Feb. 3, 1959 A. BUTTNER 2,871,782

SHEET GUARD ARRANGEMENT FOR CYLINDER PRINTING PRESSES

Filed May 1, 1958 3 Sheets-Sheet 1

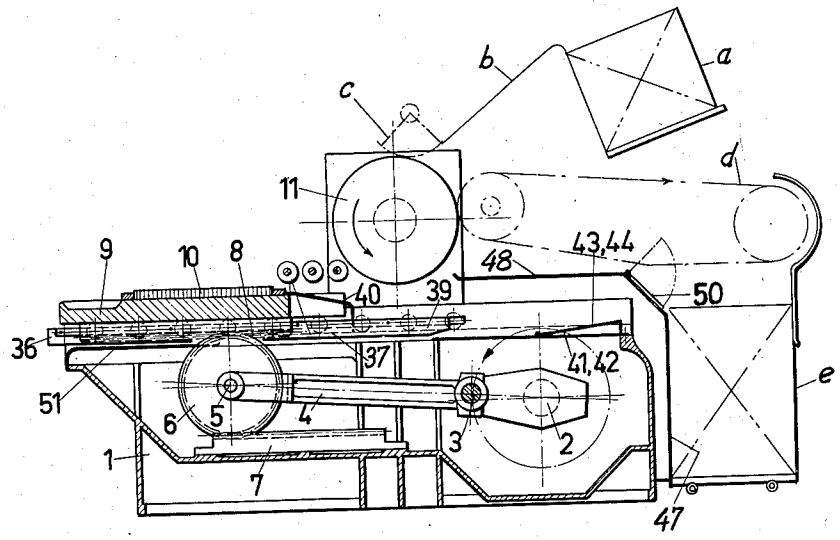
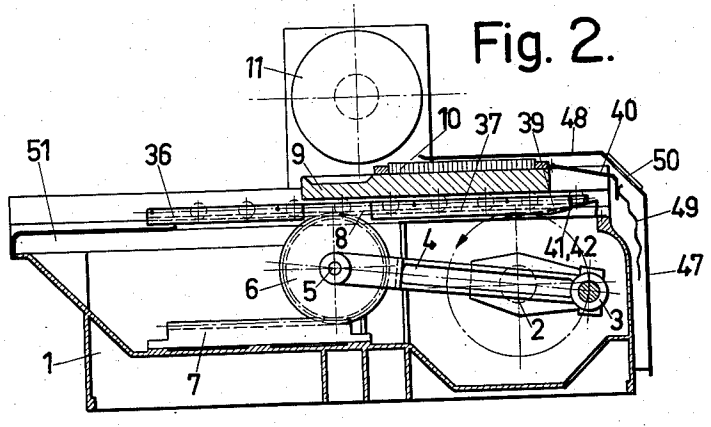


Fig. 1.

Fig. 2.



Feb. 3, 1959 A. BUTTNER 2,871,782

SHEET GUARD ARRANGEMENT FOR CYLINDER PRINTING PRESSES

Filed May 1, 1958 3 Sheets-Sheet 2

Fig. 3.

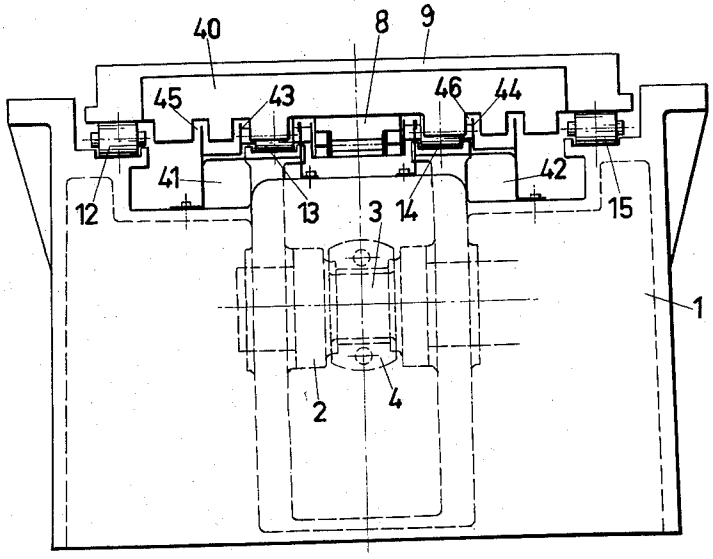
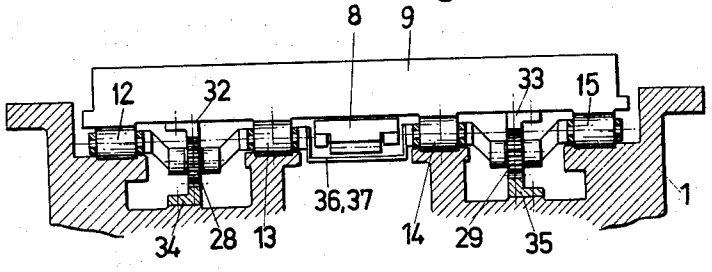


Fig. 4.

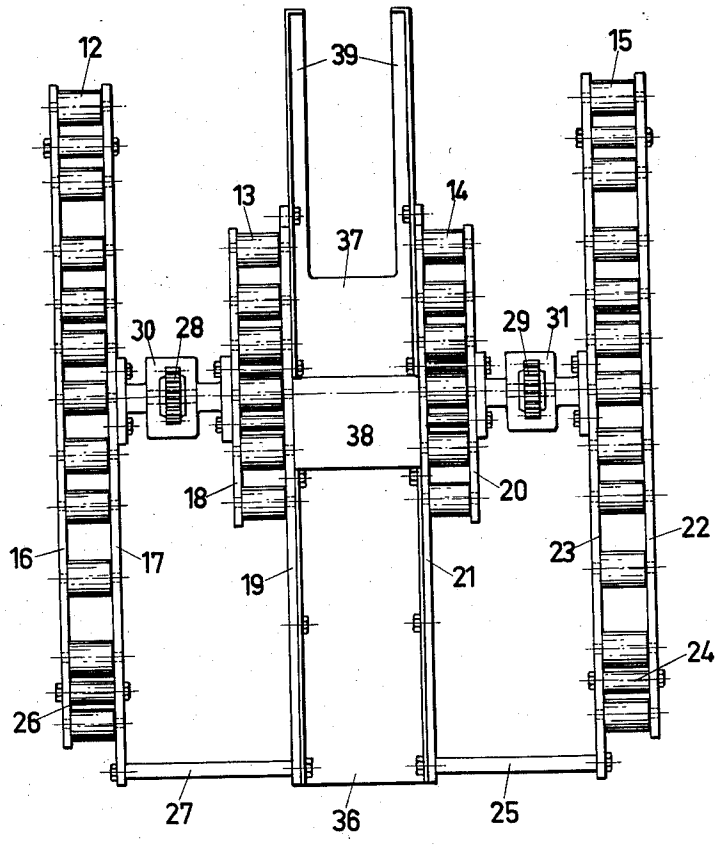


Feb. 3, 1959 A. BUTTNER 2,871,782

SHEET GUARD ARRANGEMENT FOR CYLINDER PRINTING PRESSES

Filed May 1, 1958 3 Sheets-Sheet 3

Fig.5.



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SHEET GUARD ARRANGEMENT FOR CYLINDER PRINTING PRESSES

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Application May 1, 1958, Serial No. 732,279

Claims priority, application Germany July 3, 1957

4 Claims. (Cl. 101—279)

This invention relates generally to printing presses and more particularly to sheet guards for cylinder printing presses.

In known constructions of cylinder printing presses wherein the type bed drive mechanism comprises a driving arrangement, for example, a rotatably and reciprocably driven main drive gear mounted in the base or frame of the printing press and exposed to the printing cylinder and to the top of the base throughout the path of travel operational difficulties are encountered in that sheets and other foreign particles fall into the drive mechanism, more particularly onto the path of the main drive gear resulting in interruptions in the operation of the printing press. The usual construction of these presses is such that the type bed is reciprocably driven by the drive mechanism and a displaceable carriage, on which the type bed is carried, are displaced simultaneously and in synchronism or timed relationship in effecting the printing stroke. The base is constructed so that the main drive gear can operably mesh with a rack on the type bed and accordingly the base has an open space at the top substantially the full length of the press and throughout the full length of the path of travel of the main drive gear. This type of cylinder printing press is usually provided with stationary sheet guards forming a protective arrangement for preventing the introduction of foreign particles or the falling of sheets into the path of the main gear, which can particularly happen when the sheet feed mechanism is interrupted. However, the known sheet guard arrangements are ineffective and it has been found necessary, in order to maintain the printing press running throughout a production run, that other provisions must be made in the presses for effectively protecting the drive mechanism from sheets that might fall into its from the sheet delivery mechanism.

It is a principal object of the invention to provide a simple and reliable sheet guard arrangement for preventing sheets, that might fall off the sheet delivery means of the press, from falling into the path of the main drive gear and into the path of the associated elements of the drive mechanism.

It is an object of the invention to provide a sheet guard arrangement that is effective to maintain the printing press operative throughout a production run and greatly reducing any idletime or downtime caused by the necessary stopping of the press to remove sheets or other foreign matter from the drive mechanism that might have fallen therein or is about to fall into it.

A feature of the protective sheet guard arrangement in accordance with the invention is that the printing press carriage is provided with sheet guards at opposite ends thereof and the base is provided with stationary vertically extending sheet guards which are disposed substantially on either side of the space, or opening on top of the base, corresponding to the path of travel of the main drive gear. These stationary sheet guards extend longitudinally of the base and cooperate with a sheet guard carried by the type bed in delivering a sheet to a receptacle or container disposed at a delivery end of the printing press. Stationary sheet guards disposed at the opposite ends of the base of the printing press and extending transversely across the space within the base frame, in which the reciprocable drive gear operates, are provided and cooperate with the reciprocably driven sheet guards to prevent the sheets from falling into the path of the main drive gear. The stationary and movable guards cooperate to constantly protect the type bed drive mechanism. Moreover, the traveling or reciprocable guards on the carriage and type bed move in synchronism or timed relationship to constantly maintain the area of the opening in the base on either side of the impression cylinder covered so that sheets cannot fall into the drive mechanism.

Other objects, features and advantages of the invention will be understood from the following description and claims in conjunction with the accompanying drawings which illustrate by way of example a preferred embodiment of the sheet guard arrangement and in which:

Fig. 1 is an elevation or side sectional view of a cylinder printing press provided with the sheet guard protective arrangement according to the invention and shows the type bed in its front terminal position.

Fig. 2 is a view similar to the view in Fig. 1 with the type bed in the opposite terminal position corresponding to the delivery end of the printing press with the type bed having completed the printing stroke.

Fig. 3 is a cross-sectional view of the printing press base and sheet guard arrangement of Figs. 1 and 2 without showing the printing cylinder.

Fig. 4 is a cross-sectional view of the four-track carriage for transporting the type bed.

Fig. 5 is a plan view on an enlarged scale of the four-track roller carriage showing the arrangement of the sheet guards carried by it according to the invention.

In accordance with the drawings the printing press comprises a base or frame **1** on which is rotatably mounted a crank shaft **2** provided with a pin **3** by which a connecting rod **4** is connected to the crank shaft. The connecting rod **4** is provided with a pin **5** at one end thereof on which a main drive gear **6** is rotatably mounted. The crank shaft is rotated in a counterclockwise direction as shown by the arrow, thereby reciprocably driving the gear **6** between the two terminal positions shown in Figs. 1 and 2. The gear **6** meshes with a stationary rack **7** fixed to the base or frame **1** of the printing press and extends upwardly above the level of the base through an opening (Figs. 1, 2 and 3) extending longitudinally of the base and meshes with a second rack **8** fixed to a reciprocable type bed **9** which carries the type or form **10**.

An impression cylinder **11** is mounted in position above the press base **1** and is rotatably driven by means, not shown, to cooperate with the type or form **10** during a printing stroke in known manner. It will be understood that the press is provided, in known manner, with sheet delivering means positioned for delivering successively individual sheets to the impression cylinder. A sheet feed pile *a* is disposed, as for example, in position adjacent a feed table *b*, in known manner, and swinging grippers *c* deliver individual sheets from the feed table to the impression cylinder. It being understood that suction grippers (not shown) or other means remove individual sheets from the top of the feed pile *a* and feed them to the table *b* successively as well known in the art. The press is provided with continuous sheet delivery equipment *d* for delivering printed stock to a delivery pile *e* on a carriage as shown.

The type bed **9** is reciprocably transported by a roller carriage comprising tracks **12**, **13**, **14** and **15**, the rollers of which are held in spaced relationship by side members or rails **16**, **17**, **18**, **19**, **20**, **21**, **22** and **23**, in the manner

shown in Fig. 5. The inner tracks 13, 14 are shorter than the outer tracks 12, 15 and are mounted to travel substantially on either side of the center longitudinal opening in the frame as shown in Fig. 3. The outer rails 12 and 15 are provided with transverse members 24 and 26 for holding the side rails or members in spaced relationship and are in turn held in spaced relationship with the inner rails 13, 14 by transverse members 25, 27. The carriage is reciprocably driven indirectly by the type bed and is accordingly provided with gears 28, 29 mounted in transverse members 30, 31 respectively and disposed meshing with racks 32, 33 fixed on the type bed 9. The gears 28, 29 and the carriage are so constructed that the roller carriage is reciprocably driven with the type bed and travels only half the distance of the travel of the type bed and accordingly the type bed moves twice as fast as the carriage so that opposite ends of the carriage constantly extend outwardly from the opposite ends of the type bed during the synchronous travel thereof. The overall length of the carriage is such that when the type bed is in either of its terminal positions, as shown in Figs. 1 and 2, an inner end of the carriage extends outwardly longitudinally of the type bed corresponding end.

In order to prevent the sheets that may fall from the sheet delivering means, as for example, when the operation thereof is interrupted, from falling into the opening which is provided at the top of the base 1 to allow engagement of the gear 6 with the rack 8 on bed 9, the invention comprises a sheet guard arrangement for preventing sheets and foreign matter from falling into the drive mechanism through said longitudinally extending opening. Accordingly the carriage is provided with plates 36, 37 extending transversely between the rails 19, 21. The plate or sheet guard 36 extends longitudinally out to the very end of the carriage and sheet guard or plate 37 is of a shorter dimension and is spaced from plate 36 defining an opening 38 between them through which gear 6 may engage the rack 8. Extending longitudinally from plate 37 are provided two projections or extensions 39 which define the opposite end of the carriage and cooperate with other sheet guard means as later herein disclosed.

The press base 1 is provided with stationary sheet guard means comprising channel-like members 43, 44 disposed on opposite sides of the opening in the base in which the gear 6 travels and extending longitudinally of the base, as shown in Figs. 1, 2 and 3, substantially the entire length of the base. A movable sheet guard plate or means 40 is fixed at one end of the type bed 9 extending outwardly therefrom and having a portion extending downwardly so as to cooperate with members 43, 44. The sheet guard 40 is provided with notches 45, 46 so that the stationary sheet guards 43, 44 extend upwardly into the notches as shown in Fig. 3. The sheet guard 40 is mounted on the end of the type bed that passes under impression cylinder 11 first when the type bed is effecting a printing stroke. The extensions 39, are raised or extend vertically higher than the sheet guard member 43, 44 so that in the event a sheet falls onto the stationary sheet guards the extensions 39 will first engage the sheet and move it along and deflect it outwardly to one side so that sheet guard 40 will then engage the sheet and cooperate with the members 43, 44 and deliver it to a delivery end of the printing press into a receptacle hereinafter described.

The base 1 is provided with a stationary guard 51, extending from the end opposite to the delivery end of the press in a direction toward the center of the base and extending transversely of the base covering the central opening in which the gear 6 travels. The sheet guard 51 is so disposed as to allow the carriage and type bed to override it (Figs. 1, 2).

A pair of sheet guards 41, 42 are disposed at the delivery end of the printing press and are displaceable laterally extending in a direction toward the center of the press a limited extent and covering the longitudinal opening in the base in the area immediately above the crankshaft (Figs. 1 and 2).

The delivery end of the printing press, corresponding to the end of the press at which the type bed is disposed when it completes a printing stroke, is provided with a sheet guard 47 extending transversely of the base 1 and upwardly to a level higher than the base 1 at the end of which is mounted a sheet guard 48 extending in a direction toward the impression cylinder 11 and overlying the opening in the base 1 and sufficiently removed from the top of the base to allow the type bed to pass beneath it. The guards 47, 48 jointly form a receptacle or container into which sheets 49 are delivered by the sheet guard 40 when they fall onto the press base (Fig. 2). The receptacle is provided with a pivotally mounted door 50 by which any papers or sheets delivered into the receptacle can be readily removed.

It can be seen that the sheet guard protective arrangement has a plurality of sheet guards that are so arranged that the longitudinal opening in the base 1 is substantially continuously covered throughout the operational cycle of the printing press. When the type bed 9 is at its terminal position after completing a printing stroke (Fig. 2), the sheet guards 51, 36, and 48 in conjunction with the type bed 9 completely overlie the center opening in the base 1 and completely cover it. When the type bed 9 is in the opposite terminal position (Fig. 1), in position to begin a printing stroke, sheet guards 40, 37, 43, 44 and 48 substantially protect the drive mechanism of the press. It will be understood that as the type bed 9 begins its printing stroke, the carriage carrying extensions 39 moves ahead of the type bed so that extensions 39 and sheet guard 37 operate to protect the drive mechanism and the guard 37 is moved into position under guard 48 ahead of the guard 40 since the type bed catches up with the carriage substantially at the end of the printing stroke. On the reverse stroke of the type bed the roller carriage again has a leading end constantly ahead of the type bed leading end and the type bed leading end catches up at the end of the stroke. Accordingly, there is substantially no interval of time in the operational cycle of the printing press during which the drive mechanism is exposed to sheets that may fall from the sheet delivering mechanism or to the entry of other foreign matter. The drive mechanism and more particularly the main drive gear 6 and rack 7 are in this manner protected from the entry of foreign materials that would have to be removed and result in downtime of the press reducing its production output. It will be understood that the various guards may be constructed of sheets of light guage metal or any suitable material.

While a preferred embodiment of the invention has been illustrated and described, it will be understood that the invention is in no way limited to this embodiment and that many changes may be made within the spirit and scope of this invention and as defined by the following claims.

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

1. In a cylinder printing press having an impression cylinder, a base, a reciprocable type bed, a drive mechanism comprising a rotatable, reciprocably driven main drive gear for reciprocably driving the type bed between two opposite operative terminal positions, the press base having a longitudinally extending opening in which the main drive gear is disposed at a level lower than the impression cylinder and exposed to the cylinder and to the top of the press base through said opening substantially throughout its path of travel, a displaceable carriage on the base for supporting the type bed, and means for reciprocably driving the carriage in timed relationship with the type bed to cause opposite ends of the carriage to extend beyond corresponding opposite ends of the type bed when it is at said operative positions of travel and to constantly maintain a leading end of the carriage ahead of a corresponding leading end of the type bed during

reciprocable travel of the type bed in both directions, a sheet guard and protective arrangement for preventing sheets and foreign matter from falling into the drive mechanism through said opening comprising, in combination, first sheet guard means on said carriage defining a space disposed centrally between said opposite ends of the carriage and through which the main drive gear operably drives the type bed, said first sheet guard means comprising spaced plates disposed extending transversely of the carriage an extent sufficient to extend substantially across said base opening and extending in opposite directions toward said opposite ends of the carriage, stationary second sheet guard means extending vertically and longitudinally on the top of the press base substantially parallel to the path of travel of the main drive gear and on opposite sides of said opening in the base, third sheet guard means comprising a sheet guard carried by the type bed extending outwardly from an end of the type bed corresponding to the end of the type bed which passes under the printing cylinder at the start of the printing operation during the printing stroke as the type bed is reciprocated between said two operative terminal positions, said last mentioned sheet guard comprising a portion disposed outwardly from the end of the type bed and extending downwardly to cooperate with the second guard means to deliver sheets that fall onto the second guard means to a delivery end of the press corresponding with the end of the press base toward which the type bed moves when effecting a printing stroke.

2. In a cylinder printing press according to claim 1, including fourth sheet guard means comprising plate sheet guards on top of the base at opposite ends thereof and extending toward one another a limited extent and each extending transversely of the opening in the base in which the main drive gear travels, the last mentioned

sheet guards being disposed to allow the carriage and type bed to override them when the type bed is at said terminal positions.

3. In a cylinder printing press according to claim 1, in which the plates on the reciprocable carriage forming the first guard means extend toward the opposite ends thereof each a different extent, one of the plates extending substantially to one of said oposite ends of the carriage and another plate spaced from the first mentioned plate and extending toward its corresponding end of the carriage a limited extent, two laterally spaced projections extending axially from said other plate and defining the end of the carriage corresponding to end of the type bed which supports said third sheet guard means, said projections being disposed inwardly on said second sheet guard means and extending vertically higher than the level of said second guard means, whereby when the carriage is reciprocably driven said projections engage a sheet fallen on said second sheet guard means and deliver it outwardly away from the path of travel of the drive gear so that the third sheet guard means can engage it and deliver it to said delivery end of the press.

4. In a cylinder printing press according to claim 1, including means defining a receptacle disposed at said delivery end of the press for receiving sheets delivered by said third sheet guard means to said delivery end, and said last mentioned means comprising a sheet guard disposed extending transversely of the base, overlying the base and vertically spaced therefrom a sufficient distance to allow the type bed to move reciprocably beneath it and extending in a direction toward the end of the base opposite to said delivery end so that its end is disposed adjacent the periphery of the impression cylinder.

No references cited.