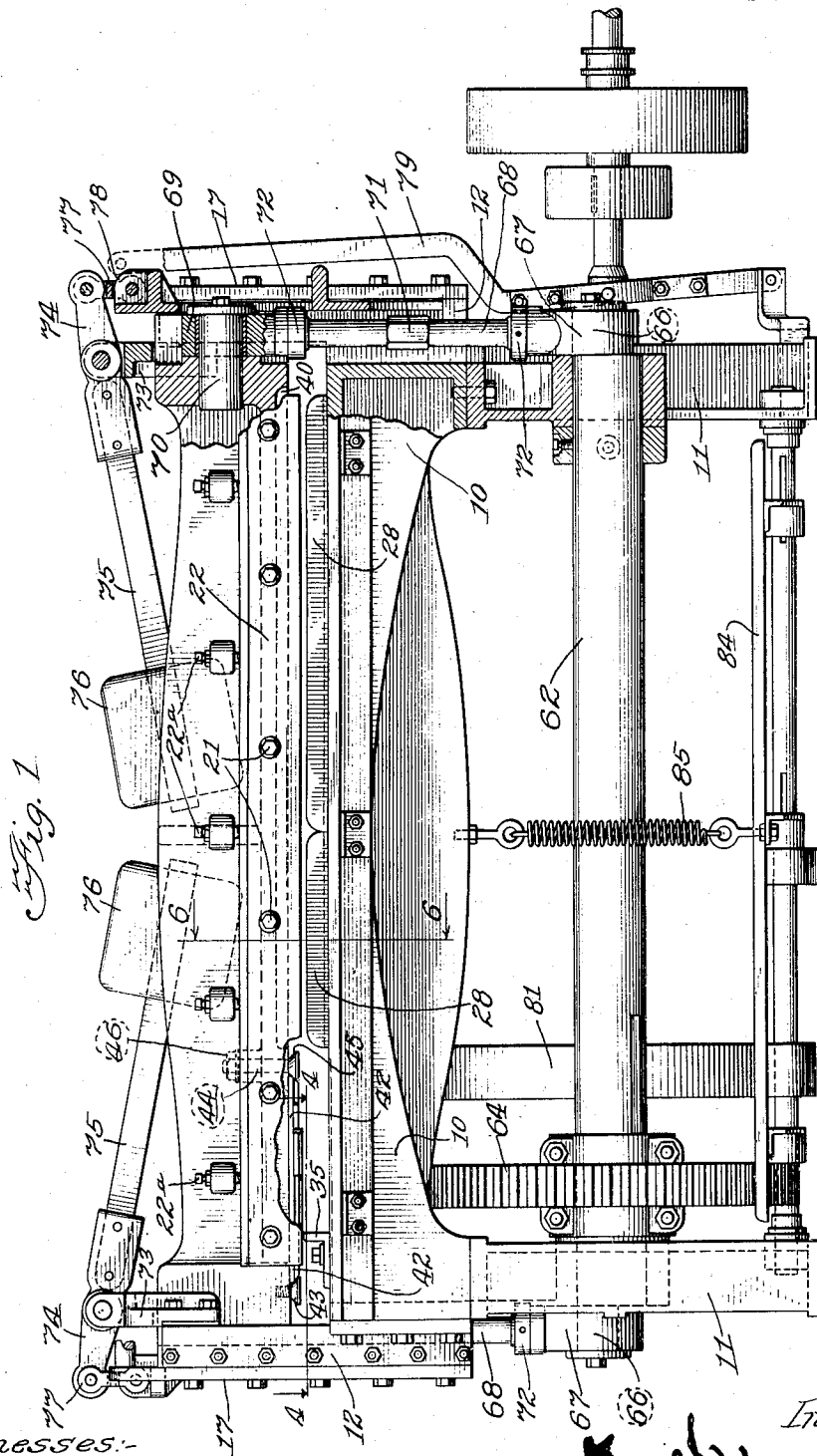


K. I. HERMAN.
MACHINE FOR CREASING AND CUTTING BOX BLANKS.
APPLICATION FILED JULY 22, 1909.

1,037,909.

Patented Sept. 10, 1912.

4 SHEETS—SHEET 1.



Witnesses:-
Wm. H. Yagel
Charles E. Cope.

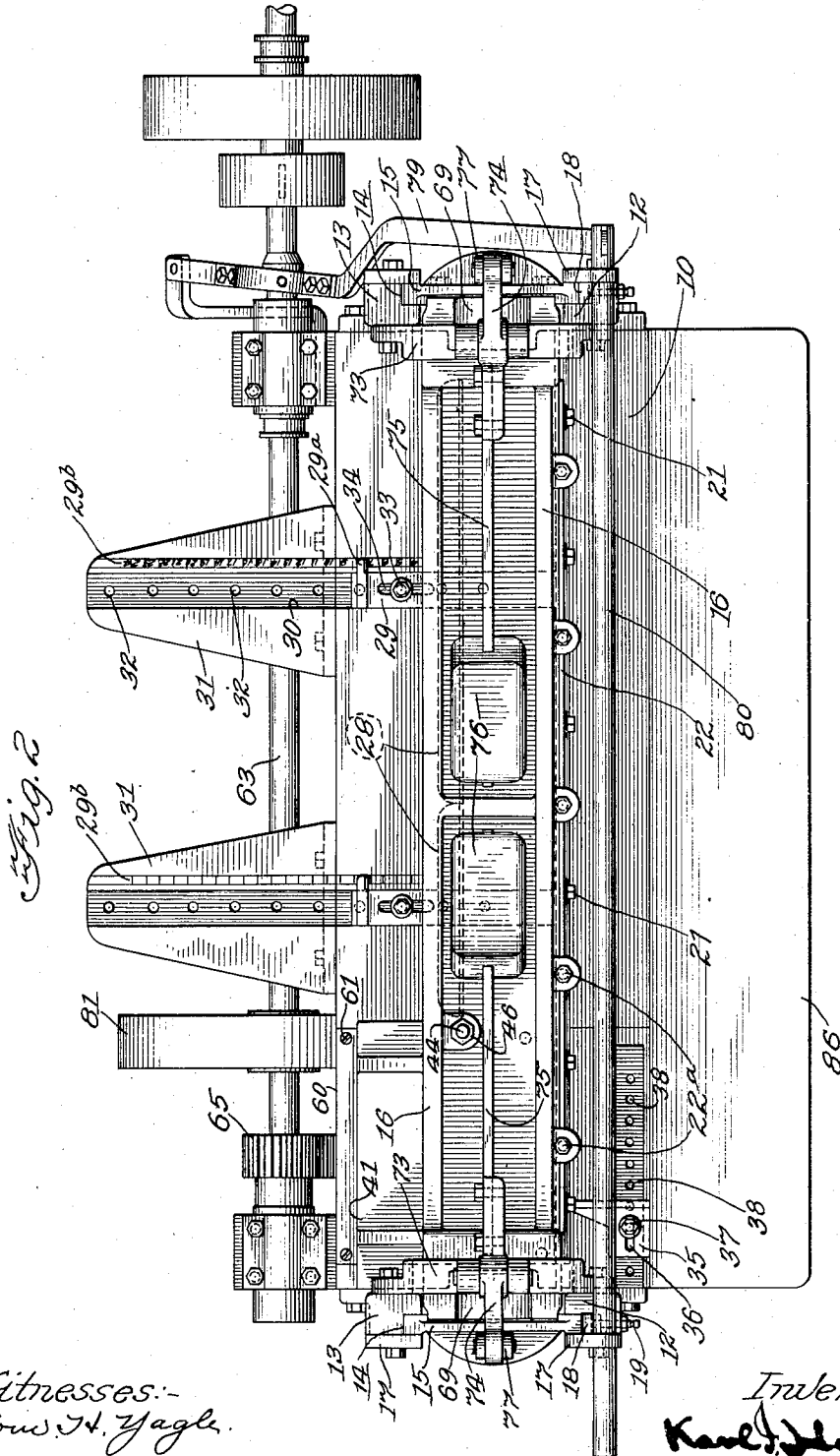
Inventor:-
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by Jones, Addington & Ames,
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Charles G. Cape

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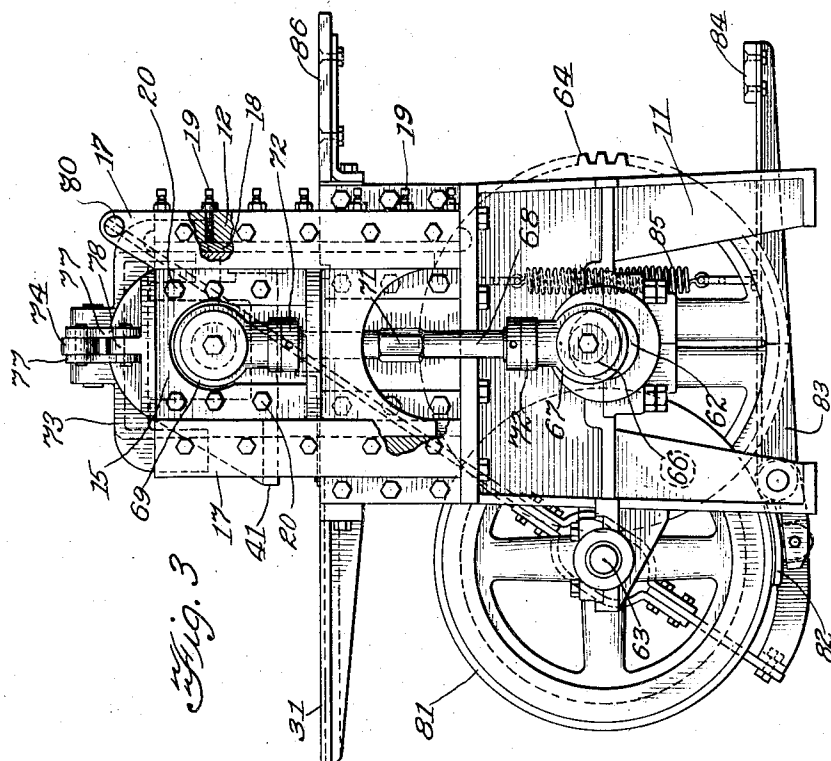
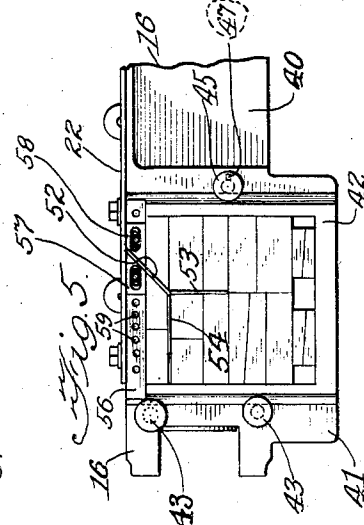
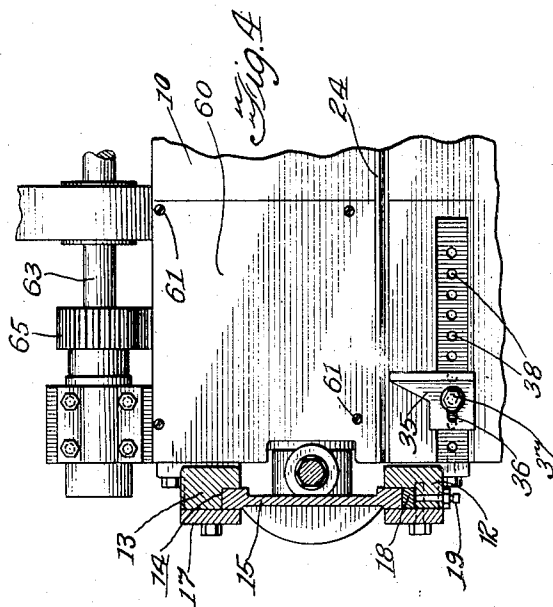
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4 SHEETS—SHEET 3.



Witnesses:—

Wm. H. Zagle

Charles G. Cope

Inventor:—

Karl I. Herman

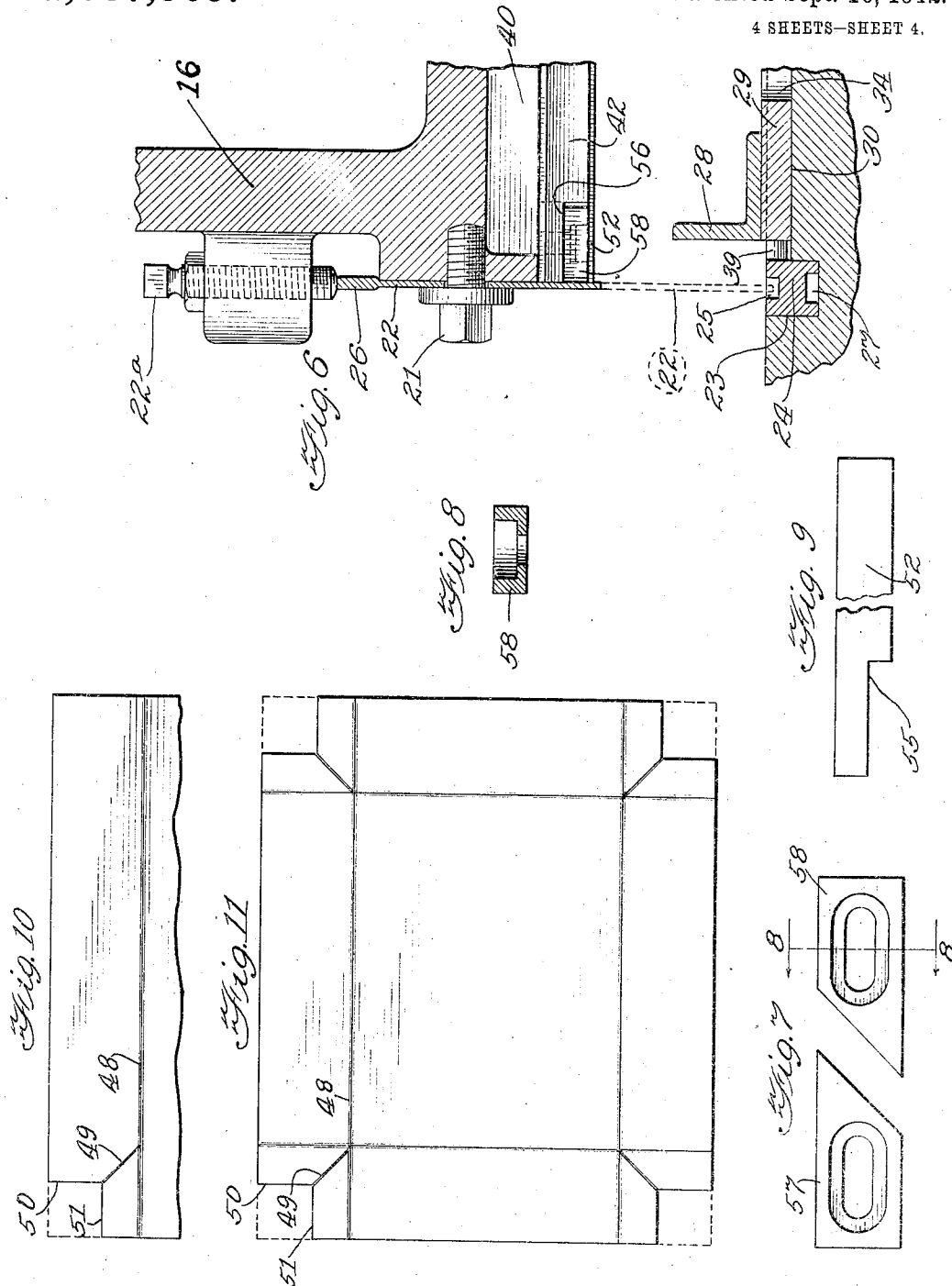
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Witnesses:-
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Charles G. Cope

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UNITED STATES PATENT OFFICE.

KARL I. HERMAN, OF CHICAGO, ILLINOIS.

MACHINE FOR CREASING AND CUTTING BOX-BLANKS.

1,037,909.

Specification of Letters Patent.

Patented Sept. 10, 1912.

Application filed July 22, 1909. Serial No. 508,903.

To all whom it may concern:

Be it known that I, KARL I. HERMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Machines for Creasing and Cutting Box-Blanks, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to machines for creasing and cutting blanks to be used in the manufacture of paper boxes, and consists in the novel combinations of parts and features of construction described in the following specification and pointed out in the appended claims.

In order that my invention may be fully understood I have illustrated an embodiment thereof in the accompanying drawings, but it is to be understood that variations may be made from the construction illustrated without departing from the spirit of my invention as expressed by the claims.

In the drawings; Figure 1 is a front elevation of the machine with portions thereof broken away to show the location of the knife-supporting chase and the position of one of the slides and its guide posts and adjacent parts; Fig. 2 is a plan of the machine; Fig. 3 is an end elevation of the machine; Fig. 4 is a fragmental sectional plan taken on the line 4—4, Fig. 1; Fig. 5 is an inverted plan of the left hand end of the creaser beam showing the location of the chase thereupon and the position of the knives in the chase; Fig. 6 is a fragmentary enlarged section upon the line 6—6, Fig. 1; Fig. 7 is an enlarged detail view of the knife retaining clamp; Fig. 8 is a section on line 8—8, Fig. 7; Fig. 9 is an enlarged detail view of the end of one of the knives; Fig. 10 shows a portion of a blank after having been creased and cut by the machine; and Fig. 11 shows a complete blank creased and cut, ready for folding to form a box.

Referring now to the drawings, in which like reference numerals refer to like parts throughout the several figures, the bed 10 of the machine, is mounted upon suitable legs 11 and is provided at each end with a front guide post 12 and a rear guide post 13, in the opposing surfaces of which are formed slide ways 14 for receiving the

slides 15, which carry between them the creaser beam 16. The slides 15 are retained in place in the slide ways 14 so as to be capable of a reciprocating movement therein, by means of plates 17 secured to the faces of the front and rear guide posts 12 and 13. Gibs 18 are inserted between the edges of the slides 15 and the guide surfaces of the front guide posts 12, a number of set screws 19 being provided which pass through the guide posts 12 and engage at their ends against the gibbs 18. By tightening the set screws 19 the gibbs 18 may be moved inward in order to take up any wear of the slides 15 which may occur in the course of use of the machine.

The creaser beam 16, which is channel-shaped in cross section, is mounted between the slides 15 and therefore participates in their reciprocating movement, the beam being secured in place by means of bolts 20 which pass through the slides and enter the ends of the beam. To the front face of the creaser beam is secured by means of studs 21, the creaser blade 22 (Figs. 1, 2 and 6), which extends somewhat below the lower edge of the beam. The holes in the creaser blade through which the studs 21 pass are somewhat enlarged (Fig. 6) so that a slight upward or downward adjustment of the blade may be made when desired.

Set screws 22^a are mounted in suitably positioned lugs formed on the creaser beam and engage with their ends against the upper edge of the blade 22. These set screws 22^a serve as a gage and render it possible to accurately adjust the creaser blade as to its vertical position above the bed of the machine. They also provide a rear abutment for the creaser blade and prevent slipping during the operation of the machine.

The bed 10 is formed with a groove 23 extending longitudinally along its upper surface and located immediately below the blade 22. In this groove 23 is removably mounted a die 24 having a slot 25 therein so disposed that the blade 22 will enter it when the beam 16 is lowered during its reciprocating movement, whereby a crease will be formed in any material which may be inserted between the die 23 and the blade.

The blade 22 is provided with a thickened portion 26 at its upper edge and the die 24 is provided with a second slot 27 in the face

opposite to the slot 25 so that when it is desired to create a wider crease or to form a crease in a material thicker than the usual; the blade may be removed and replaced with the thickened portion 26 downward, the die being also removed and reversed so that its wider slot 27 is uppermost. By this means it is possible to quickly change the machine so as to produce a wider crease without the necessity of keeping at hand a number of extra parts.

In order that the blank to be creased may be properly positioned in the machine before each creasing operation, gages 28 are provided, one of which is shown as being shorter than the other in order to provide sufficient space upon the under side of the beam for the mounting of the knife supporting chase. These gages are capable of adjustment to provide for the creasing of blanks of different sizes and, as they are similar in construction, a description of one of them will suffice. Each gage is provided with a shank 29 adapted to slide in a groove 30 extending transversely of the bed 10. In order to provide for a sufficient amount of movement of the gages 28, the bed is laterally extended by means of brackets 31 into which the grooves 30 are continued. Suitably spaced bolt holes 32 are formed through the metal of the bed and brackets at the center of the grooves 30, into any one of which holes a bolt 33 may be inserted which passes through an elongated slot 34 formed in the shank 39. By placing the bolt 33 in the proper one of the holes 32 and sliding the shank the required distance relatively to the blade the gage may be set at any desired position relatively to the creaser blade.

The shank 29 of each of the gages 28 is provided with a finger 29^a so arranged that when the gage is adjusted forward or backward the finger will move over a graduated scale 29^b which is provided adjacent the edge of each of the grooves 30. By this means it is possible to readily adjust the gages to make a crease at any desired distance from the edge of the blank without the necessity of experimenting several times before finally fixing the gage in position, as is necessary with most of the machines at present on the market.

An adjustable end gage 35 is provided against which the end of the blank being creased may be held in order to insure proper longitudinal position of the blank. The gage 35 is formed with a slot 36 similar to the slots 34 of the gages 28 and in this slot is secured a bolt 37 which may be inserted in any one of a number of bolt holes 38 formed in the bed 10, according to the position at which it is desired that the gage 35 be placed.

The gages 28 will sometimes be moved

close up to the creaser blade, and in order to prevent damage stop pins 39 are provided upon the front of each gage (Fig. 6) which strike against the die 24 and prevent the gage from being accidentally moved closer to the creaser blade than is safe.

It will often, also, be necessary to make creases at a very slight distance from the edge of the blank. When this is done the gages will be located directly beneath the creaser beam, and therefore, in order to prevent the creaser beam from striking and breaking the gages, the rear part of the lower face of the beam 16 is cut out to form a depression 40. This depression extends to the rear edge of the creaser beam and provides sufficient room beneath the latter for the gages. The depression 40 ceases above the left hand end of the left hand gage leaving a platen at the left hand end of the creaser beam for receiving the knife supporting chase, the creaser beam being at this point rearwardly extended by means of a bracket 41 whereby sufficient room is provided for receiving the chase.

The case 42 in which the cutting knives are mounted is secured to the lower face of the creaser beam at the left hand end of the same and is held in position by means of beveled studs 43 and a bolt 44 having at its lower end a beveled head 45, the stud 43 and head 45 engaging over the edges of the chase, which are beveled. The bolt 44 passes through the metal of the creaser beam and is provided, at its upper end, with a nut 46 and, at its lower end, with a pin 47 which enters a corresponding slot in the creaser beam and prevents turning of the bolt. The chase is mounted upon the beam by pushing it forward against the creaser blade, its beveled edges engaging beneath the studs 43 and the head 45 of the bolt 44. The nut 46 of the bolt 44 may then be tightened whereby the head 45 will be drawn against the edge of the chase, the latter being thus secured in position.

The machine is illustrated as being adjusted to form at one operation, the crease 48 (Fig. 10), a diagonal cut 49, and two transverse cuts 50 and 51, the end of the cut 49 striking the crease 48 at a point thereon separated from the end of the blank by a distance equal to the distance between the crease 48 and the parallel edge of the blank. Knives 52, 53 and 54 (Fig. 5) are secured in the chase 50 and make the cuts 49, 50 and 51 respectively. The knives 53 and 54 may be secured in position in the chase by means of wooden blocks and wedges in the ordinary manner. It is necessary, however, in order that the cuts illustrated may be formed, that the knife 52 should extend over the side of the chase to the outer edge thereof, in order that the end of the knife may abut against the creaser blade and form a cut

which will extend to the crease formed by the blade. In order that this may be effected, the knife 52 is formed with a cut away portion 55 and the chase is formed with a corresponding cut away portion 56 at its front edge over which the narrowed end of the knife may be placed. In order to secure the end of the knife 52 against lateral movement suitable clamping means are provided, and these clamping means are illustrated as consisting of clamping blocks 57 and 58 having their opposing surfaces beveled to the angle at which the knife 52 is set. The blocks 57 and 58 are held in place by screws which enter screw holes 59 formed in the cutaway portion 56 of the chase and pass through elongated slots formed in the blocks. By this means it is possible to shift the blocks to hold the knife 52 in any desired position in the chase. This position varies, of course, with the distance between the crease 48 and the edge of the blank.

Situated immediately below the chase 42 is a hardened steel plate 60 against which the knives strike in cutting the blank. This plate is attached to the bed of the machine by means of screws 61 and may be readily removed when desired. When the knives have become worn, or when for some other reason the knives do not strike sufficiently firmly against the plate 60, the latter may be removed and replaced after a sheet of paper or the like has been inserted between it and the bed of the machine. By this means slight adjustment of the height of the plate 60 relative to the knives may be made. Greater adjustment may be effected by bodily changing the distance between the creaser beam and the bed. Means for effecting this will be hereinafter described.

The mechanism for imparting the necessary up and down reciprocating motion to the beam, in the construction illustrated, is as follows: Mounted in bearings in the legs 11 is a rotating shaft 62 which derives its motion from a driven shaft 63 by means of a gear 64 engaging a pinion 65 upon the shaft 63. The outer ends of the shaft 62 are formed with crank pins 66 upon which the connecting rod heads 67 are rotatably mounted. The construction of the connecting rods and related parts is the same at both ends of the machine and a description of those at one end will be sufficient. Threaded into each of the heads 67 is the lower end of the connecting rod 68, the upper end of which screws into a head 69, rotatably supported upon a pin 70 carried by the end of the creaser beam. This pin 70 is preferably formed of forged steel and forced into the end of the creaser beam by hydraulic pressure.

The threads at one end of the connecting rod are right-handed and at the other end

are left-handed, so that by turning the connecting rod in one direction or the other, the creaser beam may be raised or lowered relatively to the bed of the machine. To allow such turning to be conveniently effected a nut portion 71 is formed at the middle of the connecting rod. In order that when the position of the creaser beam relative to the machine bed has been finally determined, the connecting rod 71 may be locked in position, lock nuts 72 are provided at the upper and lower ends of the connecting rod.

It will be seen from the above that, power being supplied to the shaft 62 by the shaft 63, the crank pins 66, in turning, will communicate an up and down motion to the connecting rods and thus to the creaser beam, which, as has been stated, is attached to the slides 15. When, by reason of wear of the knives or for any other reason, it is necessary to alter the distance between the creaser beam and the bed, this may be done by loosening the lock nuts 72 and turning the connecting rods to a sufficient extent to effect the vertical adjustment desired. It may happen that such vertical adjustment would only be necessary on account of the knives being either too long or too short, the position of the creaser blade being correct. The result of this would be that when the height of the creaser beam had been changed to suit the knives, the distance between the lower edge of the creaser blade 22 and the die would be either too great or too small. This may then be corrected by adjusting the height of the creaser blade by loosening the studs 21 and adjusting the set screws 22^a. It will thus be seen that three adjustments are rendered possible, that is, (1) slight adjustment of the distance between the knives and the cutting plate, by removing the cutting plate and inserting a sheet of paper or the like, (2) adjustment of the creaser beam relative to the bed by manipulating the connecting rods 68 and (3) vertical adjustment of the creaser blade by loosening the studs 21 and manipulating the set screws 22^a. By properly choosing between the above methods of adjustment it is possible to obtain any desired relation between the positions of the knives, the creaser blade, and the bed of the machine.

The creaser beam and the parts supported thereby are very heavy and in order that the machine may run smoothly it is desirable to provide counterweighting means so that the upward movement of the creaser beam may be helped and the downward movement retarded. To this end brackets 73 are bolted to the inner sides of the front and rear guide posts 12 and 13 and in these brackets are pivotally supported levers 74, to the inner ends of which are attached arms 75 carrying the counterweights 76. The outer ends of the levers 74 are connected by pivoted

links 77 with the slides 15, which are each provided with a lug 78 to which the links are connected.

A clutch is provided for connecting and
5 disconnecting the belt pulley and the driven shaft 63. This clutch is adapted to be operated by a pivoted arm 79, the upper end of which is hinged to a bar 80 which is slidably mounted in the upper ends of the cover
10 plates 17 for the front guide posts 12, which latter are extended upward for that purpose. In order to stop or start the machine the clutch may be operated by manually pushing the bar 80 to the right or left. By reason of the momentum of the parts of the
15 machine and of the fly wheel 81 on the shaft 63, the machine would ordinarily continue moving for a considerable time after the clutch had been thrown out unless means
20 were provided for preventing it from doing so. In order to stop the machine immediately the clutch has been thrown out, a brake is provided which comprises a shoe 82 arranged to be forced against the periphery
25 of the fly wheel 81 by the lever 83 upon which the shoe is mounted. The lever 83 is provided at its outer end with a treadle 84 which the manipulator of the machine may actuate with his foot after the clutch
30 has been thrown out. A spring 85 holds the shoe 82 normally out of contact with the periphery of the fly wheel.

The operation of the machine to produce a blank similar to that shown in Fig. 11 is
35 as follows: The operator places the blank to be creased upon a shelf 86 provided for the purpose, and, while the creaser beam is raised by the connecting rods 68, he quickly pushes the blank into position beneath the
40 creaser blade and cutting knives. In order that the blank may be properly positioned, one side thereof is pushed against the gages 28 and the other side against the end gage 35. The creaser beam in its downward
45 movement forms the crease 48 and the cuts 49, 50 and 51 as described above, the appearance of the blank with the crease and cuts thus formed being as shown in Fig. 10. The blank is then withdrawn, turned
50 through a right angle, and quickly replaced beneath the creaser beam against the gages 28 and 35 with the result that a second crease and series of cuts is formed. The operation is repeated two more times, the blank
55 then having the appearance shown in Fig. 11 and being ready for folding to form a box. The material bounded by the cuts 50 and 51, if it has not already fallen out, may be removed by a slight tap.

60 By reason of the fact that the machine forms at one operation both the crease and the cuts necessary for the forming of the joining flaps, a large number of blanks may be creased and cut in very short time. Furthermore, by altering the position of the

gages and the position of the knives in the chase, which may be done in a very short time, the machine may be quickly adjusted to cut blanks of a different size and to form the creases at a greater or smaller distance
70 from the edge of the blank, the position of the cuts being of course varied correspondingly.

While I have described a specific embodiment of my invention, I do not limit myself to that particular construction. For instance, a particular arrangement of cutting knives has been described and illustrated, but other arrangements and shapes of knives may be used to produce other
75 forms of box without exceeding the scope of my invention as defined by the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a box blank creasing and cutting machine, a bed, a widened creaser beam reciprocally mounted relatively to said bed, said beam having a recess formed therein
80 and extending to the rear edge thereof, a die carried by said bed, a creaser blade carried by said beam and located above said die, a knife carried by said beam, and an adjustable gage for determining the position
85 of the blank relatively to the creaser blade.

2. In a box blank creasing and cutting machine, a bed, a die carried by said bed, an adjustable gage for determining the position of the blank relatively to the die, a
90 chase, a knife carried by said chase, a widened beam having a recess formed in its lower face above said gage and having a platen for receiving said chase, and a creaser blade carried by said beam and located above
95 said die.

3. In a box blank creasing and cutting machine, a creaser beam, a creaser blade carried thereby, a chase having one of its edges beveled located against said blade, and a
100 bolt passing through said beam and having a beveled bead for engaging over the beveled edge of said chase and holding the chase against the lower surface of said beam.

4. In a box blank creasing and cutting
105 machine, a bed, guide posts carried by said bed, slides mounted in said guide posts, a creaser beam mounted between said slides, levers pivoted between their ends to said posts and pivoted at their outer ends to said
110 slides, and counterweights carried by the inner ends of said levers.

5. In a box blank creasing and cutting machine, a chase having one side reduced in thickness, and a knife carried by said chase
115 and projecting over said reduced side.

6. In a box blank creasing and cutting machine, a chase having one side reduced in thickness, and a knife carried by said chase, said knife being formed with a narrowed
120 125 130

portion for projecting over the reduced side of said chase.

5 7. In a box blank creasing and cutting machine, a chase having one side thereof reduced in thickness, a knife carried by said chase and projecting over said reduced side, and an adjustable clamp carried by said reduced side for retaining said blade in position.

10 8. In a box blank creasing and cutting machine, a chase having one side thereof reduced in thickness, a knife carried by said chase and projecting over said reduced side, and a pair of clamping blocks adjustably
15 mounted on said reduced side one on either side of said knife.

9. In a box blank creasing and cutting machine, a chase having one side reduced in thickness, a knife carried by said chase, said knife having a narrowed portion at one end 20 for projecting over the reduced side of said chase, and a clamp adjustably mounted on said reduced side for securing said knife in position.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses. 25

KARL I. HERMAN.

Witnesses:

M. L. FARRAR,
CHARLES G. COPE.