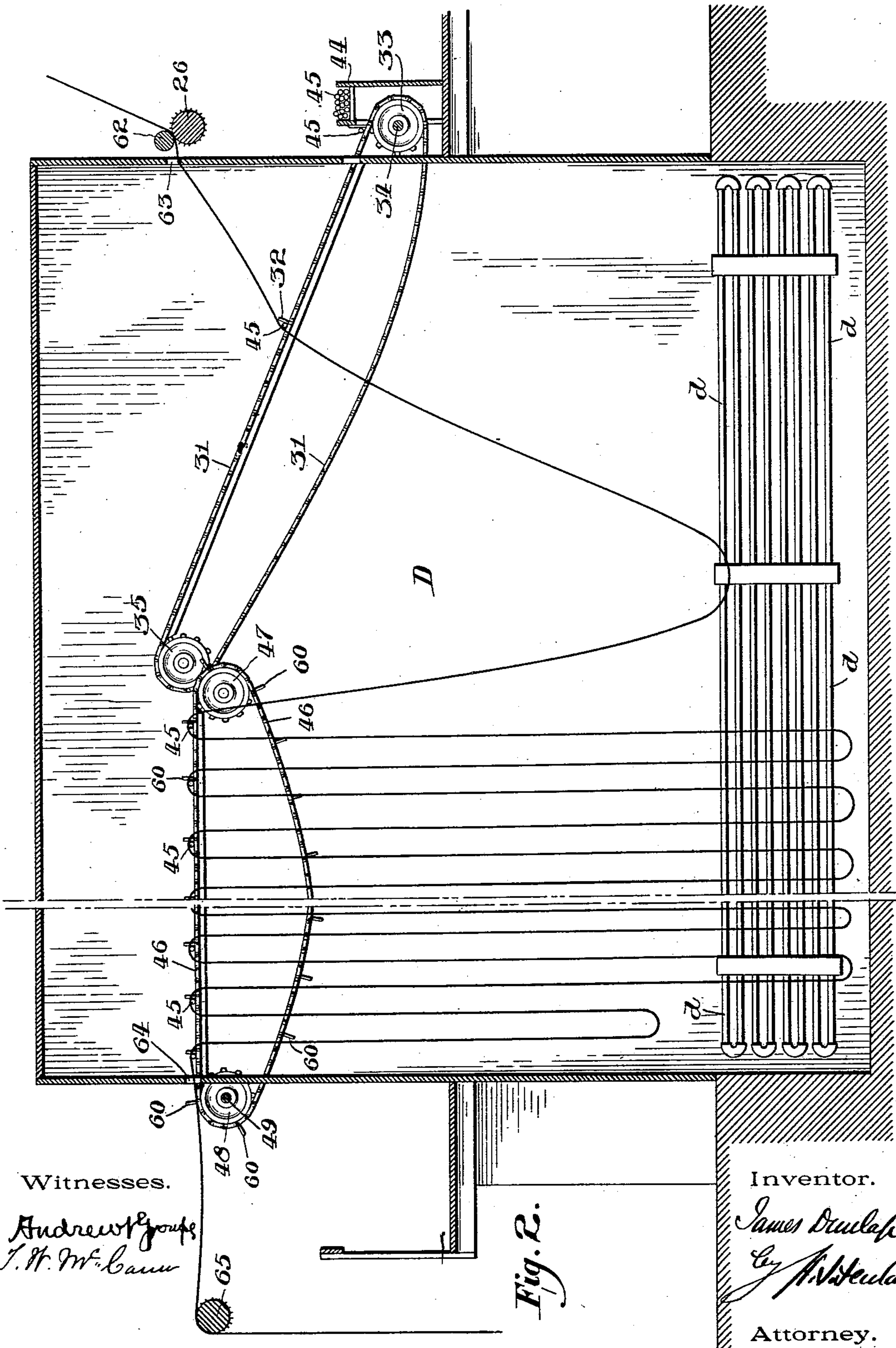
3 Sheets—Sheet 3.

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MACHINE FOR PRINTING AND FINISHING PILE FABRICS.

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# UNITED STATES PATENT OFFICE.

JAMES DUNLAP, OF PHILADELPHIA, PENNSYLVANIA.

## MACHINE FOR PRINTING AND FINISHING PILE FABRICS.

SPECIFICATION forming part of Letters Patent No. 563,024, dated June 30, 1896.

Application filed June 26, 1895. Serial No. 554,165. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES DUNLAP, a citizen of the United States, residing at the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for the Printing and Finishing of Pile Fabrics, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

In the art of manufacturing certain kinds of figured pile carpets, a plain tapestry fabric is run through a suitable printing-machine, which imprints upon it a predetermined figure or design. The fabric is then treated in a steam-room for the purpose of fixing the colors, after which it is passed through suitable sizing or starching apparatus, and from thence to a drying chamber or apparatus. Heretofore these several operations have been to a greater or less degree separate and independent of each other, and more or less manual labor has been required to transfer the fabric from one operation to another.

My object is to provide a construction whereby the successive operations above named shall be continuously and automatically carried out; and to this end the invention embraces, in a single structure, a printing mechanism, a steam-chamber, a starching apparatus, a drying-chamber, and means for automatically and concertedly operating the same to secure their successive actions upon the fabric, all as hereinafter described, and pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation of the apparatus, the drier being continued in Fig. 1<sup>a</sup>, Sheet 2. Fig. 2 is a longitudinal vertical section of the drier.

A designates the printing-machine, which may be of any appropriate character. In the present instance the machine comprises a large heavy drum 1, to which motion is imparted from a power-driven shaft 2, through the medium of the coacting gears 3 and 4; a series of relatively-disposed color-printing rollers 5, the shafts of which are provided with pinions 6, that mesh with and are actuated by the drum-gear 3, and an endless elastic blanket 7, that runs around the drum and forms a yielding bearing-surface for the car-

pet thereon. The carpet is fed to the drum from a suitably-located roll 8, the shaft 9 of which is preferably provided with a suitable tension device to prevent the otherwise accelerated movement of the roll, which device, in this instance, comprises a pulley 10, on the end of the roll-shaft, and a weighted band 11, bearing on said pulley. There is interposed between the roll and the printing mechanism a series of frictional resistance-bars 12 and rollers 13, around which the carpet passes on its way from the roll to the mechanism. The blanket 7 passes around suitably-disposed guide-rollers 14, and also through a washing-tank 15 on the framework 16, whereby any color on the surface of the blanket is removed. One of the guide-rollers is preferably supported in an adjustable bearing 17, by means of which the requisite tension may be applied to the blanket. As there is nothing new in the details of construction of the parts just described, no specific description thereof is necessary.

Supported upon the framework 16 is a large steam-chamber B, in which is contained a series of perforated steam-pipes 18, by means of which free steam is introduced to the chamber. The carpet is passed from the printing-machine through this chamber, immediately above the steam-pipes, so that the carpet during its onward traverse will be subjected to the action of the steam, and the colors thereby fixed. Rollers 19 on the respective ends of the steam-chamber guide the carpet in its traverse to and from the chamber. On the frame 16, just rearward of the discharging end of the steam-chamber, is supported the starching apparatus C, to the action of which the under side or back of the carpet is subjected as it leaves the steam-chamber. This apparatus comprises a tank 20, in which is contained a mixture of starch and glue usually, a revolving roller 21, which runs in the mixture and applies it to the back of the carpet for the purpose of stiffening the latter, and an oppositely-revolving brush 22, which takes against the back of the carpet and brushes the surplus mixture therefrom. The carpet is held in contact with the roller 21 by means of a superposed roller, which is arranged to slide vertically in lateral housings on the tank. The roller 21 is driven by means



of a sprocket-chain 23, passing around a wheel 24 on the trunnion or shaft of said roller and around a corresponding wheel 25 on a suitably-located shaft 26, to which motion is imparted from the main driving-shaft 2, as hereinafter described. The brush 22 is driven by means of a crossed belt 27, passing around a pulley 28 on the brush-shaft and around a pulley 29 on a stud-shaft 30, which is also driven from the main driving-shaft, as below explained.

Immediately rearward of the supporting-frame is a large drying-chamber D, through which the carpet progressively passes as it leaves the starching apparatus. The carpet upon its egress from this chamber is thoroughly dried and ready for rolling. The chamber comprises a long closed structure, in the bottom of which is contained a system of circulating steam-pipes *d*. In the forward part of the chamber is disposed a chain conveyor 31, comprising two chains, one at each side, only one of which appears in the drawings. These chains run from the exterior of the forward part of the structure to the interior thereof in an ascending plane, and they are each provided with a projecting pin 32. Each of these chains runs on a sprocket-wheel 33 on an exterior shaft 34 and on a sprocket-wheel 35, whose stud is supported on the adjacent side wall of the structure. Shaft 34 is driven by means of a sprocket-chain 36, which passes around a wheel 37 on said shaft and around a wheel 38 on the stud-shaft above referred to, which stud-shaft is supported on the side of the drier and is driven by means of a crossed belt 39, passing around a pulley 40 on the main driving-shaft and around a pulley 41 on the stud-shaft.

The pulley 41 is preferably a cone-pulley, so that by moving the belt 39 axially thereon the speed of the pulley may be varied to regulate, in respect to the speed of the printing mechanism, the speed of the parts driven from the cone-pulley. A suitable belt-shifter 42 is provided to effect the requisite disposition of the belt on the pulley. On the end of the drier structure, adjacent to the shaft 34, is a platform 43, upon which is supported a receptacle 44 for the usual carrying-rods 45, which rods are set at intervals, by an attendant, upon the conveyor 31, so that during each revolution of the latter the pins 32 thereon take against the ends of a rod and carry it into the drier, for a purpose below explained. Within the drier-chamber, slightly below the rearward portion of the conveyor 31, is a horizontally-disposed conveyor 46, that runs to the outer rear portion of the structure, said latter conveyor comprising two laterally-disposed chains that run upon sprocket-wheels 47 within the chamber and upon similar wheels 48 on an exterior shaft 49. On this shaft is a worm-wheel 50, with which gears a worm 51 on a vertical shaft 52, that is mounted in suitable bearings on

the side of the structure. On the worm-shaft is a sprocket-wheel 53, which is geared by means of a chain 54 with a similar wheel 55 on a laterally-disposed stud-shaft 56 on the drier, which stud-shaft is driven from the shaft 30, before described, by means of a chain 57, passing around sprocket-wheels 58 and 59 on the shafts 56 and 30, respectively. On the chains 46 at regular intervals apart are corresponding pins 60, which are so disposed that during the traverse of the conveyor the opposite pins on the respective chains will receive the rod as it is discharged from the conveyor 31, the relative speeds of the conveyers being such that the successive studs on the conveyor 46 will receive the rods successively discharged from the conveyor 31.

The shaft 26 above referred to is located at the forward end of the drier, said shaft being driven from the shaft 34 by means of sprocket-gearing 61. The periphery of shaft 26 is studded with points and a freely-rotatable roller 62 is mounted above the same. The carpet emerging from the starching apparatus is passed between the bite of these rollers and through an adjacent slot 63 in the wall of the drier. It is then passed between the chains of the conveyor 31 and carried to, and suspended in folds from, the rods supported on the conveyor 46, the free end of the carpet being passed through a slot 64 in the rear wall of the drier and thrown over a positively-driven studded take-up roller 65. This roller is driven by means of a sprocket-chain 66, which passes around wheels 67 and 68 on the roller and the stud-shaft 56, respectively. Hence, when the apparatus is in operation, the carpet is progressively drawn from the starcher into the drier by means of the shaft or roller 26. The successive rods on the conveyor 31 take against the carpet and carry it in folds to and upon the conveyor 46, and the latter in turn carries the fabric to the rear of the drier, whence it is carried off by the take-up roller. The rods pass through the slot 64 in the drier and fall into a suitable receptacle 69. On the side of the drier is an opening in which is disposed a system of steam-pipes 70, in conjunction with a fan 71, which is belted with a driving-pulley 72, whereby atmospheric air is drawn into the drier and such air during its ingress heated by contact with the steam-pipes.

I claim—

1. In an apparatus of the character described a driving-shaft, a printing mechanism geared therewith, a steam-chamber adjacent to said mechanism, a starching apparatus succeeding said chamber, a drier succeeding said starching apparatus, said drier being provided with conveyers therein, and feed devices for guiding and carrying the fabric continuously through the said printing mechanism, steam-chamber and starching apparatus, to the said conveyers, together with gearing between the said feed devices and conveyers



and the driving-shaft, whereby they are all operated in concert and at relative speeds, substantially as specified.

5 2. In an apparatus of the character described, a driving-shaft, a printing mechanism geared therewith, a steam-chamber adjacent to said mechanism, a starching apparatus succeeding said chamber, a drier succeeding said starching apparatus, said drier being provided with conveyers therein, and variable  
10 gearing between said conveyers and the driving-shaft, whereby the conveyers and the printing mechanism may be operated at relative speeds, substantially as described.

15 3. In an apparatus of the character described, a driving-shaft, a printing mechanism geared therewith, a steam-chamber adjacent to said mechanism, a starching-tank succeeding said chamber and being provided with a

feed-roller, a drier succeeding said starching- 20 tanks and being provided with conveyers, feed-rollers intermediate said tank and drier, a take-up roller at the rear of the drier, and gearing between said conveyers, feed and take-up rollers and the driving-shaft, whereby 25 the said conveyers and the feed and take-up rollers are operated in concert with the printing mechanism and at relative speeds, and the fabric is moved continuously through the several mechanisms which operate thereon 30 substantially as described.

In testimony whereof I have hereunto affixed my signature this 8th day of June, A. D. 1895.

JAMES DUNLAP.

Witnesses:

JOHN R. NOLAN,  
H. T. FENTON.