

[72]	Inventor	August Wickersheim Industriestrasse 4, Egenbittel, Hamburg, Germany
[21]	Appl. No.	731,585
[22]	Filed	May 23, 1968
[45]	Patented	Feb. 16, 1971
[32]	Priority	July 18, 1967
[33]		Germany
[31]		W 40181

[51] **Int. Cl.**..... B65g 47/22
[50] **Field of Search**..... 198/29, 24,
19; 271/89; 93/36S, 54; 214/6K, 1BS, 6S

[56] References Cited

UNITED STATES PATENTS

316,329	4/1885	Brush	271/89
3,379,320	4/1968	Loach	214/6K

Primary Examiner—Richard E. Aegerter
Attorney—Mc Glew and Toren

**[54] APPARATUS FOR FEEDING ARTICLES TO BE
PACKAGED, PARTICULARLY JOURNALS,
NEWSPAPERS AND THE LIKE, TO PACKAGING
APPLIANCES**
7 Claims, 9 Drawing Figs.

[52] U.S. Cl..... 198/29,
198/24, 271/89, 198/32

ABSTRACT: The invention relates to a means for feeding articles onto a trueing table. In the vicinity of the table there is provided means including gripper arms operatively first to position the articles on the table and then secondly to move the article off from the table. The gripper arms are connected to a control means controlling the individual working movements of the gripper arms.

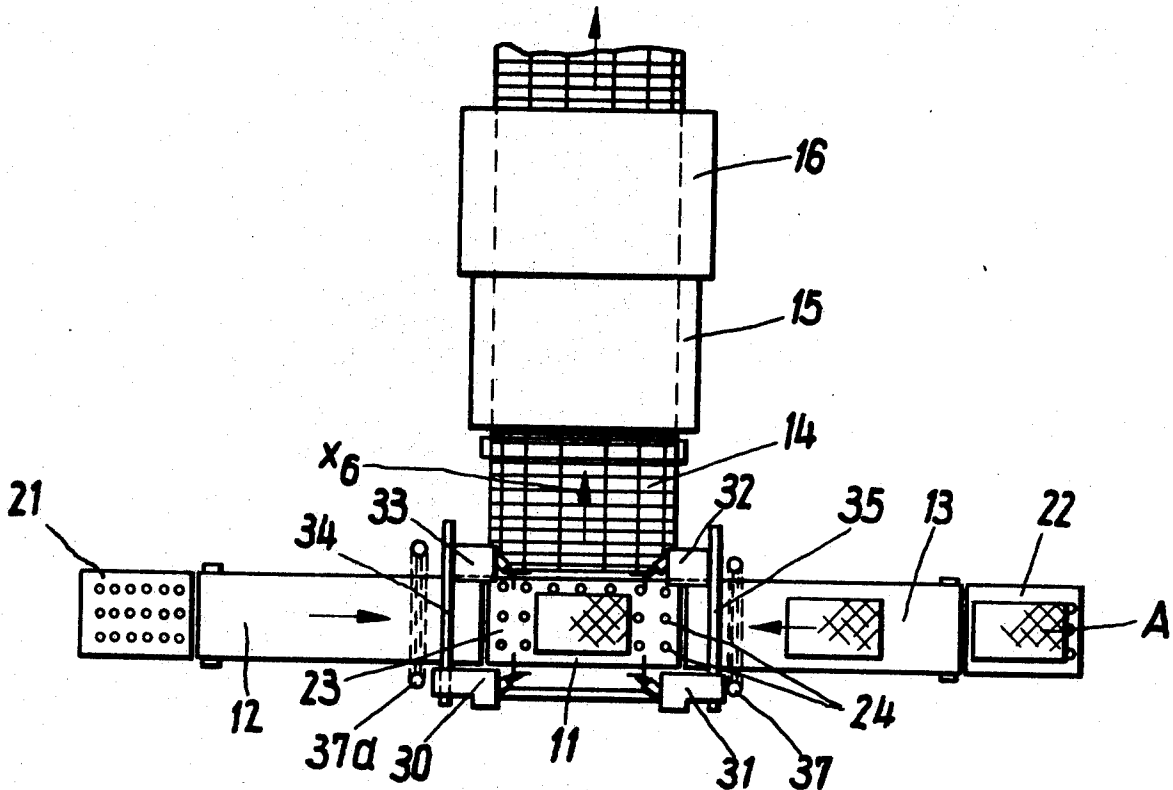


Fig. 1

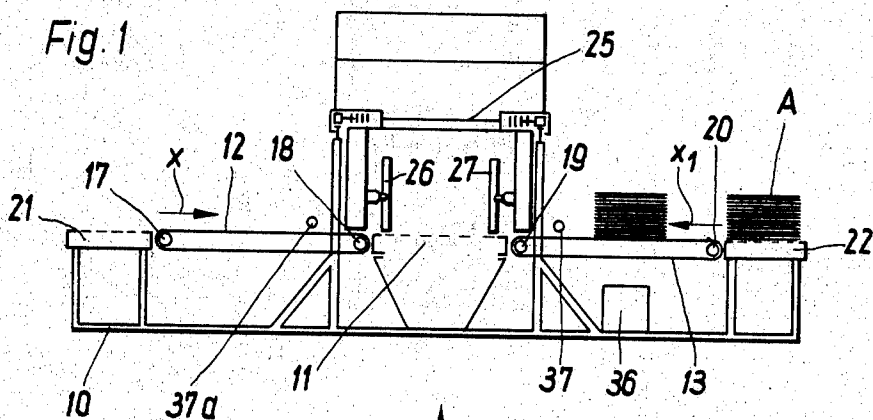


Fig. 2

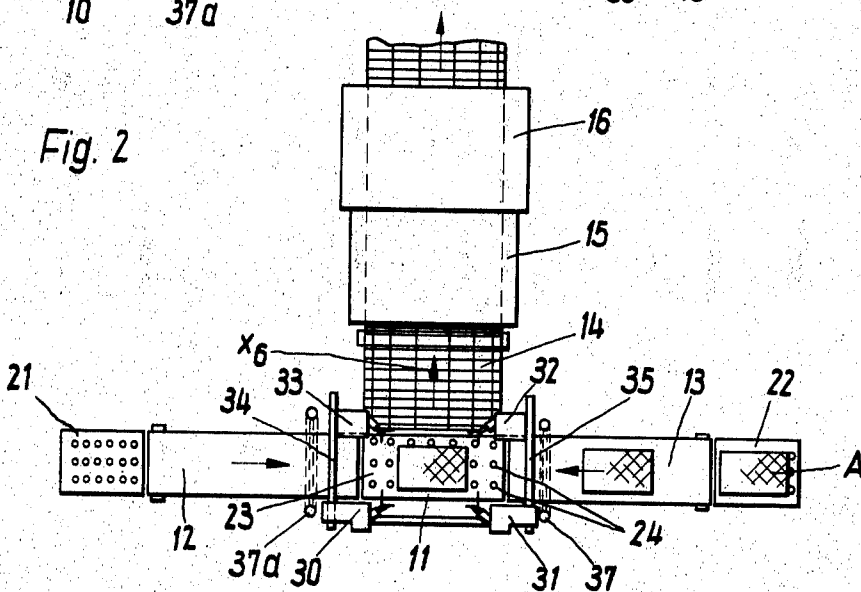
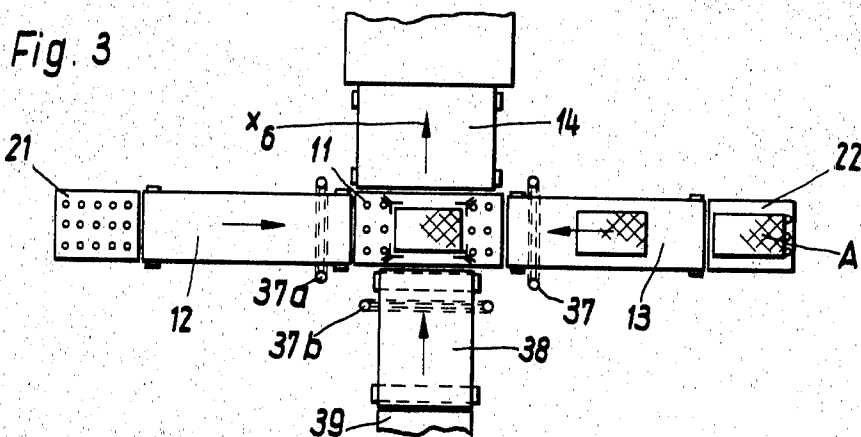


Fig. 3



Inventor:
AUGUST WICKERSHEIM
By *Mandel and Torres*
attorneys

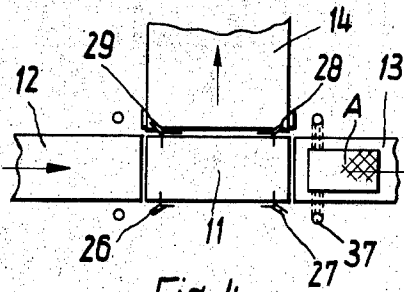


Fig. 4

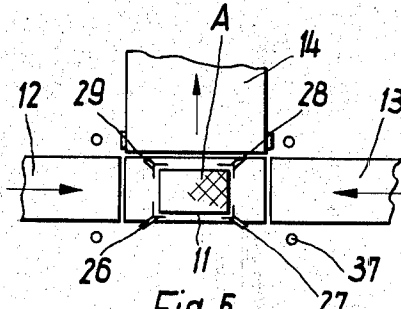


Fig. 5

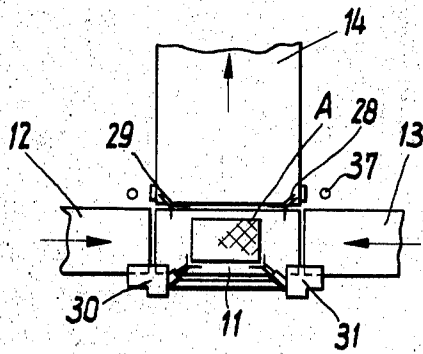


Fig. 6

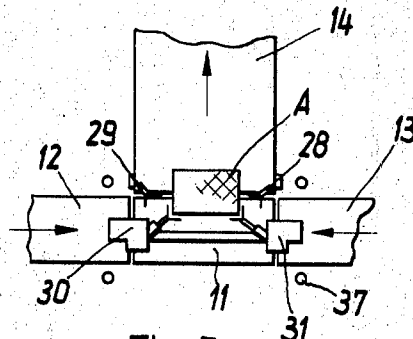


Fig. 7

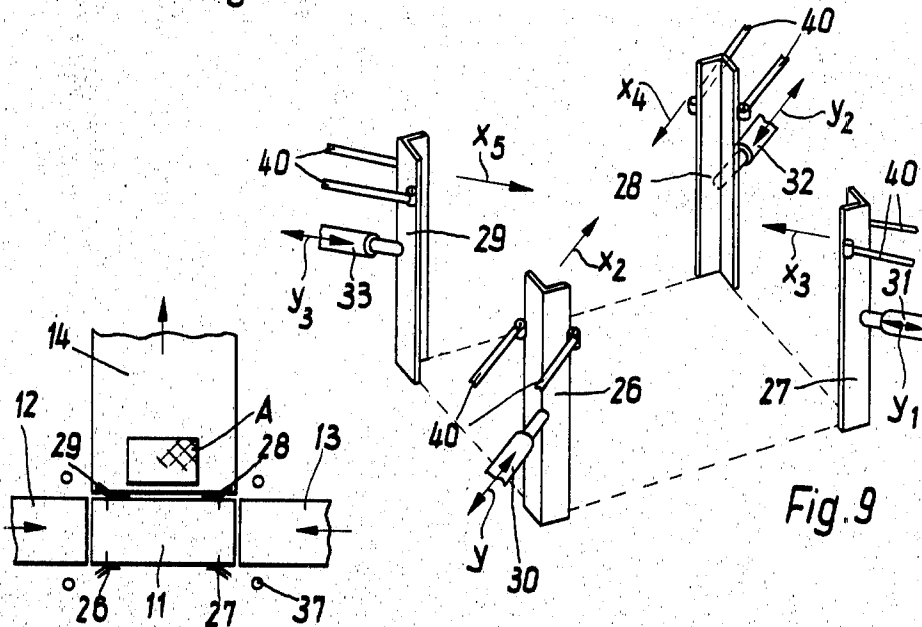


Fig. 8

Fig. 9

Inventor:

AUGUST WICKERSHEIM

By *Marble and Toran*
Attorney

APPARATUS FOR FEEDING ARTICLES TO BE PACKAGED, PARTICULARLY JOURNALS, NEWSPAPERS AND THE LIKE, TO PACKAGING APPLIANCES

This invention relates to apparatus for feeding articles to be packaged, particularly journals, newspapers and the like assembled in stacks, to packaging appliances, where the article to be packaged is led over feed belts, wrapped in a thermoplastic foil which can be shrunk by the action of heat, and finally guided by a conveyor belt through a shrinkage tunnel.

It is known art to lay articles for packaging, assembled in stacks, such as journals and newspapers, by hand on feed belts preset to the packaging appliances and simultaneously to true up the individual newspapers or the like. The laying-on of the individual stacks by hand, especially when they are heavy, is frequently laborious. It has furthermore been found that packages of poor appearance are obtained if the individual journals or newspapers are not trued up exactly. To this it must be added that in the transition from one feed belt to a second feed belt, or from a stacking table arranged in front of the feed belt, on to the feed belt, the individual stacks may become disarranged, the lowest newspapers frequently projecting laterally out of the stack.

By contrast, it is an object of the invention to provide with relatively simple technical means, an apparatus for feeding articles to be packaged, particularly journals, newspapers and so on, assembled to form stacks, to packaging appliances, which apparatus makes possible the production of satisfactory stacks of articles to be packaged and their feed to the packaging appliance without additional labor being required.

For this purpose in accordance with the invention the apparatus is constructed in the following manner, there is provided in a machine frame in front of the conveyor belt to the packaging appliance, a trueing table with an air cushion, produced by means of compressed air emerging through perforations provided in a horizontal trueing plate, above the trueing plate, and with four gripper arms held at a support frame above the trueing plate for the articles to be packaged, the gripper arms being swivelable and/or movable vertically independently of one another, and the said trueing table being connected with drive means provided in the support frame. The gripper arms, whose basic surface supplements the basic surface of the articles being packaged, have a substantially rectangular bar type section, they are swivelable, by means of the drive means fixed to the support frame, out of the feed path of the articles to be packaged, and also movable diagonally for application to the stack to be packaged, on the trueing table, and the gripper arms nearest the packaging appliance are formed so as to lead in respect of the other two gripper arms which are movable parallel to the direction of rotation of the conveyor belt for conveying the articles to be packaged from the trueing table to the packaging appliance, into the starting position outside the feed path for the articles to be packaged.

The drive means for the gripper arms take the form of pneumatically or hydraulically acting cylinders or a drive motor and are connected to an electric or pneumatic control mechanism controlling the individual stages of operation of the gripper arms. A light barrier is provided at the delivery side of the trueing table for controlling the control mechanism for the drive means.

For feeding the articles to be packaged to the trueing table feed belts are provided, which are aligned in front of the trueing table at one, two or three sides. As requisite one, two or three feed belts can be used. At the delivery (i.e. discharge) sides of the feed belts, whose stacking tables may be placed in line with air cushions formed above the horizontal deposite plates, light barriers are provided for controlling the control mechanism for the drive means of the gripper arms.

Specific embodiments of the invention will now be described by way of example with reference to the accompanying drawings, in which:

FIG. 1 shows the apparatus, consisting of a trueing table with two feed belts for feeding articles to be packaged to a packing appliance viewed from the front;

FIG. 2 shows the apparatus of FIG. 1 viewed from above;

FIG. 3 represents a further embodiment of the apparatus with three feed belts;

FIGS. 4 to 8 show the trueing table with four gripper arms in the individual operational positions, in plan; and

FIG. 9 is a perspective view of the four gripper arms.

In a preferred embodiment, shown in FIGS. 1 and 2, the apparatus comprises a machine frame 10 with a trueing table 11, to which two feed belts 12, 13 are assigned, a conveyor belt 14 of the steel jointed-band type, a packaging appliance 15 and a shrinkage tunnel 16. The packaging appliance 15 has magazine reels for thermoplastic foil shrinkable by heat. The articles to be packaged, fed by the conveyor belt 14, are wrapped in the plastic foil in known manner and fed to the shrinkage tunnel 16, where the foil is shrunk under the action of heat, which thus applies the foil firmly to the articles to be packaged. Stacking tables 21, 22 are placed in line with the two feed belts 12, 13 which are guided over guide pulleys 17, 18 and 19, 20 and driven in the direction of the arrows X, X₁.

In order to form an air cushion above the trueing plate 23 of the trueing table 11, the said trueing plate 23 is provided with perforations 24, through which compressed air produced by means of a blower (not shown in the drawing) emerges, so that an air cushion is produced. The stacking tables 21, 22 in line with the feed belts 12, 13 are formed correspondingly to the trueing table 11 and provided with an air cushion.

In the vicinity of the trueing table 11 there is provided at the machine frame 10 a support frame 25, forming a crossmember and carrying four vertical gripper arms 26, 27, 28, 29, whose lower free ends are applied above the trueing plate 23 of the trueing table 11. The gripper arms 26, 27, 28, 29 (FIG. 9) of substantially rectangular section are fitted to the support frame 25 in such a way that their base area supplements the base area of the article to be packaged. At their upper ends the gripper arms, 26, 27, 28, 29 are connected to drive means 30, 31, 32, 33 which effect a swiveling and/or diagonal movement of the gripper arms, 26, 27, 28, 29. The drive means 30, 31, 32, 33, may take the form of hydraulic or pneumatic drive cylinders, as shown in FIG. 9. However, drive motors may also be used. The complete arrangement of the gripper arms, 26, 27, 28, 29 and their drive means 30, 31, 32, 33 is such, or they are so constructed, that the gripper arms 26, 27, 28, 29 can travel or swivel out of a starting position, that is, a position in which the article to be packaged can be satisfactorily fed to the trueing table 11, until they are applied against the stack to be packaged. To guide the gripper arms 26, 27, 28, 29 diagonally they may be additionally guided by means of guide rods 40. The possibility of diagonal travel of the gripper arms 26, 27, 28, 29 is indicated by the arrows Y, Y₁, Y₂, Y₃. The movement of the gripper arms, 26, 27, 28, 29 coming to rest against the stack to be packaged is indicated by the arrows X₂, X₃, X₄, X₅ (FIG. 9).

Of the four gripper arms, 26, 27, 28, 29 the gripper arms 28, 29 in their movement into the starting position are made to lead in relation to the gripper arms, 26, 27, which can be effected either by a suitable construction of the mechanical control devices or by a suitable control arrangement of the drive for the gripper arms, 26, 27, 28, 29, for instance in such a way that when the drive means 30, 31, 32, 33 are activated for transferring the gripper arms 26, 27, 28, 29 out of the application position into the starting position, first of all the drive means 32, 33 for the gripper arms, 28, 29 are set in operation and only after this are the other working positions of the gripper arms 26, 27 initiated.

The gripper arms are made additionally movable in the direction of the packaging appliance 15, so that the stacks first trued by the gripper arms, 26, 27, 28, 29 on the trueing table 11, are pushed by the gripper arms 26, 27 during their forward movement, off the trueing table 11 on to the conveyor belt 14. For the movement of the gripper arms 26, 27 the support

frame 25 has two guide rails 34, 35 extending parallel to the direction of rotation X_a of the conveyor belt 14, and on which the drive means 30, 31 with the gripper arms 26, 27, can travel. The reciprocating motion of the gripper arms 26, 27 can be effected by additional drive means, but it is however also possible for control rods to be used.

The drive means 30, 31, 32, 33, for the gripper arms 26, 27, 28, 29 are connected to an electrical or pneumatic control mechanism 36 controlling the individual working movements of the gripper arms. The control of the control mechanism 36 is effected by means of light barriers 37 which are arranged either, if only the trueing table 11 without feed belts is used, at the sides of the trueing table 11 or, when feed belts are used at their delivery (discharge) sides.

The apparatus can be used either without feed belts or with feed belts. In the first case the individual stacks are applied by hand on the trueing table 11 and trued by means of the gripper arms, 26, 27, 28, 29 and then subsequently transferred by the gripper arms 26, 27 to the conveyor belt 14.

The mode of operation of the apparatus when using feed belts is as follows:

On the stacking table 22 there is produced by superimposition of a multiplicity of newspapers a stack A, which is pushed by hand on the feed belt 13, which can easily be done, as the air cushion maintained above the stacking table 22 assists easy sliding of the stacks on the receiving surfaces. On the feed belt 13 the stack A is fed to the trueing table 11. On reaching the light barrier 37 the control mechanism 36 begins to operate: the drive means for all four gripper arms are actuated and they travel or swivel into the starting position so that the stack can be led between the gripper arms 27, 28 through to the trueing table 11 (FIGS. 2 and 4). Hereupon the gripper arms travel diagonally and are brought to rest against the stack (FIGS. 3 and 5). At the same time the stack is trued and also the individual newspapers of the stack are trued within the stack. After the trueing the gripper arms, 28, 29 swivel back into the starting position and thus free the path for the transfer of the stack on to the conveyor belt 14 (FIG. 6). Following this the gripper arms 26, 27 travel towards the packing appliance 15 until the stack has been engaged by the rotating conveyor belt 14. (FIG. 7). The stack is fed to the packing appliance, while the gripper arms 26, 27 travel back and are swiveled into the starting position (FIG. 8). The swiveling of the gripper arms 26, 27 into the starting position can also be started by the breaking of the light barrier 37 by a further stack being fed forward. As soon as the gripper arms have reached their starting position another stack is fed to the trueing table 11, over the feed belt 12, for instance, whose light barrier 37a actuates the control mechanism 36.

By means of the apparatus constructed in accordance with the invention the possibility is obtained of packaging a large number of stacks of newspapers per unit of time, with the minimum amount of labor, only the labor of producing the stack being required, if in fact the stacking of newspapers is not actually effected mechanically. The stacks arrive in the packaging appliance accurately trued up, so that satisfactory packages are obtained. The output capacity of the apparatus is very much higher than that of known ones. Speed of operation can also be further increased if there is applied on the front side a third feed belt 38, on whose delivery side there is likewise provided a light barrier 37b and in line with which a stacking table 39 is provided. The feed of compressed air for forming an air cushion above the trueing table 11 can likewise be controlled by the control mechanism 36, that is to say that when the light barrier is interrupted compressed air is supplied and after the transfer of the stack from the trueing table 11 to the conveyor belt 14 the supply of compressed air is shut off.

I claim:

1. Equipment for feeding material to packaging machines, in particular magazines, newspapers and the like which are put together in stacks, comprising an elongated machine frame, a horizontally arranged trueing plate mounted on said machine frame, a support frame extending upwardly above said trueing

plate, a packaging means supported on said machine frame and spaced from said trueing plate, conveyor means supported on said machine frame for transporting materials to be packaged from said trueing plate to said packaging means, four gripper arms mounted on said support frame and located above and separate from said trueing plate, said gripper arms disposed in horizontally spaced relationship to one another and arranged to define the corners of a variable rectangularly-shaped area aligned above said trueing plate, a drive means for each said gripper arm, each said drive means secured to said support frame and in operative engagement with one of said gripper arms for moving said gripper arms in the horizontal direction diagonally relative to said trueing plate into and out of engagement with the corners of a stack of material located on said trueing plate, a control mechanism for individually actuating said drive means for said gripper arms and for regulating the movement of said gripper arms, and means arranged for guiding at least certain of said driving means and said gripper arms in operative engagement therewith for moving the material from said trueing plate to said conveyor means for transporting material to be packaged to said packaging means.

2. Equipment, as set forth in claim 1, wherein said trueing plate is rectangular in shape and said conveyor means for transporting material to said packaging means extends from one side of said trueing plate, a pair of feed belts mounted on said machine frame and each extending from an oppositely disposed side of said trueing plate adjacent the side thereof from which said conveyor means extends for feeding material to said trueing plate from which it is supplied to said conveyor means.

3. Equipment, as set forth in claim 1, wherein said trueing plate is rectangular in shape with said conveyor means for transporting material to said packaging means being located along one side of said trueing plate, three feed belts each extending from one of the other sides of said trueing plate outwardly therefrom for supplying material to said trueing plate for its subsequent delivery to said conveyor means.

4. Equipment, as set forth in claim 3, wherein a light barrier is located adjacent the end of each said feed belt adjoining said trueing plate, a control mechanism arranged for actuating said drive means for operating said gripper arms, and said light barriers arranged in communication with said control mechanism so that as material passes over said feed belts to said trueing plate a signal is transmitted to said control mechanism for operating said gripper arms.

5. Equipment, as set forth in claim 4, wherein stacking tables mounted on said machine frame adjacent the ends of said feed belts remote from said trueing plate for supplying materials to said feed belts, a horizontal deposit plate located on each of said stacking tables for receiving materials to be fed to said trueing plate, each of said horizontal deposit plates having a plurality of perforations therethrough so that compressed air supplied to said hollow horizontal deposit plates passes through the perforations therein for forming an air cushion for the materials placed on said stacking tables.

6. Equipment, as set forth in claim 1, wherein each said gripper arms comprises a vertically extending L-shaped member with the interior angle formed by said L-shaped member directed inwardly toward the other said L-shaped members and the lower end of said L-shaped member spaced above said trueing plate, said drive means for each said gripper arm being secured thereto at a location intermediate the height of said gripper arm, and guide rods secured to the upper parts of said gripper arms for guiding the diagonal movement of said gripper arms.

7. Equipment, as set forth in claim 1, wherein a stacking table for receiving material to be packaged is mounted on said machine frame and is spaced from said trueing plate in a direction disposed angularly to the direction between said trueing plate and packaging means, a feed belt for transporting material to be packaged from said stacking table to said trueing plate, a light barrier located on said machine frame ad-

5

adjacent to and spaced from said trueing plate and located in the path of said feed belt, said light barrier being in communication with said control mechanism so that as material is fed over said machine frame from said stacking table to said true-

6

ing plate, it passes said light barrier and actuates said control mechanism for operating said drive means and selectively positioning said gripper arms.

5

10

15

20

25

30

35

40

45

50

55

60

65

70

75