Dec. 4, 1951 H. J. LUEHRS 2,577,424

METHOD OF AND MEANS FOR STRIPPING CUT AND CREASED SHEETS

Filed Dec. 31, 1946 5 Sheets-Sheet 1

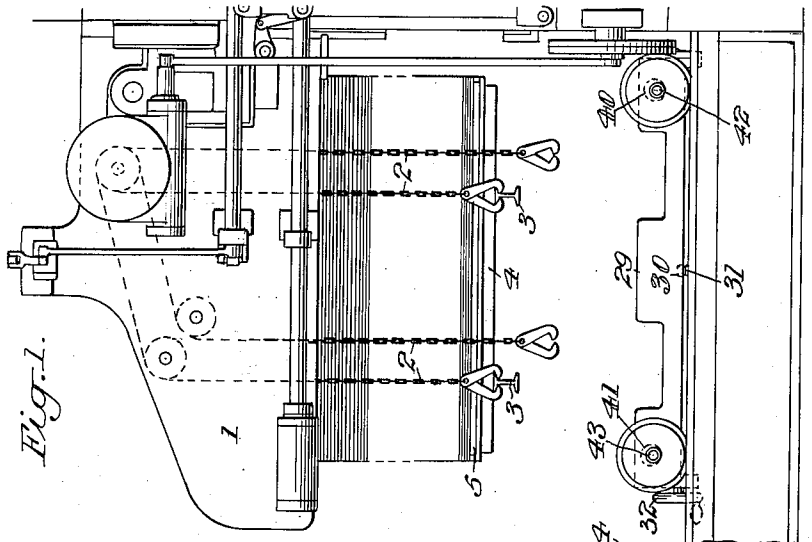

Fig. 1.

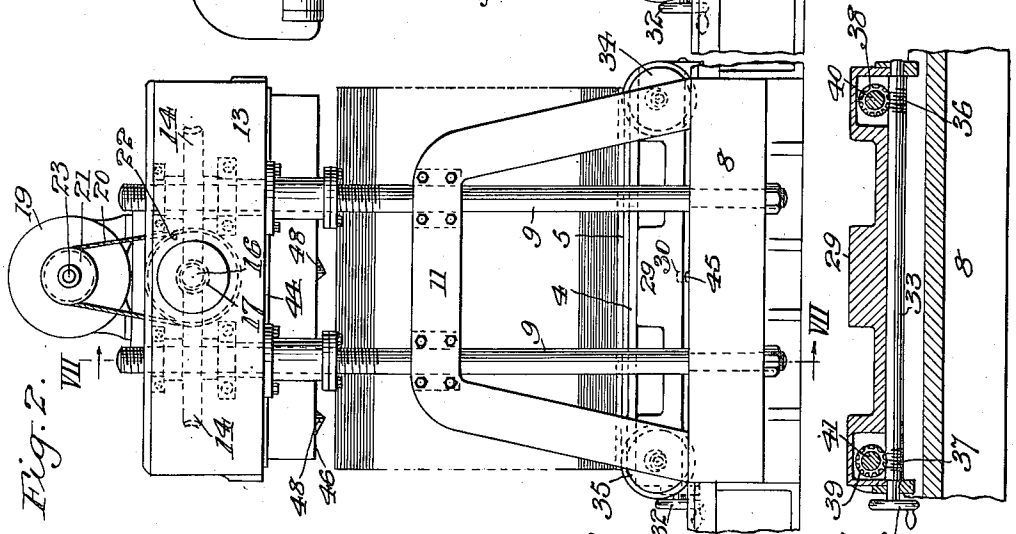

Fig. 2.

Fig. 2a.

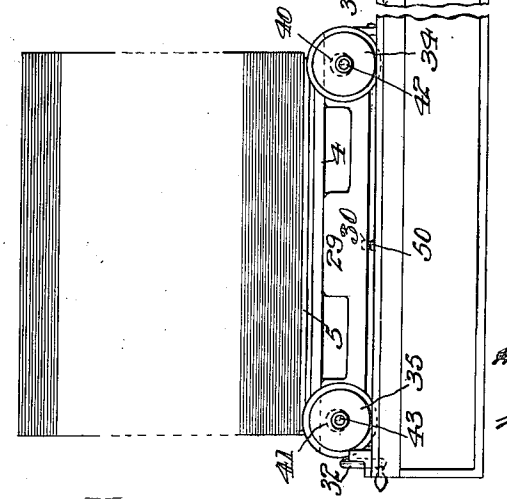

Fig. 3.

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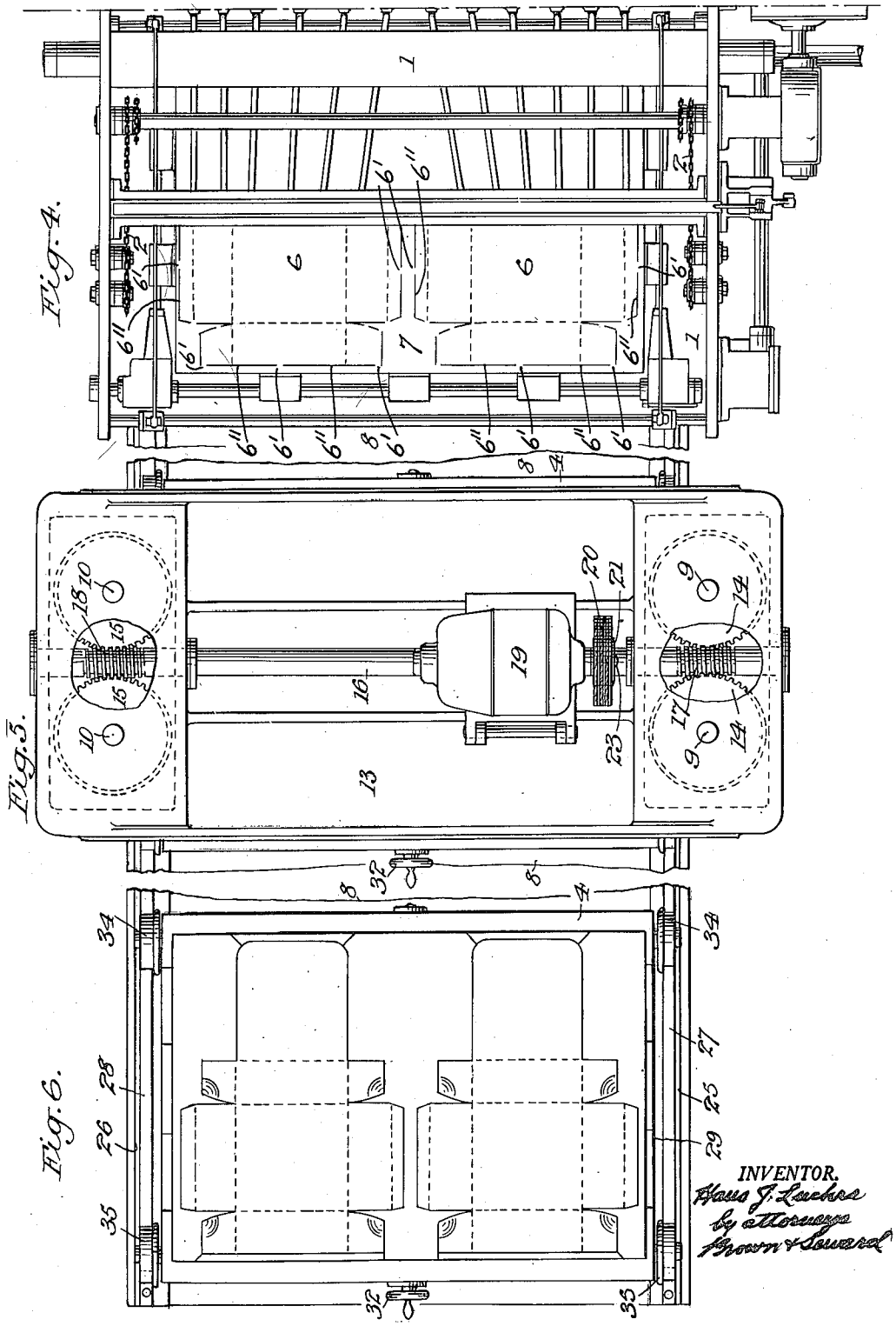
METHOD OF AND MEANS FOR STRIPPING CUT AND CREASED SHEETS

Filed Dec. 31, 1946 5 Sheets-Sheet 2



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METHOD OF AND MEANS FOR STRIPPING CUT AND CREASED SHEETS

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Fig. 8.

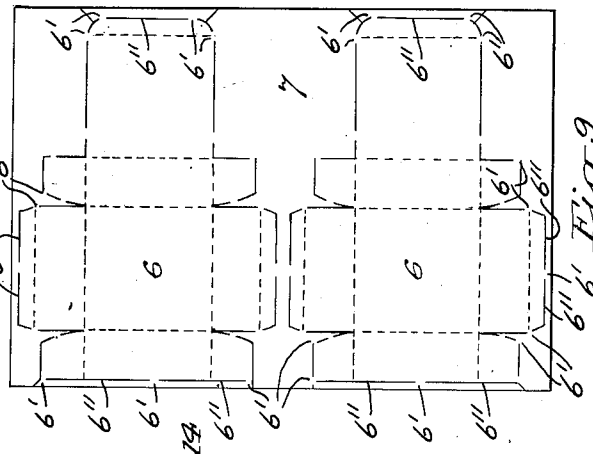


Fig. 9.

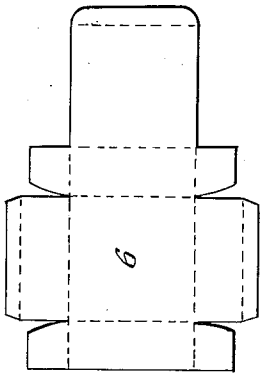
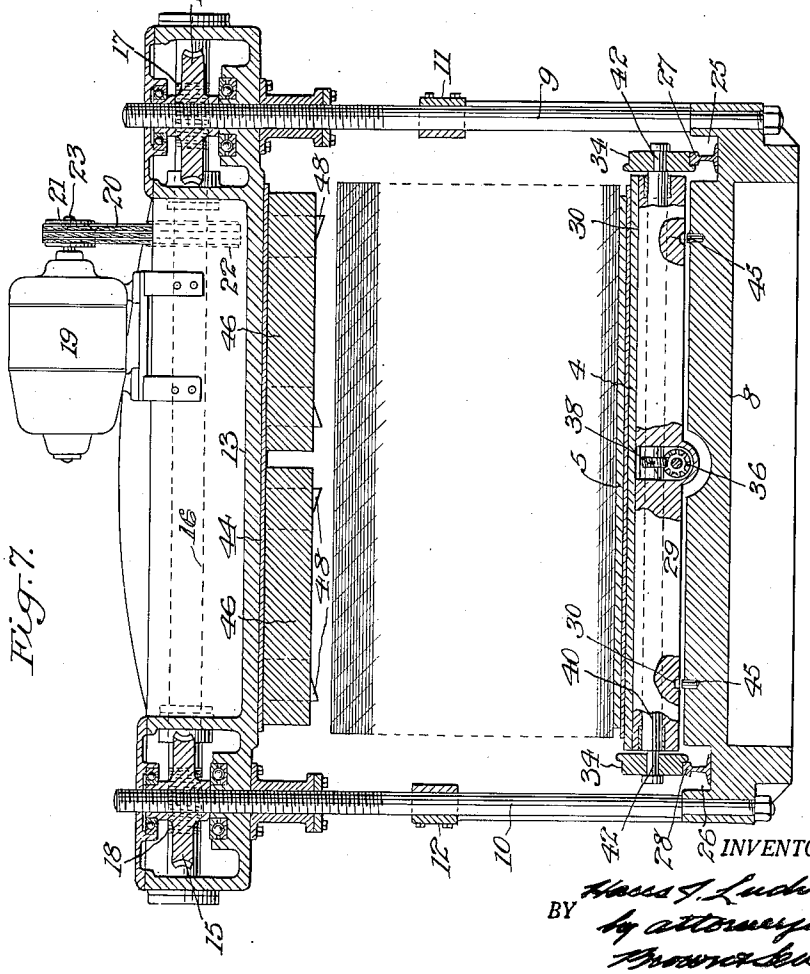


Fig. 7.



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METHOD OF AND MEANS FOR STRIPPING CUT AND CREASED SHEETS

Filed Dec. 31, 1946 5 Sheets-Sheet 4

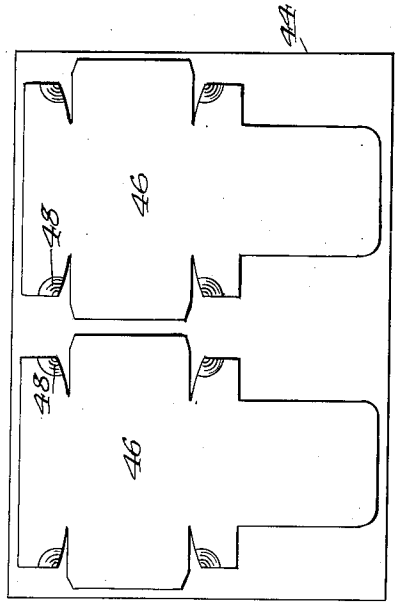

Fig. 11.

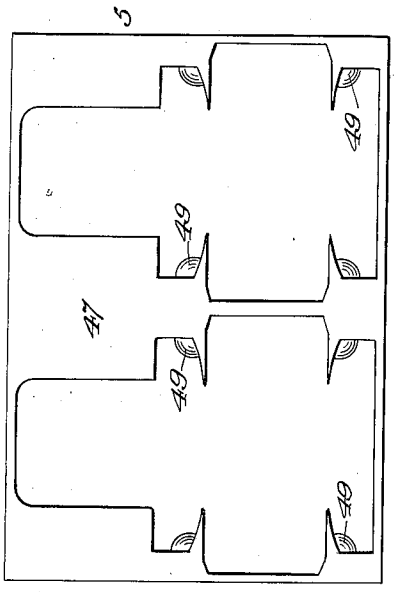

Fig. 12.

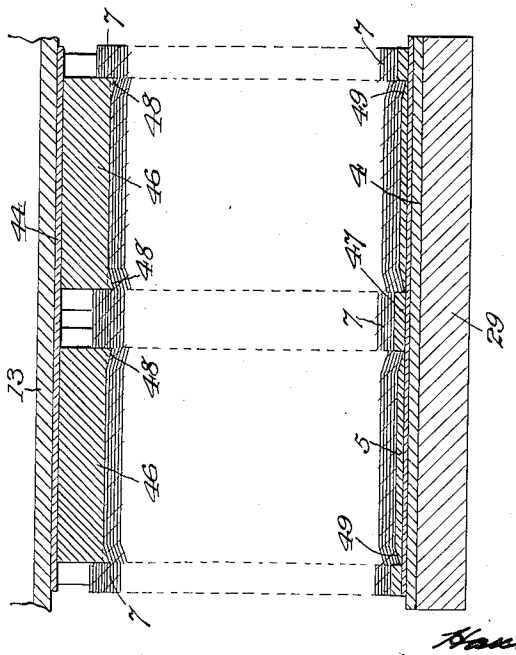

Fig. 10.

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Dec. 4, 1951

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Fig. 14.

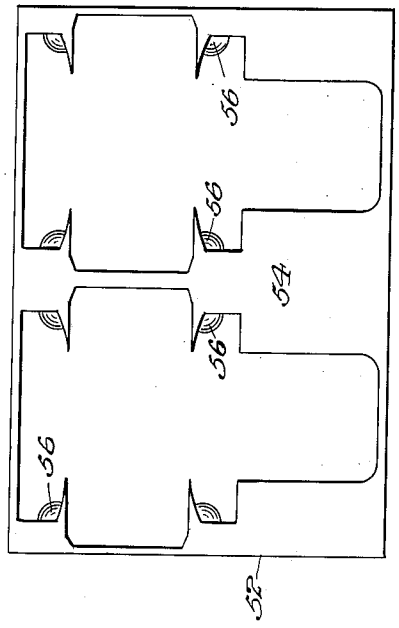


Fig. 15.

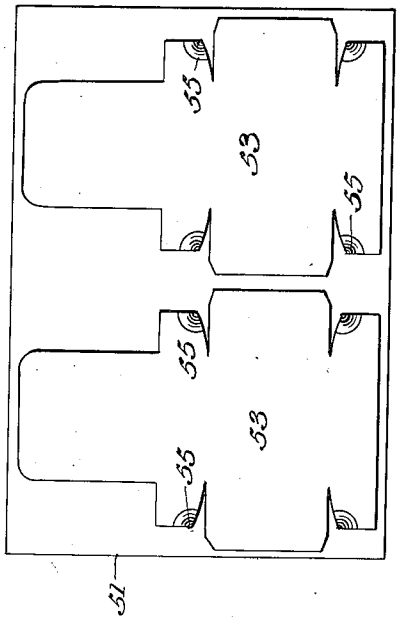
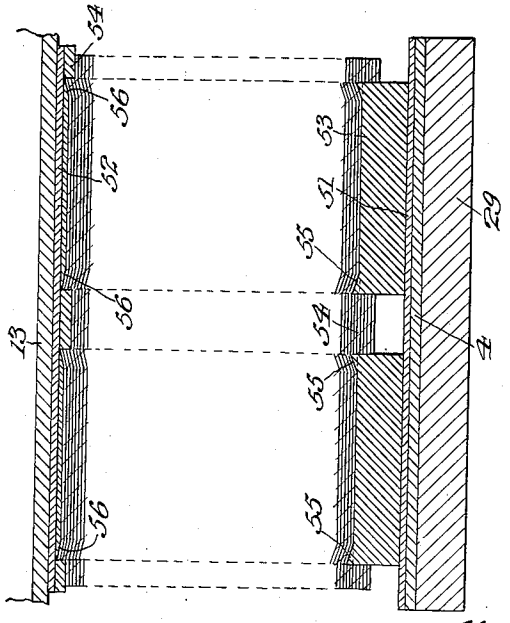


Fig. 13.



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Patented Dec. 4, 1951

2,577,424

UNITED STATES PATENT OFFICE

2,577,424

METHOD OF AND MEANS FOR STRIPPING CUT AND CREASED SHEETS

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Application December 31, 1946, Serial No. 719,553

24 Claims. (Cl. 93—58)

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The object of my invention is to provide a novel method of and means for stripping cut and creased sheets arranged in a pile by the coaction of upper and lower stripping dies to sever the connections between the useful and waste portions of the sheets.

My invention further consists in providing one of the stripping dies with a raised waste portion contacting surface and the other die with a raised useful portion contacting surface, the raised surface of one of the dies being higher than the raised surface of the other die for causing a successive sheet stripping action.

My invention further consists in providing the stripping dies with means, as, for instance, coacting projections and recesses for releasably interlocking the corresponding useful portions of the pile to prevent their unintentional displacement during the subsequent handling of the said useful portions.

My invention consists, more particularly, in positioning the lower stripping die to receive successive cut and creased sheets thereon at the delivery end of a sheet cutter and creaser; moving the lower die with its pile of cut and creased sheets to the sheet stripper into register with the upper stripping die; releasably locking the lower die with its pile in register with the upper die; moving the upper die downwards to strip the waste portions from the useful portions of the sheets and at the same time to releasably interlock the superimposed useful portions of the pile; raising the upper die to free it from the pile; unlocking the lower die and finally transferring the lower die with its pile of stripped sheets to a useful and waste portion removal position.

My invention also includes the provision of a track and a truck movable along the same for transferring the lower stripping die with its pile of sheets from the sheet cutter and creaser to the sheet stripper in register with the upper stripping die and, after the stripping operation of the two dies, to transfer the stripped sheets to a position where the useful and waste portions may be removed.

My invention also includes means for releasably locking the truck in its pile receiving position and in its sheet stripping position and, if so desired, in its useful and waste portion removal position.

My invention also includes certain improvements in the method of and means for stripping and handling the piles of cut and creased sheets

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which will be hereafter more particularly set forth and claimed.

In the accompanying drawings I have shown means whereby a pile of sheets which have been cut and creased to produce two folding boxes from each sheet are transferred from the cutter and creaser to the sheet stripper and from thence to a position where the boxes and their waste portions may be readily removed.

Fig. 1 represents a detail side view of the delivery end of a sheet cutter and creaser of any well known or approved construction and showing a partially completed pile of cut and creased sheets; a transfer truck also being shown in position to receive the lower die and the sheets when the pile is completed.

Fig. 2 represents a detail side view of the sheet stripper with the lower die and the pile of cut and creased sheets transferred by the truck into position to be stripped.

Fig. 2a represents a detail vertical longitudinal section through the truck to more clearly show the manually operated means for lowering and raising the truck body.

Fig. 3 represents a detail side view showing the pile of stripped sheets together with the lower die transferred by the truck to their useful and waste portion removal position.

Fig. 4 represents a top plan view of the parts shown in Fig. 1.

Fig. 5 represents a top plan view of the parts shown in Fig. 2.

Fig. 6 represents a top plan view of the parts shown in Fig. 3.

Fig. 7 represents a vertical section taken in the plane of the line VII—VII of Fig. 2.

Fig. 8 represents a plan view of the pile of cut and creased sheets before the sheets have been stripped.

Fig. 9 represents a top plan view of one of the stacks of useful portions after the sheets have been stripped and the waste portions removed.

Fig. 10 represents a detail vertical section in which the pile of sheets has been stripped between the upper die which contacts the useful portions only of the top sheet of the pile and the lower die which contacts the waste portions only of the bottom sheet of the pile.

Fig. 11 represents a bottom plan view of the upper stripping die.

Fig. 12 represents a top plan view of the lower stripping die.

Fig. 13 represents a detail vertical section similar to Fig. 10 except that the upper die contacts the waste portions only of the top sheet of the

pile and the lower die contacts the useful portions only of the bottom sheet of the pile.

Fig. 14 represents a bottom plan view of the upper die shown in Fig. 13.

Fig. 15 represents a top plan view of the lower die represented in the said Fig. 13.

In the form shown in Figs. 1 to 12 inclusive, the sheet cutter and creaser 1 is shown as provided with the usual lifting chains 2 and removable cross-bars 3 for supporting the delivery board 4 and the lower or female die 5 of the sheet stripper in position to receive successive cut and creased sheets from the sheet cutter and creaser, which sheets comprise useful portions 6 as, for instance, folding boxes, and waste portions 7 connected thereto as is usual, the connections 6^1 being formed by short uncut portions which alternate with the cut through portions 6^{11} between the said useful and waste portions 6 and 7.

The sheet stripper is shown as comprising a base 8 having two pairs of posts 9 and 10 extending upwardly therefrom. These pairs of posts are additionally supported by braces 11 and 12 uprising from the said base.

The head 13 of the sheet stripper is vertically slidable on the pairs of posts 9 and 10. Two pairs of worm gears 14 and 15 are rotatably mounted in the head 13 and have screw-threaded engagements with their respective pairs of posts 9 and 10. A horizontally disposed worm shaft 16 is rotatably mounted in the head 13 and it has two worms 17 and 18 meshing with their respective pairs of worm gears 14 and 15. This worm shaft 16 is shown as driven from a reversible electric motor 19 mounted on the head 13, as by a rope 20 connecting the pulleys 21 and 22 on the motor shaft 23 and worm shaft 16 respectively.

A track leads from the sheet cutter and creaser 1 through the sheet stripper to a position where the useful and waste portions of the stripped sheets may be separated and removed. Grooves 25 and 26 along the top surface of the base 8 of the sheet stripper form seats for the track rails 27 and 28.

A four-wheeled truck is movable along the track to the delivery end of the sheet cutter and creaser 1 in position to receive and support the delivery board 4, the lower or female stripping die 5, and the completed pile of cut and creased sheets. This truck may be releasably locked to the track in register with the said delivery board, lower die and completed pile of cut and creased sheets at this point, as by providing means for lowering the truck body 29 onto the track bed between the track rails 27 and 28, to cause the holes 30 in the bottom of the truck body 29 to receive the registering pins 31 located on the track bed between its rails 27 and 28.

The means for lowering and raising the truck body 29 is shown as comprising a hand wheel 32 located beyond the rear end of the truck body, which hand wheel is carried by a horizontally disposed worm shaft 33 mounted in the truck body, between its pairs of wheels 34 and 35 in position to have its two worms 36 and 37 mesh with the wheels 38 and 39 fast on the axles 40 and 41 respectively. Pairs of eccentric axle pins 42 and 43 project from the ends of the axles 40 and 41 on which eccentric pins the pairs of truck wheels 34 and 35 are rotatably mounted.

In operation: after the truck has received the delivery board 4, the lower die 5 and the completed pile of cut and creased sheets and the crossbars 3 have been removed, the truck body 29 is raised from its locked position on the track and the truck is moved along the track to the sheet stripper into register with the upper stripping die 44.

The truck may then be releasably locked to the track bed to register the lower die 5 with the upper die 44 by again lowering the truck body 29 by the means already described, to cause the holes 30 to receive the second set of registering pins 45 located on the track bed between the track rails 27 and 28. In this position it will be seen that the weight is taken off the truck wheels 34 and 35.

The upper stripping die 44 may then be moved downwards into contact with the top sheet of the pile and caused to exert sufficient pressure thereon to successively sever the connections 6^1 between the useful and waste portions of the pile of cut and creased sheets.

This upper die 44 is shown as provided with a raised surface 46 arranged to contact the useful portions 6 of the top sheet of the pile and the lower die as provided with a raised surface 47 in contact with the waste portions 7 of the bottom sheet of the pile; the raised surface 46 of the upper die being considerably higher than the raised surface 47 of the lower die to ensure a shearing action to sever the connections 6^1 between the useful and waste portions of successive sheets during the downward stripping movement of the upper die.

It is to be understood that the stripping dies have contours corresponding with the contours of the useful portions of the sheets to ensure a correct stripping of the sheets.

Means may be provided for causing each stack of useful portions 6 of the superimposed cut and creased sheets to be releasably interlocked as the sheets are being stripped, to facilitate the handling of the useful portions after the stripping operation. To accomplish this result the upper die 44 is provided with raised wedge-shaped pieces 48 and the lower die with relieved or recessed wedge-shaped pieces 49 which coact with the pieces 48 to bend corresponding elements of each stack of useful portions to releasably interlock them.

After the pile of sheets has been stripped and, in the present instance, the two stacks of useful portions of the sheets releasably interlocked, the upper die 44 is raised to free it from the pile by reversing the electric motor 19. The truck body 29 is then raised to free the holes 30 from the second set of registering pins 45.

The truck with its delivery board 4, lower stripping die 5 and pile of stripped sheets with their interlocked stacks of useful portions 6 may then be moved along the track to the useful and waste portion removal position. In this position the truck body 29 may again be lowered onto the track to cause the holes 30 to receive the third set of pins 50 which are located on the track at this point. The waste portions 7 which have been severed from the useful portions 6 may now be removed and discarded and the two stacks of useful portions may also be removed for further operations thereon. In the meantime, a duplicate delivery board and its lower stripping die 5 have been positioned by the chains 2 and their crossbars 3 to receive the successive cut and creased sheets of the next pile from the cutter and creaser.

After the useful and waste portions have been removed from the truck, the truck may be again moved along the track to its first named posi-

tion in register with the growing pile of cut and creased sheets at the cutter and creaser.

In the embodiment shown in Figs. 13, 14 and 15, the stripping dies are reversed, the upper die 44 of the embodiment shown in Figs. 1 to 12 inclusive, becoming the lower die 51 and the lower die 5 becoming the upper die 52. In the embodiment shown in Figs. 13, 14 and 15 the raised surface 53 of the lower die 51 is arranged to contact the useful portions 6 of the bottom sheet of the pile of cut and creased sheets and the raised surface 54 of the upper die 52 is arranged to contact the waste portions 7 of the top sheet of the pile. In this embodiment the lower die 51 is provided with the raised wedge-shaped pieces 55 and the upper die with the coacting relieved wedge-shaped pieces 56 for releasably interlocking the superimposed useful portions 6 of the sheets as the sheets are being stripped.

From the above description it will be seen that cut and creased sheets in pile form may be easily and rapidly stripped by the coaction of stripping dies which contact the top and bottom of the pile and exert sufficient pressure to successively sever the connections between the useful and waste portions of the sheets.

While I have shown and described the sheets as cut and creased to each produce two useful portions, in the present instance two folding box blanks, it will be understood that I do not wish to limit myself to sheets cut and creased to produce any particular number of said useful elements.

What I claim is:

1. In a sheet stripper, upper and lower dies, means for moving one of the dies toward the other die to exert pressure on an interposed pile of cut and creased sheets to sever the connections between the useful and waste portions of the sheets to strip them, said dies having coacting cutting and stripping elements of the same contours as the said useful portions, and means for removing the lower die with its pile of stripped sheets from under the upper die and transferring them to a predetermined point.

2. In a sheet stripper, upper and lower dies, means for moving one of the dies toward the other die to exert pressure on an interposed pile of cut and creased sheets to sever the connections between the useful and waste portions of the sheets to strip them, said stripping dies having coacting cutting and stripping elements of the same contours as the said useful portions, and means on said stripping dies coacting to releasably interlock the superimposed useful portions.

3. In a sheet stripper, upper and lower dies and means for moving one of the dies toward the other die to exert pressure on an interposed pile of cut and creased sheets to sever the connections between the useful and waste portions of the sheets to strip them, said stripping dies having coacting cutting and stripping elements of the same contours as the said useful portions and also having means coacting to bend corresponding elements of the superimposed useful portions to releasably interlock them.

4. In a sheet stripper, upper and lower dies and means for moving one of the dies toward the other die to sever the connections between the useful and waste portions of a pile of cut and creased sheets to strip them, one die having a raised useful portion contacting surface and the other die having a raised waste portion contacting surface, the raised surface of one of the dies being of greater height than the raised surface of the other die to ensure the stripping action, and means on said stripping dies coacting to releasably interlock the superimposed useful portions.

5. In a sheet stripper, upper and lower dies and means for moving one of the dies toward the other die to sever the connections between the useful and waste portions of a pile of cut and creased sheets to strip them, one die having a raised useful portion contacting surface and the other die having a raised waste portion contacting surface, the raised surface of one of the dies being of greater height than the raised surface of the other die to ensure the stripping action, said stripping dies having projections and recesses coacting to bend corresponding elements of the superimposed useful portions to releasably interlock them.

6. In combination, a sheet stripper having upper and lower dies, a track bed, a track thereon passing through the sheet stripper, a truck movable on the track to bring the lower die with a pile of cut and creased sheets having connected useful and waste portions into register with the upper die, said dies having coacting cutting and stripping elements of the same contours as the said useful portions, manually operated means for lowering the truck body onto the track bed, and means for moving the upper die toward the lower die to sever the connections between said useful and waste portions and to strip the sheets when the truck body is in its lowered position.

7. In combination, a sheet stripper having upper and lower dies, a track bed, a track thereon passing through the sheet stripper, a truck movable on the track to bring the lower die with a pile of cut and creased sheets having connected useful and waste portions into register with the upper die, said dies having coacting cutting and stripping elements of the same contours as the said useful portions, manually operated means for lowering the truck body onto the track bed, said truck body and track bed having coacting holes and pins to releasably lock the truck body in its lowered position, and means for moving the upper die toward the lower die to sever the connections between said useful and waste portions and strip the sheets when the truck body is in its lowered position.

8. In combination, a sheet stripper having upper and lower dies, a track bed, a track passing through the sheet stripper, a truck, wheels thereon movable on the track to bring the lower die with a pile of cut and creased sheets having connected useful and waste portions into register with the upper die, said dies having coacting cutting and stripping elements of the same contours as the said useful portions, eccentric mountings for the truck wheels, and manually operated means to impart a rotary movement to said eccentric mountings for lowering the truck body onto the track bed and thereby releasing the weight from the truck wheels, and means for moving the upper die toward the lower die to sever the connections between said useful and waste portions and strip the sheets when the truck body is in its lowered position.

9. The method which consists in associating a pile of cut and creased sheets with upper and lower dies having coacting cutting and stripping elements of the same contours as the useful portions of the sheets, moving one of the dies toward the other die with sufficient pressure on the pile to sever the connections between the useful and waste portions of the sheets and strip

the sheets, moving the lower die together with the stripped pile of sheets to a predetermined point and thereafter separating and removing the said useful and waste portions.

10. The method which consists in associating a pile of cut and creased sheets with upper and lower dies having coacting cutting and stripping elements of the same contours as the useful portions of the sheets, said dies also having coacting useful portion interlocking elements, moving one of the dies toward the other die with sufficient pressure on the pile to sever the connections between the useful and waste portions of the sheets, strip the sheets and releasably interlock the superimposed useful portions of the sheets, moving the lower die together with the stripped pile of sheets to a predetermined point and thereafter separating and removing the said useful and waste portions.

11. The method which consists in associating a pile of cut and creased sheets with upper and lower dies having coacting cutting and stripping elements of the same contours as the useful portions of the sheets, said dies also having coacting useful portion bending elements, moving one of the dies toward the other die with sufficient pressure on the pile to sever the connections between the useful and waste portions of the sheets, strip the sheets and bend corresponding parts of the superimposed useful portions to releasably interlock them, moving the lower die together with the stripped pile of sheets to a predetermined point and thereafter separating and removing the said useful and waste portions.

12. The method which consists in moving a pile of cut and creased sheets together with a lower stripping die from a suitable source into register with an upper stripping die, said dies having coacting cutting and stripping elements of the same contours as the useful portions of the sheets, moving the upper die downward to exert sufficient pressure on the pile to sever the connections between the useful and waste portions of the sheets and strip the sheets and thereafter transferring the lower die with its pile of stripped sheets to a useful and waste portion separation and removal position.

13. The method which consists in moving a pile of cut and creased sheets together with a lower stripping die from a suitable source into register with an upper stripping die, said dies having coacting cutting and stripping elements of the same contours as the useful portions of the sheets, the dies also having useful portion interlocking elements, moving the said upper die downward to exert sufficient pressure on the pile to sever the connections between the useful and waste portions of the sheets, strip the sheets and releasably interlock the superimposed useful portions, and thereafter transferring the lower die with its pile of stripped sheets to a useful and waste portion separation and removal position.

14. The method which consists in moving a pile of cut and creased sheets together with a lower stripping die from a suitable source into register with an upper stripping die, said dies having coacting cutting and stripping elements of the same contours as the useful portions of the sheets, releasably locking the lower die with its pile in such register, moving the upper die downward with sufficient pressure on the pile to sever the connections between the useful and waste portions of the sheets and strip the sheets and thereafter transferring the lower die with its pile of stripped sheets to a useful and waste portion separation and removal position.

15. The method which consists in moving a pile of cut and creased sheets together with a lower stripping die from a suitable source into register with an upper stripping die, said dies having coacting cutting and stripping elements of the same contours as the useful portions of the sheets, the dies also having useful portion interlocking elements, moving said upper die downward to exert sufficient pressure on the pile to sever the connections between the useful and waste portion of the sheets, strip the sheets and at the same time releasably interlock the superimposed useful portions, and thereafter transferring the lower die with its pile of stripped sheets to a useful and waste portion separation and removal position.

16. In a sheet stripper, upper and lower dies, means for positioning the lower die to receive successive cut and creased sheets having connected useful and waste portions, means for receiving the lower die with its pile of sheets from the positioning means and moving the die with its pile into register with the upper die, said dies having coacting cutting and stripping elements of the same contours as said useful portions, and means for moving the upper die downward to sever the waste portions from the useful portions of the superimposed sheets and strip them and then upward to free the die from the pile.

17. In a sheet stripper, upper and lower dies, means for positioning the lower die to receive successive cut and creased sheets having connected useful and waste portions, means for receiving the lower die with its pile of sheets from the positioning means and moving the die with its pile into register with the upper die, said dies having coacting cutting and stripping elements of the same contours as said useful portions, means for releasably locking the pile in its registered position, and means for moving the upper die downward onto the pile to sever the waste portions from the useful portions of the superimposed sheets and strip them and then upward to free the die from the pile.

18. In a sheet stripper, upper and lower dies, means for positioning the lower die to receive successive cut and creased sheets having connected useful and waste portions, means for receiving the lower die with its pile of sheets from the positioning means and moving the die with its pile into register with the upper die, said dies having coacting cutting and stripping elements of the same contours as said useful portions, and means for moving the upper die downward to sever the waste portions from the useful portions of the superimposed sheets and strip them and then upward to free the die from the pile, the lower die being subsequently movable with its pile of stripped sheets to a predetermined point.

19. In a sheet stripper, upper and lower dies, means for positioning the lower die to receive successive cut and creased sheets having connected useful and waste portions, means for receiving the lower die with its pile of sheets from the positioning means and moving the die with its pile into register with the upper die, said dies having coacting cutting and stripping elements of the same contours as said useful portions, means for releasably locking the pile in its registered position, and means for moving the upper die downward onto the pile to sever the waste portions from the useful portions of the

superimposed sheets and strip them and then upward to free the die from the pile, the lower die being subsequently movable with its pile of stripped sheets to a predetermined point.

20. In a sheet stripper, upper and lower dies, means for positioning the lower die for receiving from a sheet supply source successive cut and creased sheets having connected useful and waste portions, means for receiving the lower die and its pile from the positioning means and moving the die with its pile into the sheet stripper in register with the upper die, said dies having coacting cutting and stripping elements of the same contours as said useful portions, and means for moving the upper die downward onto the pile to strip the waste portions from the useful portions and for thereafter raising the upper die, the lower die being subsequently movable with its pile of stripped sheets to a predetermined point.

21. In a sheet stripper, upper and lower dies, means for positioning the lower die to receive from a sheet supply source successive sheets having connected useful and waste portions, a track leading from the supply source through the stripper to a predetermined point, a truck on said track for receiving the lower die and its pile of sheets from the positioning means and moving the die with its pile into register with the upper die, said dies having coacting cutting and stripping elements, means for releasably locking the truck in its registered position, and means for moving the upper die downward onto the pile to sever the useful and waste portions of the sheets and then upward to free the die from the pile, the truck being subsequently movable with its lower die and pile to said predetermined point.

22. In a sheet stripper, upper and lower dies, means for positioning the lower die to receive successive cut and creased sheets from a sheet supply source, said sheets having connecting useful and waste portions, a track leading from the supply source through the stripper to a predetermined point, a truck on said track for receiving the lower die and its pile of sheets from the positioning means and moving the die with its pile into register with the upper die, said dies having coacting cutting and stripping elements of the same contours as the said useful portions, means for lowering the truck body onto and raising it from the track bed, means for releasably locking the truck in its lowered position, and means for moving the upper die downward onto the pile to sever the useful and waste portions of the sheets and then upward to free the die from the pile, the truck being subsequently movable with its lower die and pile to said predetermined point.

23. In a sheet stripper, upper and lower dies, means for positioning the lower die to receive cut and creased sheets from a sheet supply source, said sheets having connected useful and waste portions, a track leading from the supply source through the sheet stripper to a predetermined point, a truck movable on the track to receive the lower die with its pile of sheets from the positioning means and moving the die with its pile to the sheet stripper into register with the upper die, said dies having coacting cutting and stripping elements of the same contours as the said useful portions, means for causing the dies to coact to sever the connections between the useful and waste portions of the sheets, the truck being subsequently movable with its lower die and pile to said predetermined point, and means for releasably locking the truck at the source of sheet supply and also at the sheet stripper.

24. In a sheet stripper, upper and lower dies, means for positioning the lower die to receive cut and creased sheets from a supply source, said sheets having connected useful and waste portions, a track leading from the sheet supply source through the sheet stripper to a predetermined point, a truck movable on the track for receiving the die with its pile of sheets from the positioning means and moving the die with its pile to the sheet stripper into register with the upper die, said dies having coacting cutting and stripping elements of the same contours as the useful portions, means for causing the dies to coact to sever the connections between the useful and waste portions of the sheets, said truck being movable with its lower die and pile to said predetermined point, and means for releasably locking the truck at the source of sheet supply, at the sheet stripper and at the said predetermined point.

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