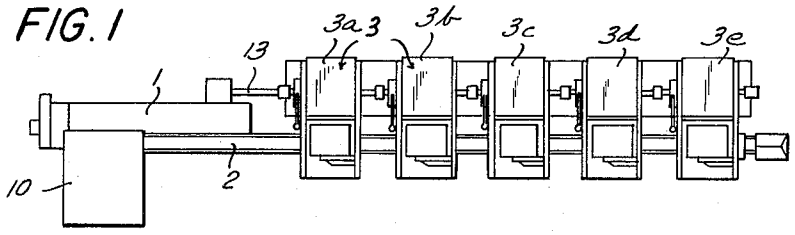
April 12, 1966 H. MUELLER 3,245,679

COMPILING AND STAPLING OF FOLDED SHEETS OF PRINT

Filed Feb. 24, 1964 2 Sheets-Sheet 1

FIG. 1



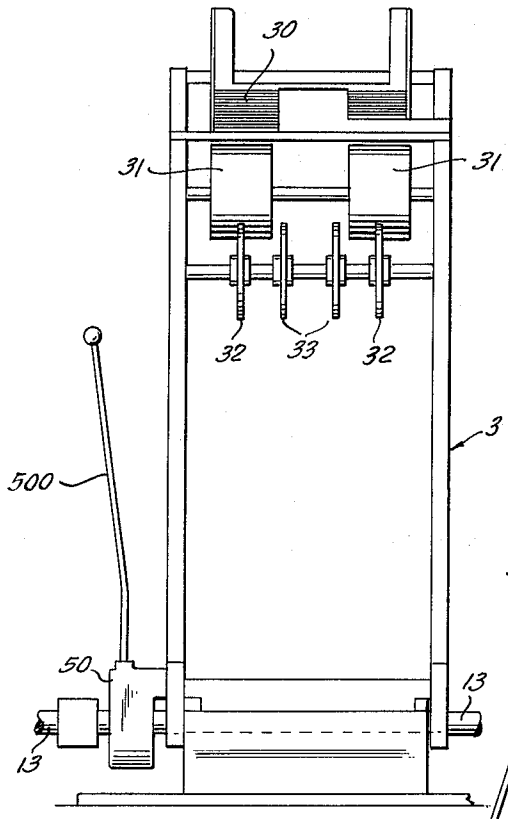


FIG. 3

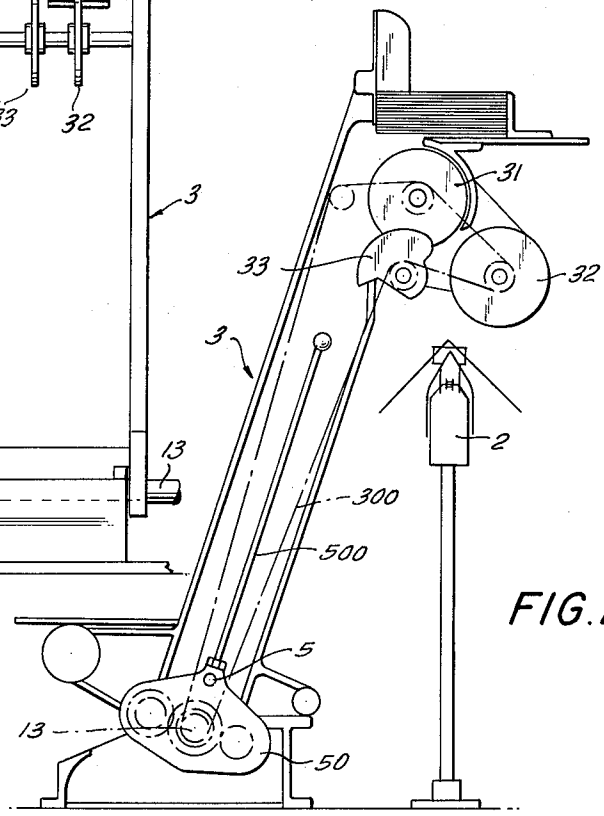


FIG. 2

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FIG. 4

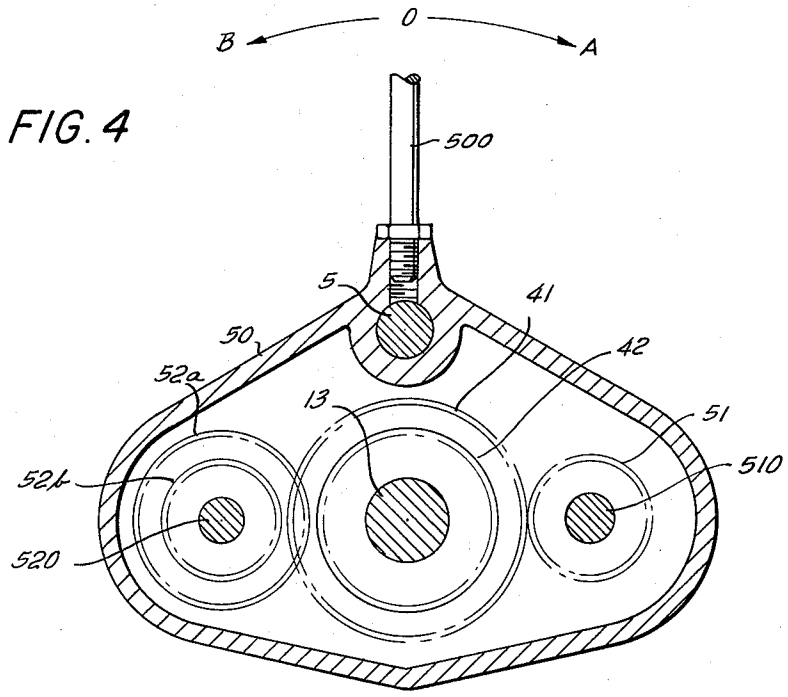
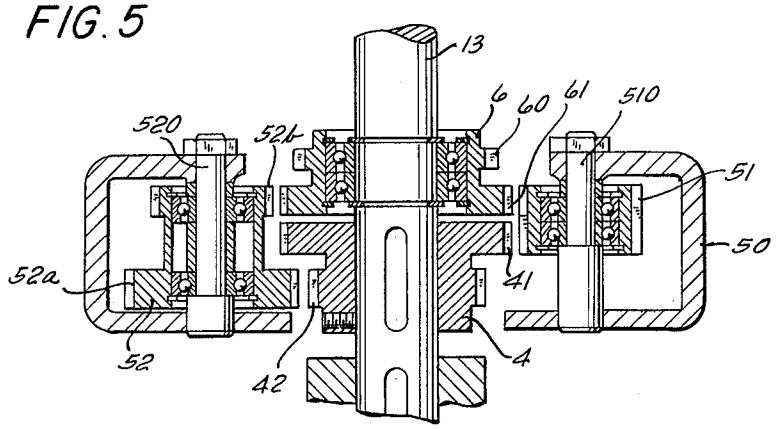


FIG. 5



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United States Patent Office 3,245,679 Patented Apr. 12, 1966

3,245,679

COMPILING AND STAPLING OF FOLDED SHEETS OF PRINT

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Filed Feb. 24, 1964, Ser. No. 346,664
Claims priority, application Switzerland, Apr. 11, 1963, 4,702/63
4 Claims. (Cl. 270—53)

The present invention relates to a group of machines for the compiling and stapling of folded sheets of print, comprising a series of feeders for depositing the paper sheets of print from a pile onto a conveyer device for the compiled sheets.

With such groups of feeders there arises often the problem, that one or some of the sheets to be compiled, owing to different paper qualities, must be deposited at a relatively much smaller rate than other sheets when a reliable operation is to be assured. Since all feeders of the group have to co-operate with the conveyer device in such a manner that throughout the group all the sheets belonging to one quire are compiled on the conveyer device, they have to be driven by a driving member common to them, or otherwise to be driven in synchronism. Accordingly, hitherto all the feeders of one group have to be driven at a reduced working speed, whenever one sheet has to be deposited onto the conveyer means at reduced speed even if the feeders for the other sheets could be operated at a higher working speed. This however is uneconomical.

The present invention has the primary objects of improving such machine groups to allow to drive each feeder selectively at full or at half working speed.

With this and other objects in view which will become apparent later from this specification and the accompanying drawings, the present invention relates to a machine for compiling a plurality of paper sheets having, in combination, elongated conveyer means, a plurality of feeder means arranged spaced from each other along the elongated conveyor means for depositing paper sheets onto spaced portions of the conveyor means, moving means operatively connected to the conveyor means for moving the same at a given speed in longitudinal direction, a drive shaft operatively connected to the moving means to be driven thereby at a speed corresponding to the given speed, and a plurality of coupling means, one for each feeder means, for coupling the respective feeder means to the drive shaft, each of the coupling means having an output means connected to the respective feeder means and between the drive shaft and the output means speed changer means permitting to set the rotational speed of the output means to at least two different ratios relative to the speed of the drive shaft wherein one ratio is a multiple of the other ratio.

These and other features of my invention will be clearly understood from the following description of a preferred embodiment thereof given by way of example with reference to the accompanying drawings, in which:

FIG. 1 is a plan view of such a machine group on a small scale of illustration,

FIG. 2 is a side elevation and

FIG. 3 is a front elevation of a single feeder on a medium scale of illustration.

FIG. 4 is a cross sectional view and

FIG. 5 is a plan view in cross section of the gear change mechanism on a large scale of illustration.

With a saddle stapling machine of known construction a conveyer device **2** likewise of known construction is associated, along with a plurality of feeders **3** indicated by reference numerals **3***a* to **3***e*. The feeders **3** are each designed and constructed for taking at each working stroke a folded sheet of print from a pile **30**, and by the

aid of conveyer and auxiliary drums **31**, **32**, **33** with grippers to deposit it in a known manner in opened condition onto the conveyer device **2**. The conveyer device is driven from the saddle stapling machine **1**, which latter also drives a shaft **13**. Each of the feeders **3** is driven by a chain drive **300** connected to said shaft. Thereby it is attained that all the feeders co-operate with the conveyer device **2**, and the latter co-operates with the saddle stapling machine **1** in synchronism, all the printed sheets for one quire being deposited in the correct sequence on top of one another on the conveyer device, i.e., they are compiled there, and the stapling machine staples the sheets thus compiled in the sequence of their arrival and lays the same out fan-shape on the laying-out table **10**. The working speed of the machine may be varied stepwise or steplessly. It will obviously be chosen as high as possible in order to produce as many quires as possible.

A limit of the working speed is set for example by the capacity of the feeders to deposit the sheets from their pile **30** with safety upon the conveyer device. When the working speed becomes too high the feeders will deposit a certain number of sheets beyond the conveyer device, or will tear some sheets or deposit them in an irregular fashion. The maximum working speed attainable depends to a great extent on the sort of paper used. In practice it often occurs that most of the sheets of a quire can be compiled at a relatively high working speed, while one or two sheets of the quire have to be deposited at a reduced working speed. In this case one may either work the whole group of machines at the lower working speed or one may double the number of feeders, in order to attain the full rate of production, the feeders being operated at a comparatively low speed and depositing identical sheets in pairs, while the stapling machine **1** operates at full speed, i.e., it is coupled by gearing of different transmission ratios with the driving shaft **13** for the feeders and with the conveyer device **2**.

In the accompanying drawing a more economical solution of this problem is disclosed.

For each feeder **3** the drive shaft **13** has a double gear wheel **4** keyed on it, consisting of gears **41** and **42** which have different diameters and/or a different number of teeth.

On a pivot shaft **5** which is mounted in the pedestal of the associated feeder **3** parallel to and above the drive shaft **13**, a gear casing **50** is pivotally mounted. In this casing at one side of the drive shaft a double gear wheel **51** is mounted idly on a shaft **510** orientated parallel to the drive shaft **13**, which gear wheel, in the position A of the control lever **500**, meshes with the gear **41** and with a gear **61** of an output means being a gear **6** mounted idly on the drive shaft **13** together with a sprocket gear **60**, and which thereby couples this driving gear wheel at the ratio 1:1 or any other fixed transmission ratio with the drive shaft **13**.

On the other side of the shaft **13** in the gear casing a double gear wheel **52** is mounted idly on a likewise parallel shaft **520** said gear wheel having two gears **52***a* and **52***b* and meshing in the position B of the control lever **500** with the gear **42** and the gear **61** and thereby establishing a coupling of the output gear wheel **6** with the driving shaft **13** at half the transmission ratio. In the position O of the control lever **500** as illustrated in FIG. 4 none of the intermediate gears **51**, **52** is in mesh with the gear wheel **4** and with the output gear wheel **6**, so that the latter runs idly or is at a standstill. Accordingly, it is readily possible to disconnect a feeder **3** from the driving shaft **13** by appropriate adjustment of the control lever **500**, i.e., to disengage its driving chain **300** from the output gear wheel **6** of the associated change speed gearing independently of the other feeders or alternatively to drive it at full or half speed relative to the shaft **13**.

For example the feeders 3*a* and 3*b* may operate at half the rate of the other feeders of the group, but deposit identical sheets, e.g., the wrapper sheets of the quire, so that a quire having three inner sheets and one wrapper sheet may be produced at full working speed.

While I have herein described and illustrated in the accompanying drawings what may be considered a typical and particularly useful embodiment of my said invention, I wish it to be understood that I do not limit myself to the particular details and dimensions described and illustrated, for obvious modifications will occur to a person skilled in the art.

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

1. In a machine for compiling a plurality of paper sheets, in combination, elongated conveyor means; a plurality of feeder means arranged spaced from each other along said elongated conveyor means for depositing paper sheets onto spaced portions of said conveyor means; moving means operatively connected to said conveyor means for moving the same at a given speed in longitudinal direction; a drive shaft operatively connected to said moving means to be driven thereby at a speed corresponding to said given speed, and a plurality of coupling means, one for each feeder means, for coupling the respective feeder means to said drive shaft, each of said coupling means having an output means connected to the respective feeder means and between said drive shaft and said output means speed changer means permitting to set the rotational speed of said output means to at least two different ratios relative to the speed of said drive shaft wherein one ratio is a multiple of the other ratio.

2. In a machine as set forth in claim **1**, wherein said coupling means include a housing surrounding parts of said drive shaft; support means supporting said housing tiltably between two end positions about an axis substantially parallel to said drive shaft; drive gear means fixed to said drive shaft for rotation therewith and having a pair of axially displaced gear rims; wherein said output means is an output gear means idly mounted on said drive shaft and having a first gear rim arranged within said housing and a second gear rim arranged outside of said housing; first and second intermediate gear means turnably mounted in said housing about axes spaced from and parallel to said drive shaft and having each two gear rims, the gear rims of said first intermediate gear means meshing simultaneously with said first gear rim of said output gear means and with one of said gear rims of said drive gear means in one end position of said housing, the gear rims of said second intermediate gear means meshing simultaneously with said first gear rim of said output gear means and with the other of said gear rims of said drive gear means in the other end position of said housing, whereby the rotational speed of the output gear means may be changed by tilting said housing between said two end positions and the gears of the engaging gear means being constructed so that the speed of said output gear means in one end position is twice the speed of the output gear means in said other end position of said housing.

3. In a machine as claimed in claim **2** said housing being lockable in a middle position between said end positions in which said intermediate gear means are disengaged from said output and said drive gear means.

4. In a machine as claimed in claim **2** wherein said second gear rim of said output gear means is a sprocket wheel, said feeder means including another sprocket wheel and an endless link chain coupling said two sprocket wheels.

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