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54 **Apparatus for straightening and conveying articles of flat work.**

57 Apparatus for spreading and feeding articles of flatwork such as sheets to an ironing machine and comprising a conveyor over which a beam with two movable clamps is arranged. The clamps are adapted to grip the article at two corners and to move apart to draw the upper edge of the article tight. The beam is stationary in order to simplify construction. Between the beam and the conveyor is a movable plate, onto which the upper edge of the article is transferred and from which plate the article is transferred to the conveyor by a movement of the plate in the moving direction of the conveyor.

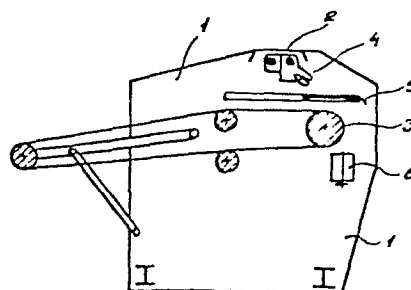


Fig. 2

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see front page

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Apparatus for spreading and feeding of articles of flatwork.

The present invention relates to an apparatus for spreading and feeding of articles of flatwork comprising a conveyor, at the upstream end of which a beam with a pair of clamps is supported, the clamps
5 being suited to hold a corner of an article each and to move apart until the edge of the article is tight and thereafter release the article onto the conveyor.

In a known apparatus of this type the beam is adapted to be reciprocated in such a way that the ar-
10 ticle during its insertion with the corners in the clamps is freely suspended in front of the conveyor, but when released is placed over the upstream end of the conveyor. The clamps thereby perform a complex combined movement, being at first moved apart and thereafter moved
15 in synchronization with the conveyor, over which the releasing takes place at the end of the latter movement. For this combined movement a certain amount of time is consumed in which the operator is not able to insert another article. Besides, the complicated construction of
20 the reciprocable beam and the considerable movable masses in it, it is a drawback for the operator to see the beam reciprocate just in front of him or her.

It is an object of the present invention to provide an apparatus, in which the abovementioned drawbacks
25 have been reduced. According to the invention the apparatus is characterized in that above the upstream end of the

conveyor and below the beam a plate is arranged, said plate being reciprocable from a first position in which the upstream end of the conveyor is covered and a second position in which the interspace between the beam and
5 the conveyor is free.

During the insertion of the article in the clamps the plate is in its first position and stays in this position during the moving apart of the clamps. When the upper edge of the article is tight and the article is
10 suspended over the edge of the plate, it is moved quickly to the second position simultaneously with the releasing of the clamps. The article will then drop partly on the conveyor and partly on the plate, the latter of which will, however, during its movement transfer and smoothe
15 the leading edge of the article upon its delivery to the conveyor. The movement of the plate takes place with a speed, which according to the invention is substantially greater than the speed of the conveyor. Thereafter, the clamps are moved together and the plate returns to its
20 first position, and the apparatus is ready for a new cycle.

As the beam is preferably stationary during this cycle, the apparatus will be more comfortable for the operator.

25 In apparatuses of this type a pair of belts are usually provided in front of the conveyor, the outward facing parts running from the center of the apparatus to the sides. According to the invention it is preferred that the plate has a third position behind the first one
30 and into which the plate is moved during the moving apart of the clamps, and in which third position the conveyor is covered, whereas the oppositely moving belts are free.

As soon as the article has been released from the clamps it will start its movement on the conveyor
35 under the beam. This may involve the risk of the corners of the article inserted in the clamps being folded backwards.

According to a further aspect of the invention this drawback has been eliminated in an embodiment, in which a roller is placed in front of the upstream edge of the conveyor and provided with driving means, said
5 means being arranged to rotate the roller during the releasing of the clamps in a direction opposite the conveyor over a predetermined angle and thereafter to rotate the roller synchronously with the conveyor.

At the release of the clamps the roller in front
10 of the conveyor will prevent the weight of the article hanging freely in front of the apparatus from slipping out of the apparatus, and by the opposite rotation it will pull the article out of the clamps without folds. As soon as the article is free of the clamps and the
15 plate has been removed totally from the interspace between the conveyor and the bridge the roller is driven with a speed, which is substantially synchronous with the conveyor, whereby the article will be transported without folds by the conveyor.

20 The invention will be described further in the following specification with reference to the drawing, in which:

Fig. 1 shows perspectively an embodiment of the apparatus according to the invention,

25 Fig. 2 shows a section through the apparatus according to Fig. 1 with the plate in first position,

Fig. 3 shows a section like in Fig. 2, but with the plate in third position,

Fig. 4 shows a section like in Fig. 2, but with
30 the plate in second position,

Fig. 5 schematically shows an embodiment of the spreading mechanism in the beam seen from above, and

Fig. 6 shows an embodiment of the apparatus according to the invention with a roller in front of the
35 conveyor.

The apparatus according to the invention comprises as shown in Fig. 1 a frame with side plates 1 connected at their upper edges by means of a beam 2. Between the side plates a conveyor 3 is mounted, on which con-

veyor articles of flatwork is spread and fed into a subsequent treatment, for example in an ironing machine or folding apparatus. On the beam a pair of slidable clamps 4,4' are mounted, each adapted to receive a corner of the article to be spread out and transferred to the conveyor 3. The two clamps are arranged to move apart along the beam 2 after the insertion of the article until the edge of the article is drawn tightly and thereafter to release the article. In order to prevent the article before being spread from being pulled up by the conveyor a slidable plate 5 is arranged, which during the insertion of the article may serve as a working surface and onto which the article after being spread out is transferred. As soon as the transfer to the plate has taken place, the plate 5 is adapted to perform a quick movement in the direction of the conveyor, by which movement the space under the beam is made free, whereby the article falls down onto the conveyor. Immediately after the plate may be returned to the first position over the article, which is transported on the conveyor 3 under the plate. As soon as the clamps 4,4' have returned to the position close to each other, the operator may insert another article in the clamps, even if the trailing edge of the first article has not passed under the plate.

25 In order to make sure that quick and complete spreading takes place, it is preferred that under the upstream edge of the conveyor a pair of oppositely driven belts 6,7 is arranged, the portions facing outwards running from the center to the sides.

30 The operation of the apparatus will be explained by means of the Figs. 2 - 4 showing a longitudinal section through the apparatus. In Fig. 2 the apparatus is ready for the insertion of the corners of the article of flatwork in the pair of clamps 4. The plate 5 is in its first position, in which its front edge is in front of the conveyor 3 and the pair of belts 6,7. As soon as both claims are closed and the trailing edge of a possible preceeding article has passed under the plate, the apparatus starts the spreading procedure. The plate 5 is moved a short distance in the direction of the conveyor as shown in Fig. 3, in which an article is

inserted in the clamps, in order to free the belts, which are uncovered by the front edge of the plate. Simultaneously, the pair of clamps 4 are moved apart until the edge of the article is drawn tightly.

5 Sensing means, for example a photo cell, detects when the upper edge of the article is drawn tightly and releases the clamps 4, dropping the article T on the plate 5, which thereafter performs a quick movement backwards over the conveyor 3, thereby transferring the article to
10 the conveyor as shown in Fig. 4. The plate immediately thereafter returns to the first position - the starting position - the clamps being simultaneously moved together at the center.

 In Fig. 5 a driving arrangement for the pair of
15 clamps 4 is shown. It may be preferred that the path of the clamps forms an angle allowing the clamps to be situated further up the conveyor when moved apart than in the position, wherein the insertion takes place.

 The clamps in the pair of clamps 4 are fastened
20 to different portions of a cable loop 8, which is guided by a number of freerunning pulleys 9 in such a way that the clamps move symmetrically in respect of each other. The cable is further passing over a number of freely running pulleys arranged on a slide 10 in such a way that
25 a conversion ratio is obtained between the movement of the slide and the pair of clamps. The slide may be driven by means of for example a pneumatic cylinder 11.

 In Fig. 6 a longitudinal section through a modified apparatus according to the invention is shown. The
30 construction corresponds to the apparatus described above, apart from a roller 12 arranged in front of the upstream edge of the conveyor. The other parts correspond to the elements in the above apparatus and consequently have the same reference numbers.

35 The roller 12 is arranged to be driven substantially synchronously with the conveyor, which may be arranged by a common chain driving the roller via a friction clutch.

The roller is furthermore arranged to be stopped and to be driven through a predetermined angle in the opposite direction. The driving means for this opposite drive may be a brake, the moment arm of which is provided with
5 driving means for the opposite drive, for example by connecting the moment arm 13 with the frame by means of a pneumatic cylinder 14.

The operation of the apparatus according to the invention is that the roller 12 is stopped after the clamps
10 4 have moved apart. The plate 5 is moved a short distance in the direction of the conveyor, whereby the roller is uncovered, said roller is rotated oppositely through an angle corresponding to a linear movement of 2 - 10 cm. The clamps are simultaneously released, the article T
15 dropping onto the plate 5 when the plate is reaching the position in which the interspace between the beam and the conveyor is free, the synchronuous drive of the roller 12 is started, the article being conveyed through the apparatus. The plate is then returned to its starting
20 position, while the trailing edge of the article is transported under the plate 5 as described above in connection with the Figs. 1 - 4.

C l a i m s

1. Apparatus for spreading and feeding of articles of flatwork, said apparatus comprising a conveyor, at the upstream end of which a beam with a pair of clamps
5 is supported, the clamps being suited to hold a corner of an article each and to move apart until the edge of the material is tight and thereafter release the article onto the conveyor, c h a r a c t e r i z e d in that above the upstream end of the conveyor and below the beam
10 a plate is arranged, said plate being reciprocable from a first position in which the upstream end of the conveyor is covered and a second position in which the interspace between the beam and the conveyor is free.
2. Apparatus according to claim 1, c h a r a c t e r -
15 i z e d in that the beam is stationary.
3. Apparatus according to claim 1, c h a r a c t e r -
i z e d in that the speed of the movement of the plate between first and second position is substantially greater than the speed of the conveyor.
- 20 4. Apparatus according to claim 2, and in which a pair of oppositely driven belts is arranged in front of the conveyor, c h a r a c t e r i z e d in that the plate is movable to a third position from the first position, in which third position the conveyor is covered, whereas
25 the belts are uncovered.
5. Apparatus according to claim 2, c h a r a c t e r -
i z e d in that a roller is placed in front of the upstream edge of the conveyor and provided with driving means, said means being arranged to rotate the roller during the
30 releasing of the clamps in a direction opposite the conveyor over a predetermined angle and thereafter to rotate the roller synchronously with the conveyor.
6. Apparatus according to claim 5, c h a r a c t e r -
i z e d in that the driving means is a brake, the momentum
35 arm of which is connected with a pneumatic cylinder for driving the roller in the direction opposite of the con-

veyor, and a friction clutch for driving the roller
synchronously with the conveyor.

Fig. 1

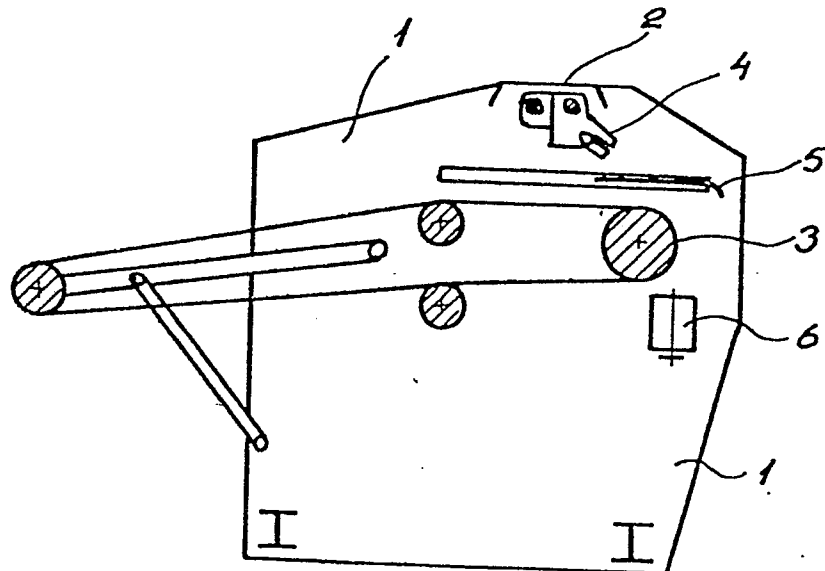
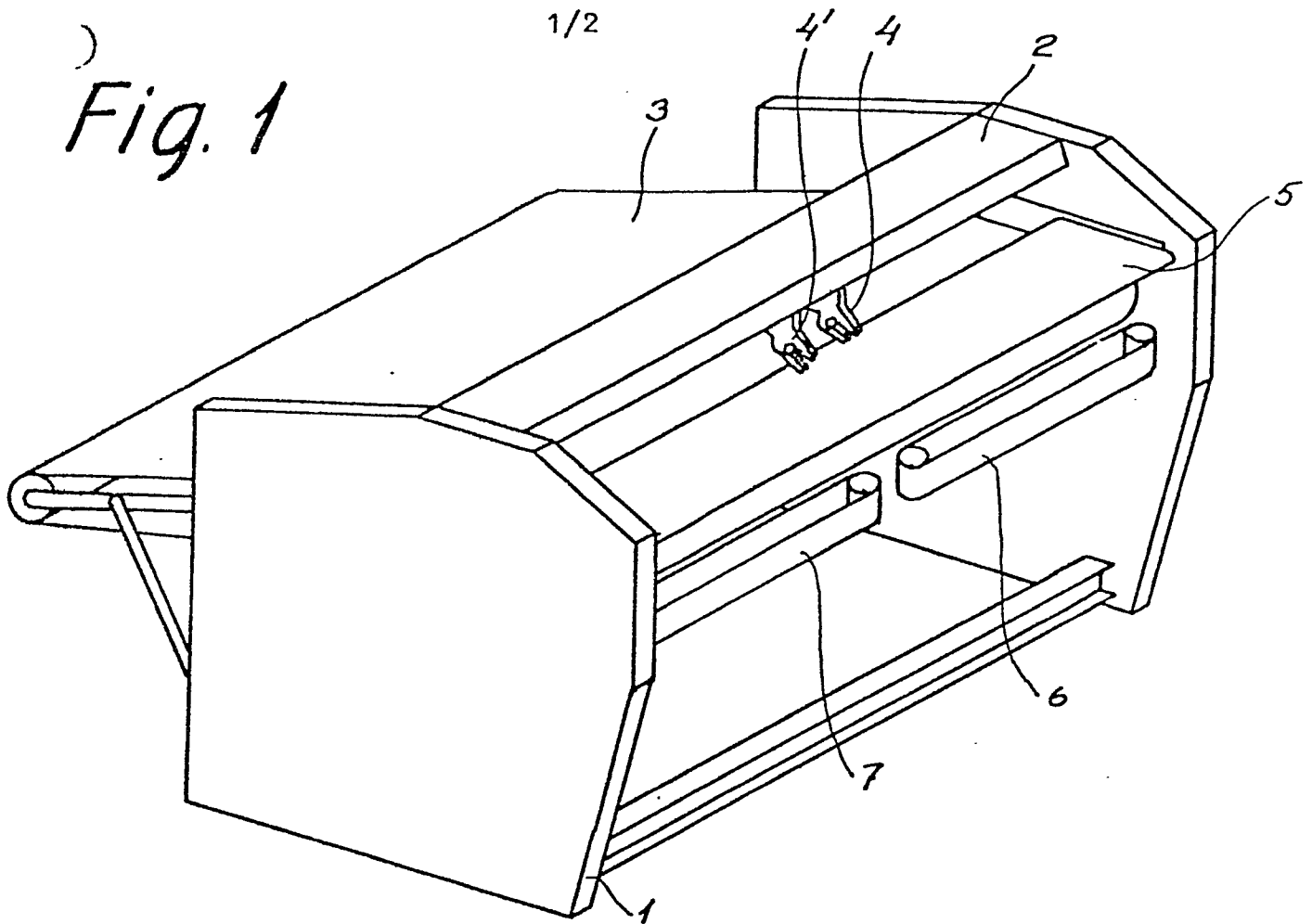


Fig. 2

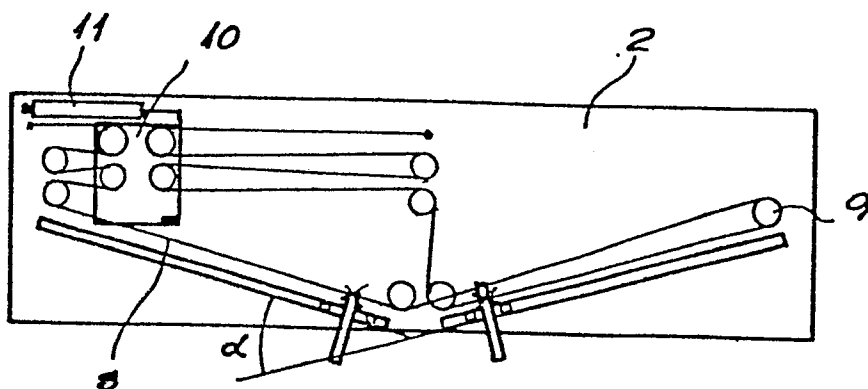


Fig. 5

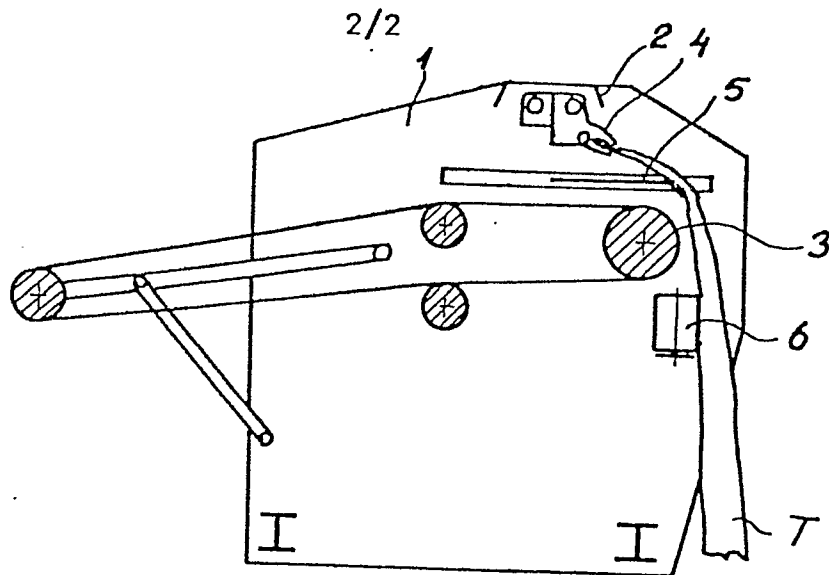


Fig. 3

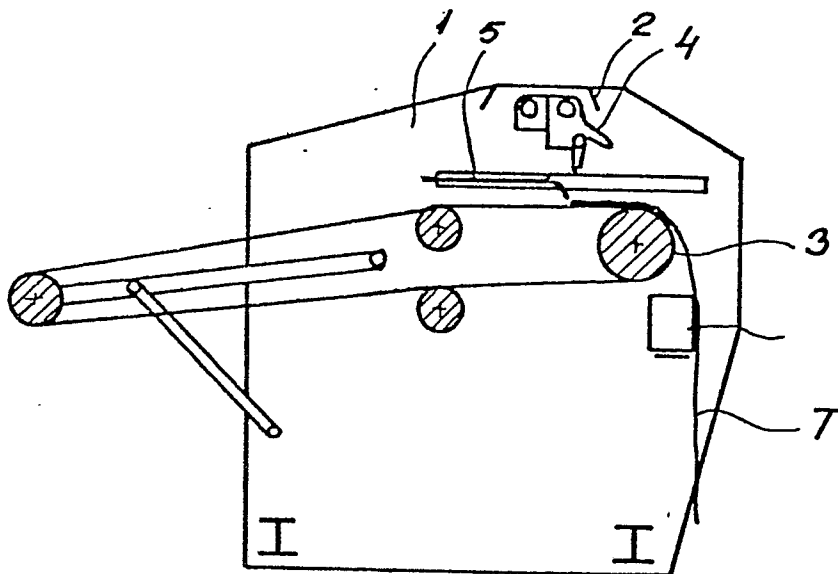


Fig. 4

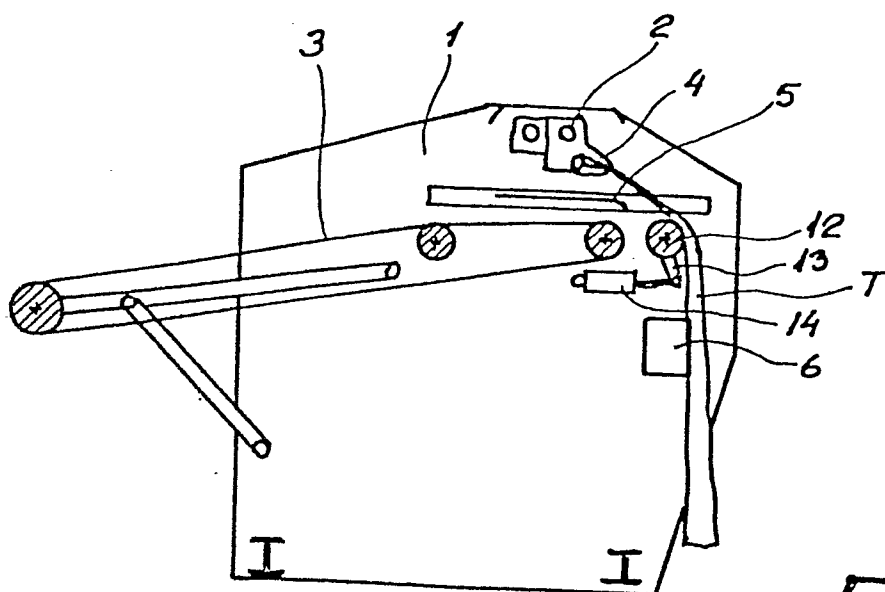


Fig. 6



DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<u>GB - A - 1 350 755 (WEIR)</u> + Page 2, lines 52 to 54; page 3, lines 24 to 37; page 3, lines 45 to 72; Figure 11 + --	1,2,5,6	D 06 F 67/04 B 65 H 5/08
	<u>GB - A - 1 105 901 (WFIR)</u> + Page 5, lines 19 to 46 + --	5,6	
	<u>US - A - 3 664 046 (THOMPSON)</u> + Column 2, lines 37 to 39 + --	5	TECHNICAL FIELDS SEARCHED (Int. Cl.) 3
	<u>DE - A - 2 258 698 (E&E PETERS)</u> + Page 6, lines 13 to 18 + --	5	D 06 F 67/00 B 65 G 47/00 B 65 H 5/00
	<u>DE - A - 2 319 654 (F&E PFTERS)</u> + Figure 6 + --	5	
	<u>GB - A - 1 169 513 (WEIR)</u> + Page 2, lines 115 to 118 + --	5	
A	<u>DE - A - 1 785 303 (BAROZ)</u> + Page 6, lines 4 to 14 + --		CATEGORY OF CITED DOCUMENTS
A	<u>DE - A - 1 585 756 (KANNEGISSEF)</u> + Page 9, lines 14 to 23; page 10, lines 1 to 3 + ----		X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
X The present search report has been drawn up for all claims			&: member of the same patent family, corresponding document
Place of search		Date of completion of the search	Examiner
VIENNA		20-12-1979	KAMMERER