June 24, 1924. 1,499,209

C. GAVED

SHEET FEEDING MACHINE

Filed May 2, 1922 2 Sheets-Sheet 1

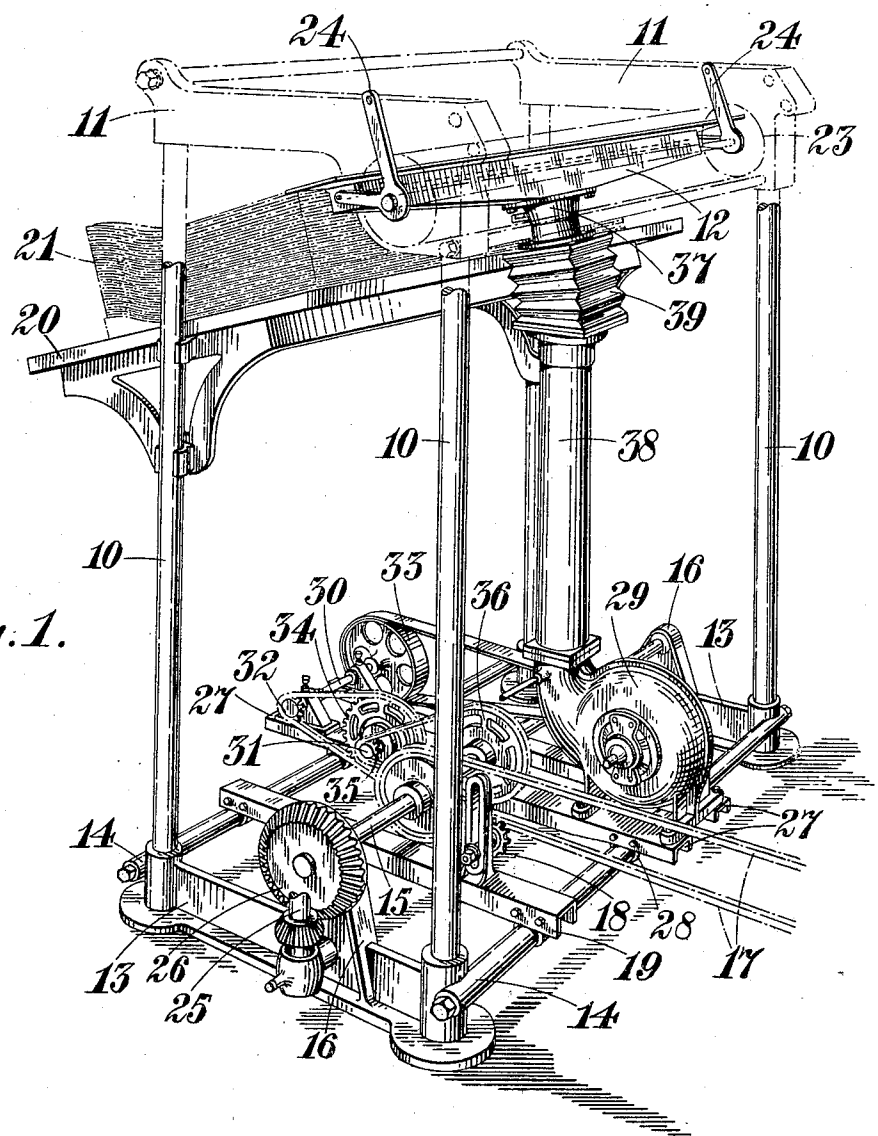


Fig. 1.

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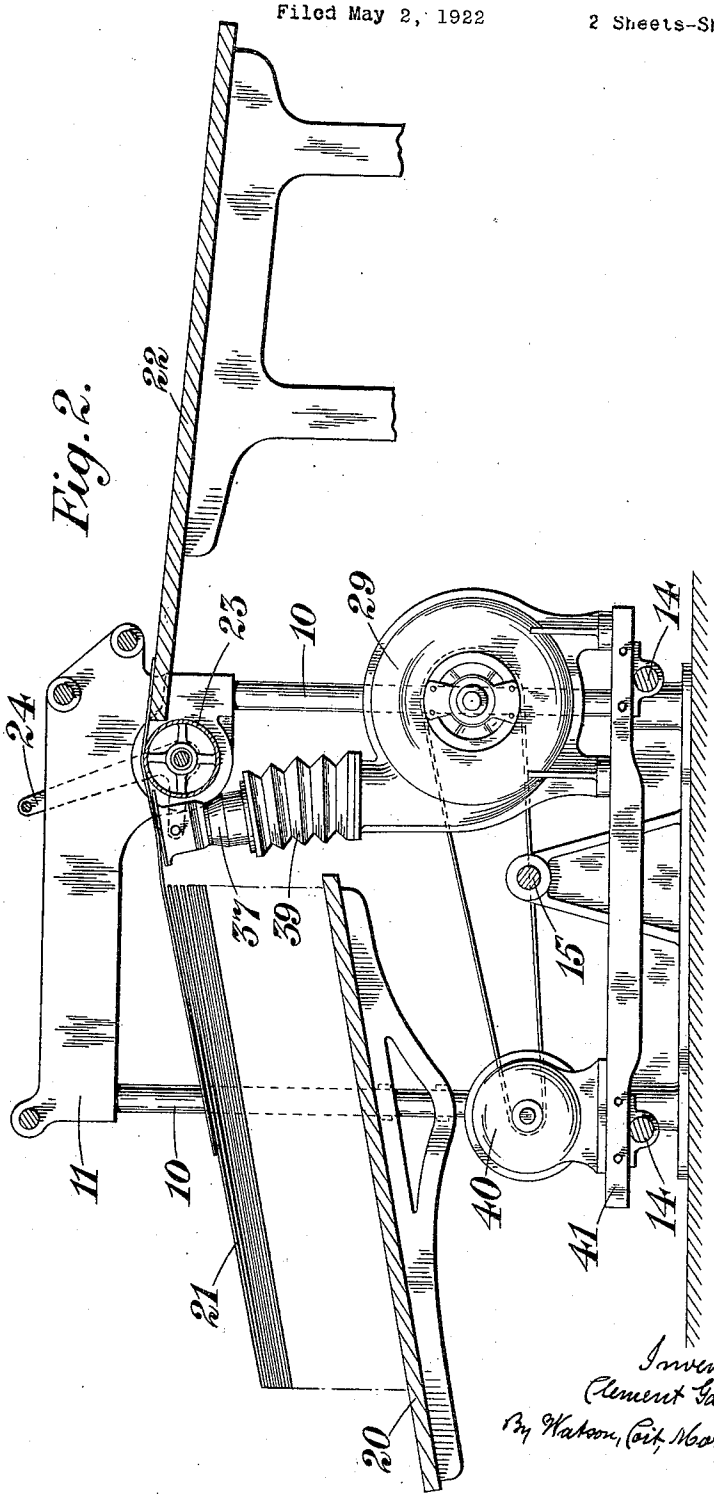
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2 Sheets-Sheet 2

Fig. 2.



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UNITED STATES PATENT OFFICE.

CLEMENT GAVED, OF ANERLEY, LONDON, ENGLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO H. T. B. LIMITED, OF WALTHAMSTOW, LONDON, ENGLAND.

SHEET-FEEDING MACHINE.

Application filed May 2, 1922. Serial No. 557,991.

To all whom it may concern:

Be it known that I, CLEMENT GAVED, subject of the King of England, residing in Anerley, London, England, have invented certain new and useful Improvements in Sheet-Feeding Machines, of which the following is a specification.

This invention consists in improvements in or relating to machines for feeding, to a printing machine, sheets of paper one at a time from a pile of sheets, an air-box being provided to discharge a stream of air on to the forward edges of the sheets at or near the top of the pile in order to separate them and to ensure accurate feeding of single sheets.

Hitherto it has been customary to drive the blower from the main shaft of the printing machine at a position close to that shaft and to lead an air-trunk from the blower to the air-box. This necessitated several bends or elbows in the air-trunk and provision had to be made, of generally at least two flexible joints, to permit the air-trunk to move with the air-box as the latter was oscillated vertically in usual manner in relation to the top of the pile of sheets.

The object of the present invention is to avoid the necessity for a long and elbowed air-trunk as hitherto employed, which is found to have drawbacks in air-leaks, particularly at the flexible joints, and air-friction losses in the necessarily long air-trunk.

According to the present invention there is provided, for attachment as a single unit to a sheet-feeding machine of the type described above, an auxiliary frame carrying a blower and driving gear train therefor, said auxiliary frame being so constructed that it can be attached to the main frame of an existing sheet-feeding machine with the blower-outlet immediately beneath, or substantially beneath, the existing air-inlet connection for the air-box.

In one form of the invention one member of the aforesaid driving gear train is so positioned and so formed that it can be operatively engaged with (for example by means of a belt or chain) the main driving shaft of the sheet-feeding machine.

In a modified form of the construction according to the present invention the blower is arranged to be driven (preferably directly) from a motor supported also upon the aforesaid auxiliary frame.

According to a further feature of the invention the connection between the blower and the air-inlet of the air-box is constituted in whole or in part by a collapsible bellows formed of material which is substantially impervious to passage of air therethrough.

Two preferred constructions embodying the features of the present invention will now be described in detail by way of example with reference to the accompanying drawings in which—

Figure 1 is a perspective view of the auxiliary frame blower, air-box and associated parts of the sheet-feeding machine according to the first example in which the blower is driven from the main driving shaft of the feeding machine;

Figure 2 is a side elevation (to some extent diagrammatic) illustrating the alternative construction in which the blower is driven by a separate motor.

Like reference numerals indicate like parts in both figures of the drawings.

The feeding-machine to which the unit attachment is to be applied, consists essentially in a main frame composed of four vertical pillars 10 connected together by an upper frame 11 in which are mounted, amongst other devices, the usual strokers and other feeding mechanism (not shown) together with an air-box 12. The pillars 10 are interconnected at their lower ends to the base frame of the machine which is constituted by side members 13 and transverse tubular stays 14. The main feeder driving shaft 15 extends parallel with the cross-stays 14 and is supported in brackets 16 upstanding from the side members 13. The shaft 15 is in turn driven from the printing machine driving mechanism (not shown) by means of a chain 17 which passes over an adjustable tensioning sprocket 18 supported from a bracket 19 extending between the stays 14. Guided for vertical movement on the rear

pillars 10 is a platform or carrier 20 which supports a pile of sheets 21, the platform being moved upwardly automatically as the sheets are fed one by one from the top of the pile. The sheets are adapted to be passed forward by the usual strokers (not shown) over the top of the air-box 12 on to a lay-board 22 (Figure 2) and thence to the printing rollers. A guide roller (or rollers) 23 is interposed between the air-box and the lay-board. The air-box 12 is adapted in usual manner to be oscillated substantially vertically through the intermediary of bell-crank levers 24. The air-box, feed platform, strokers and associated mechanisms are actuated through transmission gear (not shown) from a vertical shaft 25 driven by bevel gearing 26 from the main feeder driving shaft 15. The construction so far described is that of an ordinary feeding machine of substantially known form.

In the first example (shown in Figure 1) the auxiliary frame hereinbefore referred to comprises two channel-section bars 27 to extend between the stays 14, and to be secured thereto by straps 28. A centrifugal fan or blower 29 is secured to the bars 27 at the forward ends thereof, and towards the rear ends of the bars two parallel shafts 30 and 31 are mounted for rotation in journals suitably supported from the bars of the frame. The shaft 30 which is in the rear-most position carries a small chain sprocket 32 and also a belt pulley 33 which latter is in belt-driven engagement with the rotor-spindle of the blower. On the shaft 31 two chain-sprockets 34 and 35 are mounted, the former and larger of which is chain-connected with the sprocket 32 on the shaft 30. On the feeder driving shaft 15 a chain-sprocket 36 is mounted in such a position that it may be employed to transmit rotation by means of a chain to the small sprocket 35. Conveniently the sprocket 36 is supplied with the auxiliary unit for assembly on the feeder driving shaft. It is seen that the gear train described above effects a step-up gear between the driving shaft of the feeder and the rotor-spindle of the blower.

The auxiliary frame is secured to the stays 14 in such a position that the blower outlet is approximately immediately beneath the air-inlet 37 for the air-box. Upwardly extending from the blower outlet is a rigid pipe 38 and between the upper end of this pipe and the air-box inlet is a short bellows member 39 composed of leather or treated fabric or other material which is substantially air-tight.

It will be appreciated that it is now possible, by the present invention to apply the blower, and the necessary gearing therefor, as a unit to the feeding machine in such a position that the connection between the blower and the air-inlet to the air-box is reduced to a minimum, the bellows-connector accommodating the vertical movement of the air-box.

In the second example (illustrated in Figure 2) a feeding machine of much smaller vertical compass is shown, and in this case it is found possible to dispense altogether with the rigid connecting pipe 38 employed in the previous example. The collapsible bellows-member 39 therfore forms the sole connection between the blower outlet and the inlet pipe 37 of the air-box. In this example a further modification is made, namely the blower is adapted to be driven directly by an electric motor 40 supported on the auxiliary frame which in this case is constituted by a single casting 41, secured as before by straps to the stays 14 of the feeder frame. The motor and blower are belt-connected, and the use of step-up gearing between the feeder driving shaft and the blower is thus avoided.

What I claim as my invention and desire to secure by Letters Patent is:—

1. For attachment to a sheet-feeding machine of the type described, a detachable unit comprising in combination an auxiliary frame, a blower having an upwardly extending conduit, driving means therefor carried on said frame and means associated with the latter whereby it can be attached to the main frame of an existing sheet-feeding machine, substantially as described.

2. For attachment as a single unit to a sheet-feeding machine of the type described, the combination of an auxiliary frame, a blower and driving means therefor carried on said frame the latter being so constructed that it can be attached to the main frame of an existing sheet-feeding machine with the blower-outlet immediately or substantially beneath the existing air-inlet connection for the air-box, and a connection between the blower-outlet and the air-inlet of the air-box which connection is constituted at least in part by a collapsible bellows.

3. For attachment as a single unit to a sheet-feeding machine of the type described, the combination of an auxiliary frame, a blower and driving means therefor carried on said frame, the latter being so constructed that it can be attached to the frame of an existing sheet-feeding machine with the blower-outlet immediately or substantially beneath the existing air-inlet connection for the air-box and a collapsible bellows constituting a connection between the blower-outlet and the air-inlet of the air-box, one end of said bellows being connected directly to the blower-outlet and the other end being connected directly to the air-inlet of the air-box.

4. For attachment as a single unit to a sheet-feeding machine of the type described,

the combination of an auxiliary frame, a blower and a motor coupled thereto in driving connection, both carried on said frame and the latter being so constructed that it can be detachably secured to the frame of an existing sheet-feeding machine with the blower-outlet immediately or substantially beneath the existing air-inlet connection for the air-box, and a connection between the blower-outlet and the air-inlet of the air-box, which connection comprises a collapsible bellows.

In testimony whereof I affix my signature.

CLEMENT GAVED.