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STRIPPER MECHANISM

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Fig. 1

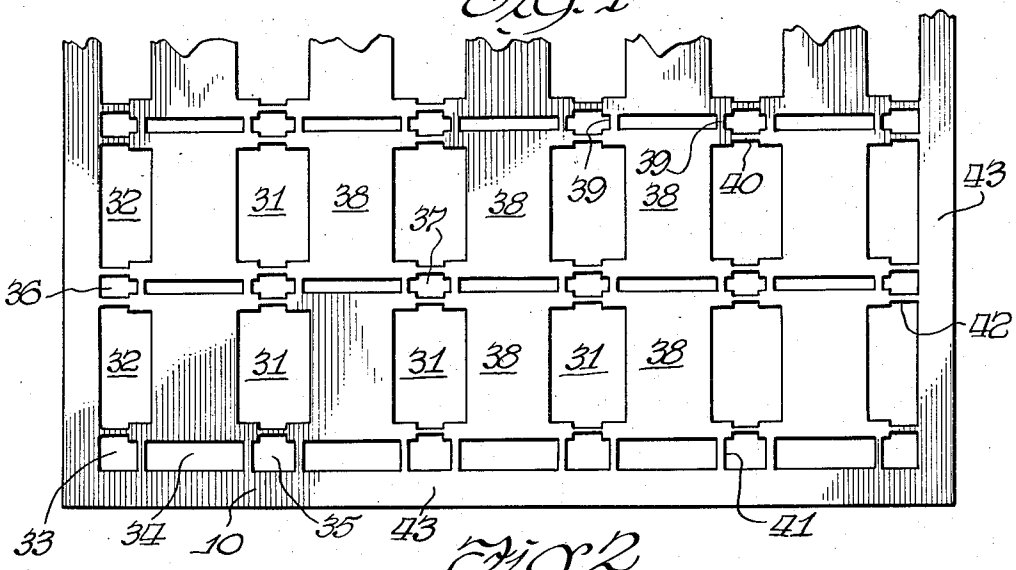


Fig. 2

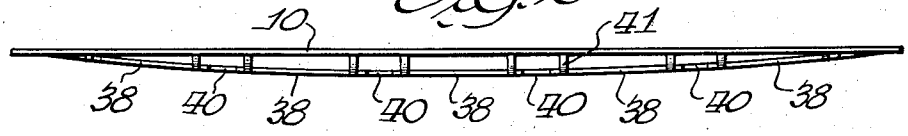
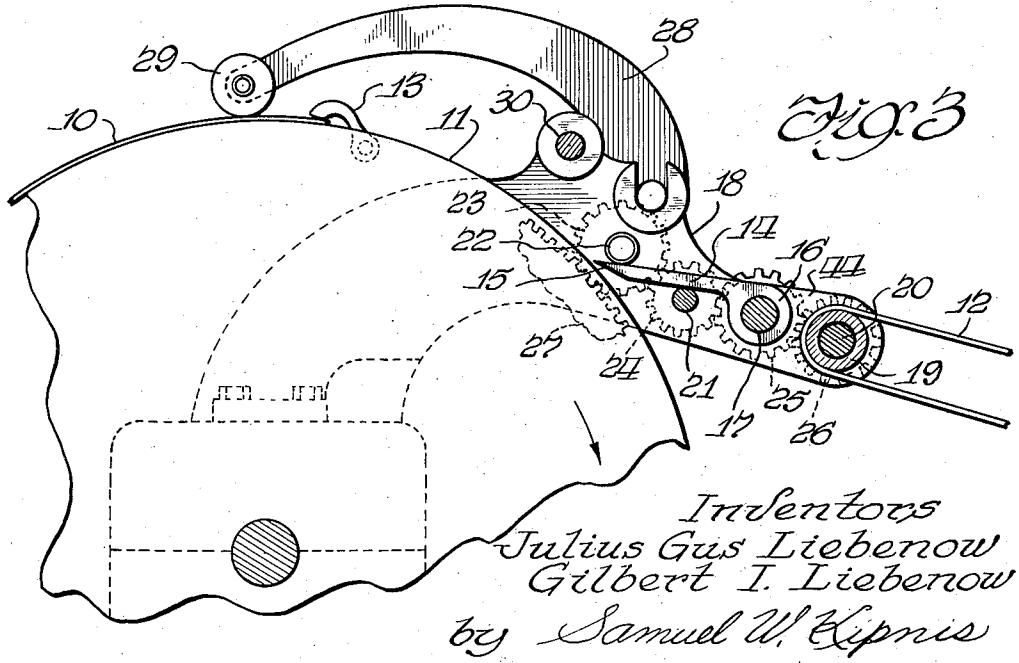


Fig. 3



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STRIPPER MECHANISM

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1 Claim. (Cl. 271—63)

This invention relates to a stripper mechanism for a printing press that has been converted to a die-cutting apparatus.

For purposes of illustration the features of the present invention have been shown and applied to a well known Miehle type printing press.

Difficulties in the use of converted printing presses were heretofore encountered at the point where the die-cut cardboard material is transferred from the cylinder to delivering tapes with the aid of lifting or stripping fingers. The chief difficulty was that portions of the die-cut sheets were intercepted below the stripping or lifting fingers instead of moving over said fingers as intended. The reason for this is that typical die-cutting operations convert a solid sheet of cardboard into a series of small sections interconnected in the manner of a chain. Ordinary sheet material passing through an unconverted printing press, consists of coherent sheets, all portions of which move over the conventional stripping fingers in a substantially identical manner. It is not so in the case of die-cut material, large portions of which tend to form a catenary, which causes difficulty mainly at the point of maximum rise of the catenary curve from the ideal, flat position of the sheet.

Attempts have been made to cure the difficulty by interconnecting the different portions of the die-cut sheet by large numbers of so-called notches or small connecting members integral with the sheet material. However, this method of solving the difficulty is rather unsatisfactory as to efficiency and economy in the operation of the die-cutting knives utilized in the press and in the die-cutting of the sheet, as it mutilates the die, produces an inferior finished product with scarred edges, increases cutting load on the machine, necessitates additional hand labor to separate finished subjects from the die-cut sheet, and severely limits use of automatic air-hammer equipment developed for the finishing operation.

The present invention avoids the necessity of using a large number of notches in the die-cut sheets, thereby adding to the efficiency and economy of the entire machine and also facilitating the subsequent operation of separating the die-cut elements from the original sheet.

This has been achieved by arrangement of the lifting or stripping fingers relative to the machine elements cooperating therewith. In the unconverted printing press the sheet material, in process of being stripped from the cylinder, moves downwardly therefrom onto the conveyor tapes or belts which carry the material away from the cylinder. According to the invention, in the printing press converted to die-cutting the sheet material is allowed partly to move downward and partly, so far as necessary, to move a slight distance outward to the level of the conveyor tapes or belts. This is achieved by a rearrangement of operative parts without extensive or expensive changes of any major machine elements. The details will appear clearly from the description which follows.

In the drawing:

Figure 1 is a plan view of a die-cut sheet which can be stripped from a cylinder according to the present invention.

Figure 2 is a front view of the sheet of Figure 1.

Figure 3 is a sectional elevation of the present stripper mechanism, also showing parts directly connected or associated therewith.

The die-cut sheet **10** is transferred from the so-called impression cylinder **11** to the conveyor tapes or belts **12**, upon the release of the sheets by the well-known grippers **13**. The transfer of the sheets from the cylinder to the tapes is effected by stripper fingers **14** (only one shown) each of which has its front tip **15** slightly spaced from the surface of the cylinder **11**. Each finger also has a hub section **16** at the opposite or back end of the finger and adjacent to the front end of the tapes. A plurality of stripper fingers **14** is usually provided, in a basically known manner, all of these fingers being carried on a stripper finger shaft **17** which is stationary and which is sectionally engaged by the fingers, subject however to the possibility of slightly adjusting the angular position of the fingers and distance of tips **15** from the cylinder **11**.

The shaft **17** has its ends mounted in a pair of bracket members **18**, one at each end of the cylinder, and these bracket members also provide support and bearing means or pulleys **19** for the tapes or belts **12**, on a shaft **20**; the finger support shaft **17** being desirably interposed between the belt roller shaft **20** and the cylinder **11**. In addition, the brackets **18**—also known as tape frame brackets—support shaft and/or stub shaft means **21**, **22** for a set of small gears **24** and **25**, the first of which is activated by a gear **23** meshed with a large gear **27** rotating with the cylinder **11** while the gear **25** meshes with a gear **26** on shaft **20** to rotate the pulleys **19** for the tapes **12**; the intermediate gears being adapted to idle on their respective shafts or sub-shafts. In the simple embodiment shown, the members **19** serve both bearing and pulley, rotating with the shaft **20** and having the gear **26** fast thereon. This gear train assembly of course is subject to various modifications which are obvious to persons skilled in the art. The tape frame brackets **18** may also provide a new manner for the installation of so-called rider wheel bracket **28** with rider wheels **29** thereon, while suitable bolt members **30** may be installed between the two brackets in order to strengthen and stabilize the entire stripper mechanism.

In the operation of the present mechanism a cardboard sheet **10** is first secured to the cylinder **11** by the grippers **13** and rotated with the cylinder; the grippers **13** moving between the spaced apart fingers **14** and the sheet **10** moving between the finger tips **15** and the boundary of the cylinder. At a suitable point, not shown, a well-known cutting or punching mechanism performs the die-cutting operation, removing various portions **31**, **32**, **33**, **34**, **35**, **36**, **37**, etc. from the sheet, while leaving the remaining die-cut member **38** interconnected by longitudinal notches **39** as well as transverse notches **40**; additional notches **41**, **42** being used to connect the section with the outer margin **43** of the die-cut sheet, so that they can still be handled as a unit until they are ready to be separated from one another by manually or automatically paring off the various notches **40**, **41**, **42** and **43**. The length as well as the other dimensions of the different notches has been exaggerated to some extent, in the drawing, as compared with the dimensions used in most practical operations. Likewise the dimensions of cut-out spaces **32**, **34**, etc. has been exaggerated. It will be understod that practically endless modifications are possible in these respects. In all cases, however, there is at least some tendency for the various sections **38** to form a catenary, as is most clearly shown in Figure 2.

When the die-cutting has been completed, the cylin-

der **11** brings the die-cut sheets into the approximate position shown in Figure 3, where the grippers **13** release said sheets at the front end thereof, whereas the rider wheels **29** continue to insure contact of the sheet with the cylinder at the top of the latter. As the cylinder continues to rotate, the front edge or margin **43** of the sheet **10** moves forward, substantially in the flat position shown in Figure 2. Shortly thereafter successive rows of die-cut sections **38** move forward and these, as mentioned, tend to sink into the catenary position, also shown in Figure 2. Their precise position is dependent mainly upon the shapes of the die-cut aside from strength of the sheet material and other operating factors. In spite of the catenary formation of inner portions of the die-cut sheet, the fingers **14**, uniformly installed on their shaft **17**, effectively guide all portions of the sheet **10** onto the tapes **12** because the stripper finger tips **15** are positioned slightly below the plane of the upper receiving run of the tapes **12**, as clearly visible in Figure 3; said upper run in turn being disposed in a plane adjacent to but below a tangent on the upper part of the cylinder **11**. Heretofore stripper fingers were used which were more tangent on the cylinders and the plane of the delivering tapes was higher, which arrangement, as mentioned, led to difficulties when used with die-cut material. In the present machine both tapes **12** and fingers **14** extend slightly below plane tangent on the cylinder, and the fingers extend at least somewhat farther below the tangent plane than the tapes do. By means of this arrangement the difficulty has been fully avoided.

It should be obvious that, in the present arrangement, practically the entire tapes and frame brackets are used in almost the same form that they previously had. It has been necessary to provide the present sequence of the parts **11**, **14**, **19**, as compared with the previously used sequence in a printing press wherein the cylinder **11** is followed first by tape wheel pulleys and thereafter by a stripper finger support shaft; the fingers being installed in steeper positions than in accordance herewith. No difficulty results from the existence of slight gaps **44** between the present stripper finger hubs **16** and tape pulleys **19**. In this connection, again, the operation according to the present invention is aided by the feature that at least portions of the die-cut sheets move upwards relative to the plane of the operating run of the tapes **12**.

We claim:

Apparatus for lifting and delivering die-cut sheets from a press cylinder, comprising a set of tapes; pulley means for each tape; a pair of tape frame brackets for connecting the pulley means with the cylinder so that an upper run of each tape extends in a plane adjacent to and slightly below a line tangent to the top of the cylinder, said plane sloping downwards from the cylinder; and a set of lifting fingers secured to the tape frame brackets between the pulley means and the cylinder one in longitudinal alignment with each tape, each lifting finger having a substantially flat top surface extending from adjacent the cylinder to adjacent the pulley means in a plane slightly below and relatively rising to the plane of the upper run of the delivery tapes, whereby die-cut sheets can be lifted and smoothly transferred from the cylinder to the tapes in spite of a tendency of inner portions thereof to sag into a catenary curve.

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