Dec. 24, 1940. C. L. GILBERT 2,225,630

SCORING DEVICE FOR SAMPLE PAPER BOXES

Filed July 29, 1938 5 Sheets-Sheet 1

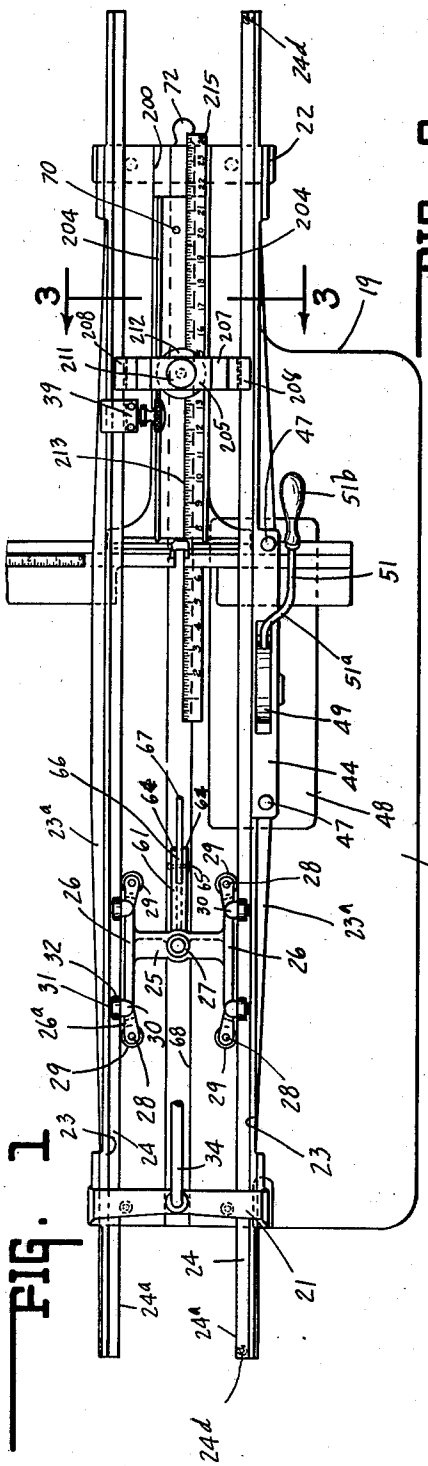


FIG. 1

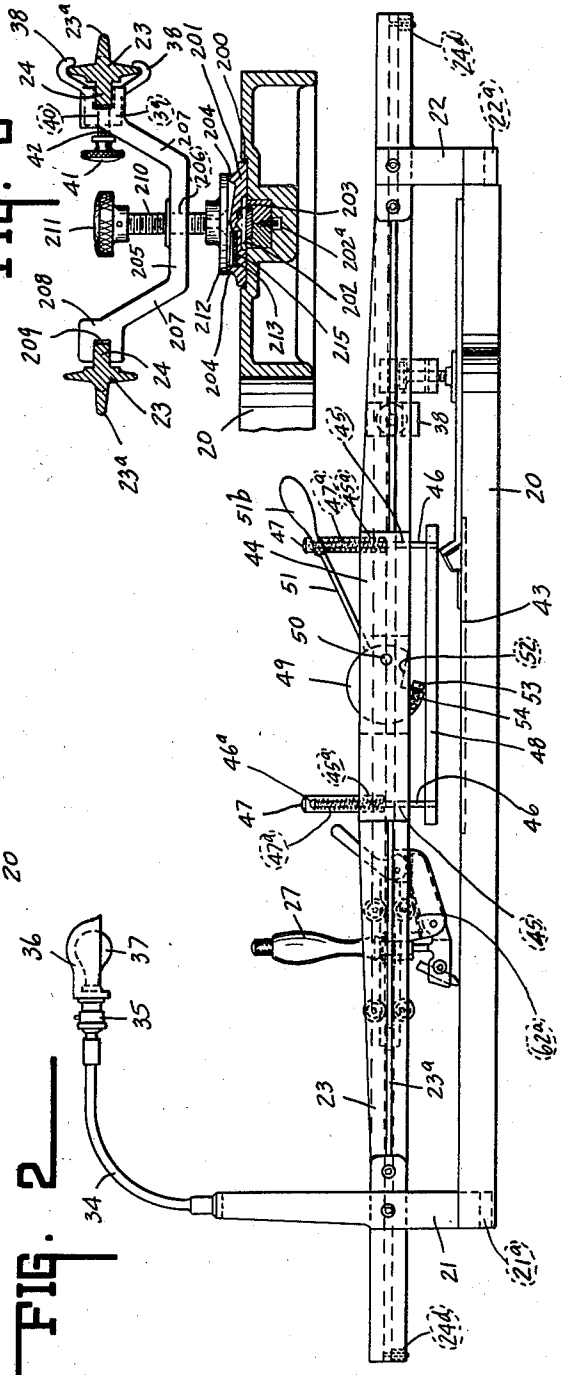


FIG. 3

FIG. 2

INVENTOR.
CLYDE L. GILBERT.

BY Lockwood, Goldsmith & Galt,
ATTORNEYS.

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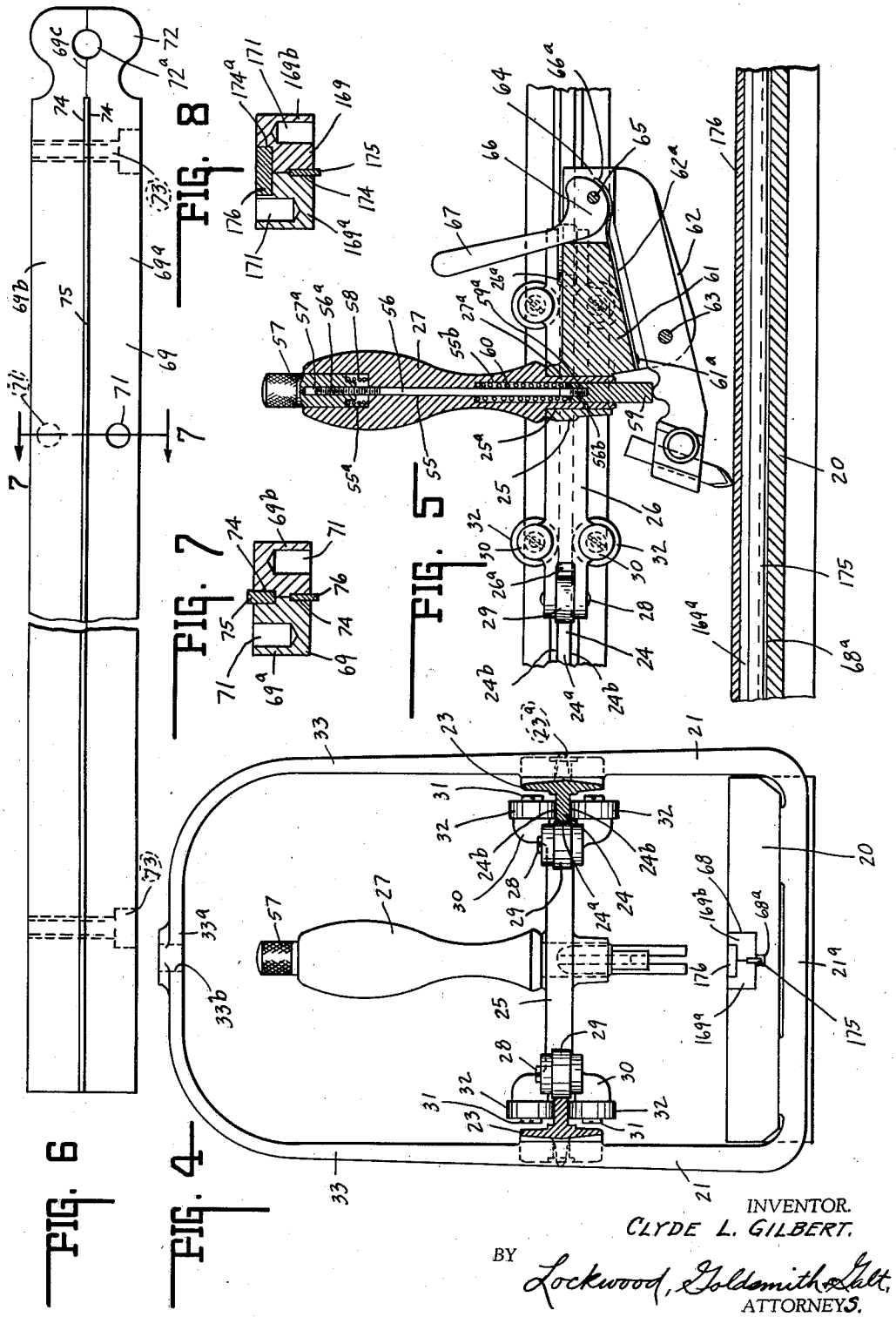


FIG. 8

FIG. 7

FIG. 5

FIG. 6

FIG. 4

INVENTOR.
CLYDE L. GILBERT.

BY Lockwood, Goldsmith & Galt,
ATTORNEYS.

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FIG. 10

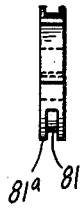


FIG. 9

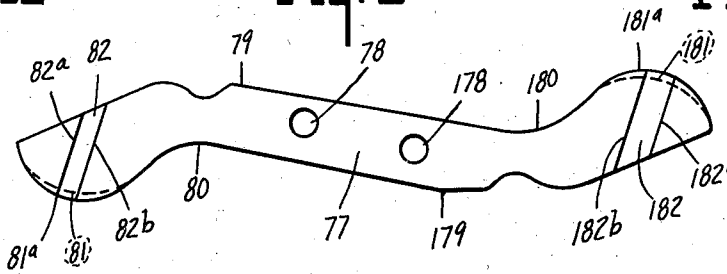


FIG. 11

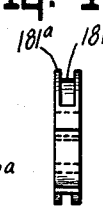


FIG. 12

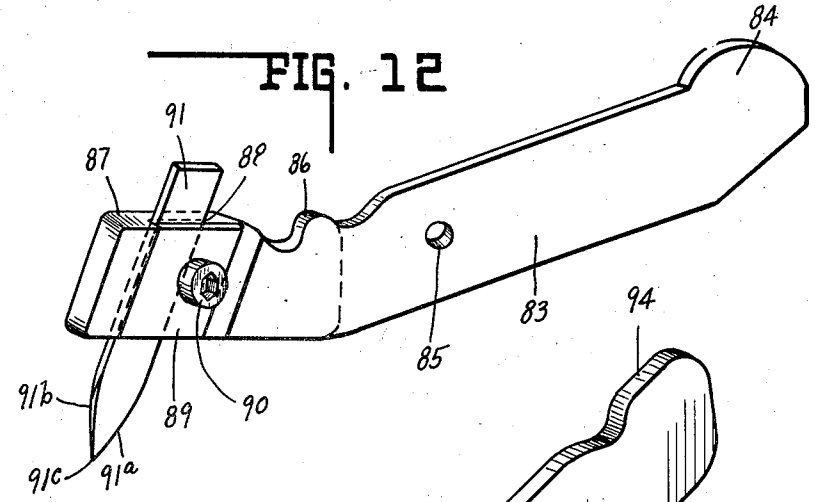


FIG. 13

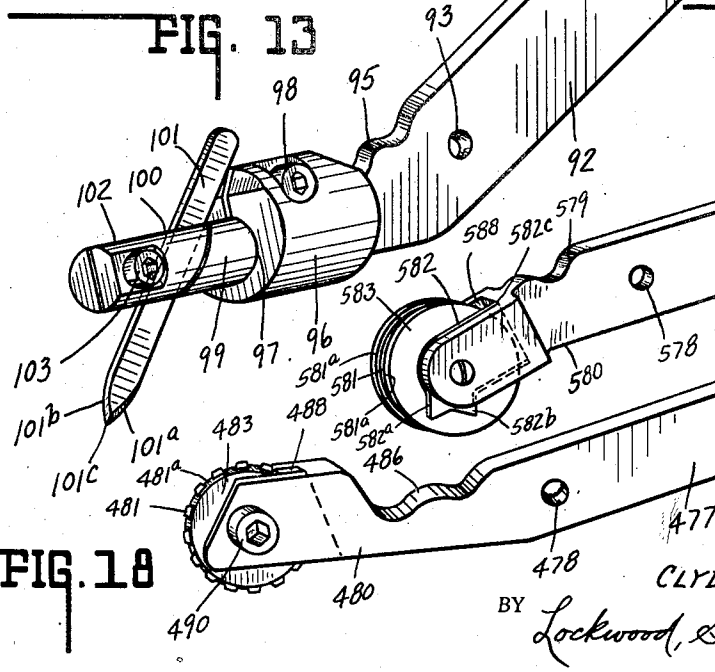


FIG. 19

FIG. 18

INVENTOR.
CLYDE L. GILBERT.
BY Lockwood, Goldsmith & Galt,
ATTORNEYS.

Dec. 24, 1940. C. L. GILBERT 2,225,630

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FIG. 14

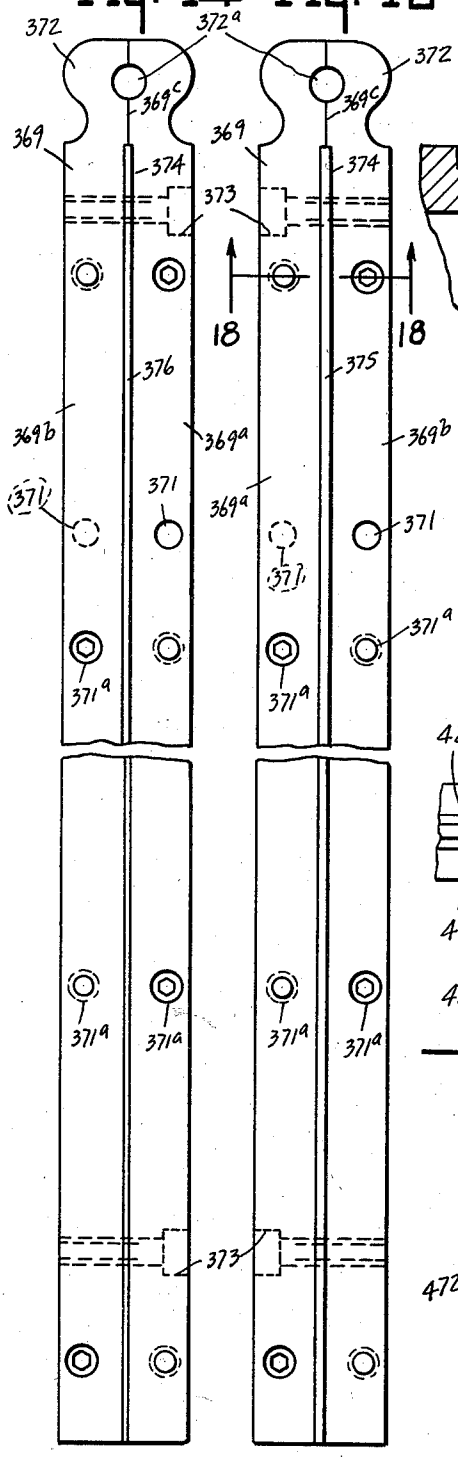


FIG. 15

FIG. 16

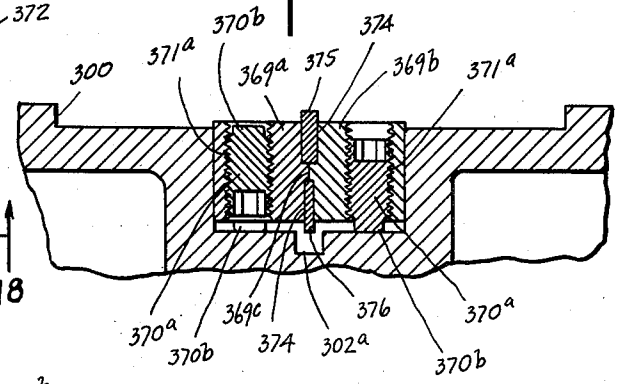


FIG. 17

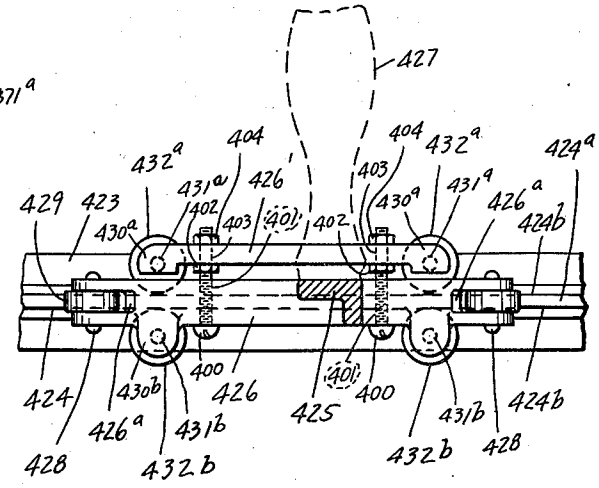
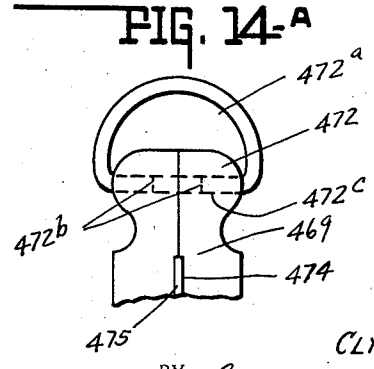


FIG. 14-A



INVENTOR.
CLYDE L. GILBERT.

BY Lockwood, Goldsmith & Galt,
ATTORNEYS.

Dec. 24, 1940. C. L. GILBERT 2,225,630

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FIG. 20

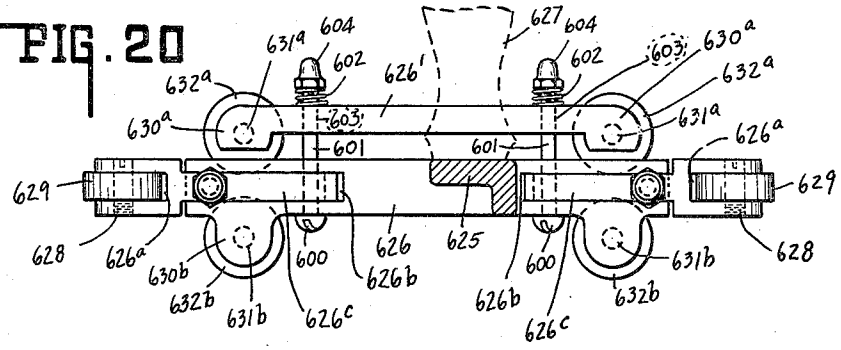
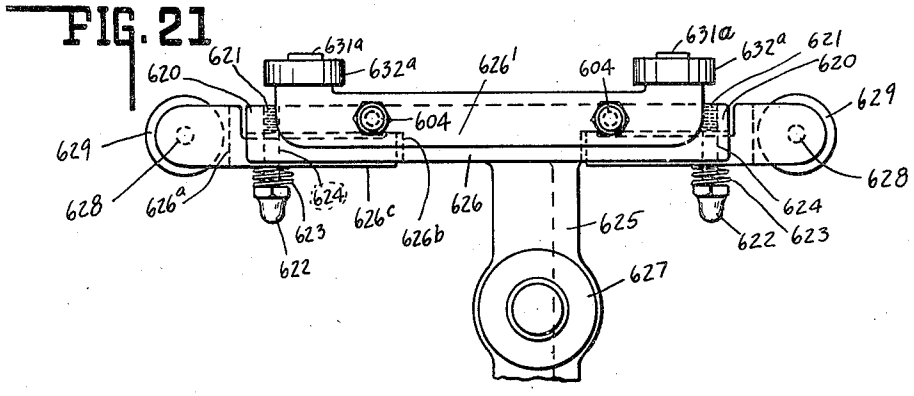


FIG. 21



INVENTOR.
CLYDE L. GILBERT.
BY Lockwood, Goldsmith & Galt
ATTORNEYS.

Patented Dec. 24, 1940

2,225,630

UNITED STATES PATENT OFFICE

2,225,630

SCORING DEVICE FOR SAMPLE PAPER BOXES

Clyde L. Gilbert, Elkhart, Ind., assignor to The Craftsman Equipment Corporation, Elkhart, Ind., a corporation

Application July 29, 1938, Serial No. 221,990

21 Claims. (Cl. 164—73)

This invention relates to a scoring and cutting device.

The following description is specifically directed to a machine for operating upon paper board stock to form creases or scores therein, cut scorings therein, cuts or trimming of the board including mat production.

The device disclosed herein is adapted not only to operate upon paper board and more especially card board but is adapted to operate upon mat, corrugated, or fibre board as well.

It is also adapted to operate upon glass, linoleum, plywood, et cetera, for cutting purposes. It is also adapted to operate upon leather, rubber and cork sheet material for cutting or creasing or cut scoring.

A machine of this general character is adapted for use by bookbinders, display studios, art studios, picture frame manufacturers, hardware stores and box manufacturers who fabricate folding, set up, corrugated and/or fibre board boxes.

As previously stated, one important field for the device disclosed herein, is in the production of boxes from paper board stock. The box industry heretofore has sold boxes by sample. These require hand fabrication as distinguished from mass production machine fabrication. Heretofore it has been the practice of the box designer to lay out the box to be made for sample purposes and then hand crease, cut or score the same in the desired manner and along the lines outlined. It will be readily appreciated that such operation is exceedingly tedious and the sample so produced involve considerable labor.

The present invention, therefore, is directed to a machine which will reduce the labor item to a minimum, especially for sample production and this reduction is obtained by providing certain attachments so that a paper board box of this general character can be readily fabricated from the sheet stock to form the finished blank ready for setting up, et cetera, into final box formation.

The invention is herein illustrated as of portable character. It may, however, be embodied as a unitary part of a large bench or table or it may be suitably secured thereto, as desired. The invention contemplates the utilization of two different cutting knife structures, as will be more fully pointed out.

The invention contemplates the use of two different creasing constructions, one having a range of capacity from about 12 point board to about 30 point board and the other having a range of capacity from about 25 point board to about 50 or 60 point board.

The invention also contemplates the utilization of two bars. One bar is provided with a cutting knife cooperating surface and a 4 point rule capable of association for forming a crease score in paper board of about 30 to 50 point. Another bar is provided with two rules, one a 2 point rule on one side which accommodates 12 to 20 point board, or the like, and the other a 3 point rule on the opposite side which accommodates 20 to 30 point board, or the like. These dimensions, however, and these limits are set forth merely by way of example only.

The present invention is adapted to be readily changed from a crease-scoring, cut-scoring, cutting or trimming device by utilizing the proper creasing tool or cutting knife, as the case may be, and the proper creasing rule or cutting surface for cooperation therewith, as will hereinafter be pointed out.

The invention includes a pair of spaced trackways elevated above the main plane of operation and which trackways support a manually movable carriage, the latter interchangeably receiving one of the aforementioned knives.

The machine also is arranged in its more complicated form to detachably receive an alignment device by which the paper board stock, or the like, to be operated upon may be properly aligned and positioned. The paper stock is positioned beneath the trackways and properly positioned or adjusted and then is clamped in said position. The carriage structure is then moved so that the proper knife, whether of creasing or cutting character, cooperates with the previously selected, complementary bar element to form the crease, score, the cut score, or the cut of the desired character and length. The stock, following the same, and upon retraction of the carriage, is released from clamping engagement, readjusted in position and the operation is repeated. It has been found that substantially all parallel creases, cuts, or the like, of the same character, can be most expeditiously effected and then the board turned at right angles and all those of similar character and previously transverse to the carriage effected. If any operations at an angle are required, the protractor attachment is utilized and the desired angular lines are followed for cutting, scoring, creasing, or the like.

To insure accuracy of operation, illumination means may be provided. To prevent injury between parts associated in the machine, adjust-

able stops may be provided. To facilitate interchangeability of knives, the rail structure is elongated or projects beyond the base structure so that the carriage is supported beyond the base structure. The knife structure and associated parts are readily accessible for removing any one of the three different knives and substituting another knife therefor, or in the case of the crease knife, reversing it to provide a different width of crease as will hereinafter be pointed out.

Other objects and features will be more fully pointed out hereinafter in the following description:

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

In the drawings, Fig. 1 is a top plan view of one embodiment of the invention, the lamp portion being omitted and the T-shaped aligner or straight edge arrangement being broken away relative to the free end thereof.

Fig. 2 is a side elevation of the invention, the same being equipped with a vertical cutting knife.

Fig. 3 is an enlarged transverse, sectional view of the T-aligner and straight edge anchoring arrangement, and the carriage stop arrangement, the same being taken on line 3—3 of Fig. 1 and in the direction of the arrows, the remainder of the invention being omitted.

Fig. 4 is an end elevational view toward the lamp end of the device, the knife being omitted from the carriage structure.

Fig. 5 is a central sectional view through the carriage, a vertical edge cutting knife being shown associated therewith and cooperating with the cutting bar.

Fig. 6 is a top plan view of a bar, the same illustrating a creasing rule form thereof.

Fig. 7 is a transverse sectional view through a bar provided with creasing rules of different widths.

Fig. 8 is a similar view of a modified form of bar equipped with a cutting or bearing plate and a creasing rule.

Fig. 9 is a side elevation of a dual creasing knife.

Fig. 10 is an end elevation of the same looking toward the right in Fig. 9.

Fig. 11 is an end elevation of the same looking to the left in Fig. 9.

Fig. 12 is a perspective view of the vertical cutting knife.

Fig. 13 is a perspective view of the adjustable swivel, or bevel edge cutting knife.

Fig. 14 is a plan view of a dual rule bar embodying a modified form of the invention.

Fig. 15 is a similar view of the opposite side of the same bar.

Fig. 16 is an enlarged transverse, sectional view of said last mentioned bar taken on line 18—18 of Fig. 15 and in the direction of the arrows and a portion of the supporting base with which it cooperates.

Fig. 17 is a vertical sectional view of a modified form of carriage and is taken in a plane between the handle portion (shown dotted therein) and the associated track element.

Fig. 18 is a perspective view of interrupted cut-scoring knife.

Fig. 19 is a similar view of a wheel type creasing knife.

Fig. 20 is a view similar to Fig. 17 of a modified form of carriage.

Fig. 21 is a top plan view of a portion of the carriage shown in Fig. 20.

Fig. 14—A is a view similar to Figs. 6, 14 and 15 and of the end of a modified form of bar structure.

Herein the term "knife" does not necessarily mean a blade for cutting and as previously set forth, the term "knife" is used in its broad sense and includes each of the constructions shown in Figs. 9, 12, 13, 18 and 19.

In the drawings the numeral 20 indicates a base plate. A pair of standards 21 at one end and 22 at the opposite end of said base plate suitably support in spaced relation a pair of tracks 23. These tracks are of T-shaped section, as shown most clearly in Fig. 4. They may be provided, if desired, with reinforcing rib portions 23*a*—see Figs. 2 and 4. Herein the two standards 21 are shown connected together as at 21*a*—see Fig. 4—and the standards 22 may be similarly connected as at 22*a*—see Fig. 2. The trackways, as stated, are of T-shape in cross section and the inwardly directed ledge portion 24 is provided with the inner face 24*a* and the upper and lower parallel faces 24*b*.

One rail 24 includes at each end a bumper or resilient stop 24*d* for carriage engagement. This includes a headed bolt screwed into the rail and having the exposed body portion enveloped by a rubber or like sleeve.

A carriage includes a transverse portion 25 and at each end, the same terminates in an elongated portion 26. The carriage supports a handle 27 and a knife carrier, as will hereinafter be pointed out. Each arm 26 at each end is bifurcated as at 26*a* and a shaft 28 pivotally supports in the bifurcated portion a roll 29 that engages the inner face 24*a* of the adjacent track member.

Adjacent each of the bifurcations and extending vertically therefrom, is an arm 30 and the same terminates in a trunnion 31 that mounts a roller 32. The two rollers 32 in vertical alignment, engage the upper and lower surfaces 24*b* of the trackway. In this manner, the carriage structure is definitely located and supported by the trackways, vertical movement of the carriage relative thereto being prevented by the rollers 32 and transverse or horizontal movement of the carriage relative thereto being prevented by the rollers 29. These rollers may be of hardened rubber or fibre or any other suitable material.

Extending upwardly from each standard 21 is the arm portion 33, the same being connected together as at 33*a* and including an aperture 33*b*. Associated therewith and suitably secured thereto is a flexible, tubular extension element 34 terminating in a light stocket 35 mounting a hood type reflector 36 and the light bulb 37. Current is supplied to the light bulb through the opening 33*b*—see Fig. 4—by means of wires, not shown. Thus, the bulb 37 may be directed to throw the light downwardly and forwardly upon the trackways and the area adjacent thereto.

To limit the sliding movement of the carriage to prevent interference with other mechanism, hereinafter to be described, there may be provided one or more stops and herein one of the same includes a C-shaped slide having the track embracing arm portions 38 and the connecting portion 39. The same is suitably apertured as at 40 and a headed clamp screw having the head portion 41 and the threaded shank portion 42 is adapted to clamp said stop to one of the rails, the central portion 39 constituting the abutment to limit the travel of the carriage.

Reference will now be had to Figs. 1 and 2. In said figures, the numeral 43 indicates a pressing, fibre or rubber mat plate set into the base 20 so that its upper surface is coplanar with the upper surface of the base. One of the tracks and herein the lower track—see Fig. 1—is laterally enlarged as at 44. It is provided with a pair of spaced openings 45 enlarged as at 45a. A pair of stems 46 are slidably supported in the openings 45 and project upwardly through the enlargement 45a. A coil spring 47a encircles each stem and has its lower end seated in the enlargement adjacent the junction between the opening 45 and its enlargement 45a and its opposite end bears on the head portion 46a of the stem. A tubular cap 47 protects the upwardly extending portion of said stem.

Suitably secured to the lower ends of the stems 46 is a clamping plate 48 that lies parallel to the pressing plate 43 and above the same. The paper board or like material which is to be operated upon by the tool carried by the carriage, is inserted between these two plates and is clamped in position by the plate 48.

The means for operating the clamping plate includes a cam member 49 pivotally mounted as at 50. Herein said cam member is shown generally of cylindrical form and it is mounted eccentrically of its central axis. A handle member 51 is offset as at 51a for carriage travel clearance. The handle member terminates in the handle portion 51b. Herein the circular cam 49 is relieved as at 52 and a headed screw 53 has threaded connection as at 54 in the reentrant portion or recess portion 52 of the cam.

As the cam is caused to rotate counterclockwise by handle movement in the same direction to insure downward movement of the plate 48 into clamping engagement, the head of the bolt 53 moves upwardly and if extreme pressure be exerted upon the cam structure, it will have no further effect then to cause the head 53 to engage the underface of the rail supporting the cam structure. This is the laterally enlarged portion 44. It is by this means that the clamping movement is limited to that determined by the adjusted position of the stop element, to-wit, bolt 53. This, as stated, prevents distortion of the several plates and possible bending of the stems 46.

The cross member 25—see Figs. 4 and 5—supports the handle 27 by means of the extension portion 27a press fitted in the bore 25a. The handle portion includes a central bore 55 laterally enlarged at its upper end as at 55a and laterally enlarged at its lower end, as at 55b. A rod 56 is slidably mounted in the bore 55 and the end thereof exposed in the chamber portion 55a is threaded for threaded connection with a finger piece 57 rotatably mounted in the bore 55a and having the threaded aperture 57a to accommodate the threaded end 56a of the rod 56.

The coil spring 58 is coaxial with the rod 56, is included in the chamber 55a and bears against the lower face thereof, and the lower face of the member 57. The purpose of the aforesaid will be set forth hereinafter. The lower end of the rod 56 is threaded as at 56b. A plunger member 59 has threaded engagement as at 59a with the threaded end 56b of the rod 56. It substantially closes and is slidably supported within the enlargement 55b of the bore 55. Interposed between the upper face of the enlargement 55b and the upper face of the member 59, is the coil spring 60 that normally projects the plunger 59 downwardly in opposition to spring 58.

Extending parallel to the portions 26 and therebetween is the portion 61. This provides a pair of parallel depending portions or flanges 62 which receive a pivot ring 63 upon which the knife structure is pivotally supported, the tail portion of the knife structure being nestable in the groove or slot between the flanges 62. The flanges 62 are continued upwardly as at 64 and extending across the same is the pivot pin 65 upon which is pivotally supported a cam 66 having the handle portion 67. It will be obvious when the handle portion 67 is turned clockwise, the cam portion 66 engages the adjacent end of the tail of the knife and tilts the tail clockwise on the pivot 63 and thereby elevates the operating end of the knife structure in opposition to the plunger 59 which normally projects downwardly and causes the operating end of the knife structure to engage the material therebeneath.

Whenever it is desired to change the knife structure or remove the same, the member 57 is threaded down upon the rod 56 which, in opposition to spring 58, elevates the rod 56 and, therefore, plunger 57 in opposition to spring 60. This relieves the pressure on the knife structure and the pin 63 may be readily withdrawn from the registering openings adapted to receive same in the flange or side faces 62.

In the channel defined by portion 61 and cheeks 62 is secured at 61a a leaf spring 62a having the curved end 66a which is interposed between the cam portion 66 and the carriage associated knife. This spring includes among its functions that of serving as a wearing plate.

Whenever it is desired to move the carriage without having the operating portion of the knife structure engage the material therebeneath, the handle portion 63 of the cam 66 is rotated clockwise which causes clockwise tilting of the knife structure to remove the operating element from material engagement. The carriage and knife structure shown in Fig. 2 is illustrated in non-engaging position so far as the operating end of the knife structure is concerned. In Fig. 5 the knife structure is shown in the normal material engaging position.

Reference will now be had to Figs. 1, 3, 4, 6, 7 and 8. The base 20 is provided in its upper face with a groove 68, the latter being provided with an extension 68a for a purpose hereinafter to be described. A bar member, indicated generally by the numeral 69, is positioned therein. The base supports a locating pin 70—see Fig. 1—very near the right end thereof and this locating pin is adapted to be received by a recess 71 formed in the bar 69. Since the bar is reversible, as will be hereinafter pointed out, two complementary recesses 71 are provided.

The bar 69 includes the handle portion 72 at one end and the same is apertured at 72a so that the bar when not in use can be hung upon a nail support or the like.

The bar 69 is comprised of two complementary members 69a and 69b that abut each other as at 69c, and are secured together by the nested clamping screws 73. The members 69a and 69b are provided with a complementary groove formation 74 that nests a rule 75 therein, and the rule is clamped by means of the bolts 73 between the two members 69a and 69b to form the bar. As shown clearly in Fig. 7, the rule 75 is of greater width than the rule 76, the former being positioned in the upper face of the bar and the latter

being positioned in the lower face thereof in the respective grooves 74.

In Fig. 8 similar numerals of the 100 series indicate a modified form of bar construction. The two bar forming members 169a and 169b include the groove 174 therebetween which receives a rule 175, smaller in width than rule 76. The upper face of the bar structure is provided with an upper groove 174a of material width and seated therein is an upper member 176 which is the cutting strip. The rule and strip are clampingly mounted in the bar structure. When a cutting knife structure is utilized, the strip 176 carried by the bar 169 is exposed uppermost as shown in Fig. 4, and engaged by the knife edge unless a cut-score operation is performed.

The bar illustrated in Fig. 8 is provided with an apertured handle portion in the same manner as bar 69, shown in Figs. 6 and 7, is provided with same.

When crease-scoring is to be performed, either the lower face with rule 175 of the bar 169 will be exposed uppermost or the bar shown in Fig. 7 will be substituted therefor, and either the rule 75 or the rule 76, as desired, will be exposed uppermost. It is noted that rules 75, 76 and 175 all project above the plane of the bar an equal amount, whereas the upper face of the strip portion 176 is preferably coplanar therewith.

Reference will now be had to Figs. 9 to 11, inclusive. In these figures, the creasing knife is illustrated. Herein the creasing knife includes a body portion 77 and there is provided a hole 78. Adjacent thereto is a bearing portion 79 adapted for engagement by the plunger 59. The hole 78 is adapted to be received by the slip pivot pin 63—see Fig. 5. The opposite face of the body portion is relieved as at 80 for a purpose hereinafter to be described.

The forward end of the creasing knife is grooved as at 81. It includes an indicator as at 82. This is of appreciable width. The margin 82a indicates the starting position and the margin 82b indicates the stopping position. It will be quite apparent that when the groove 81 is adapted to nest the paper board stock forced upwardly into the same by one of the rule members 75, 76, 175, depending upon which rule is being used and provided further that the proper rule for the proper width of groove 81 is employed, the surfaces 81a adjacent the groove, are bearing surfaces that bear on the material being creased. The opposite end of the creasing knife is similarly but reversely formed and is identical to the end previously described, except that the width of the slot or groove is different. Similar numerals of the 100 series indicate like or similar parts at this end of the knife.

In Fig. 12 there is illustrated a cutting knife that is adapted to make vertical cuts. In this form of the invention, the numeral 83 indicates the body portion and 84 the tail portion adapted for contact with the cam 66. The numeral 85 indicates an opening adapted to receive the knife supporting pin 63. The numeral 86 indicates an abutment adapted to be engaged by the plunger 59. The forward end of this knife structure is indicated by the numeral 87 and there is provided in inclined relation relative to the longitudinal axis of the knife structure, a recess 88. A closure plate 89 is clampingly associated therewith by means of the clamping member 90 for clampingly retaining a knife blade 91 in the socket 88. This knife blade has cutting edges 91a and 91b terminating in the point 91c. The cutting edges 91a and 91b are tapered edges, to-wit, oppositely and medianly tapered.

In Fig. 13 there is illustrated a swivel type cutting knife structure. The body portion is indicated by the numeral 92. The opening 93 is adapted to receive the mounting pin or shaft 63. The tail portion 94 is adapted for contact by the cam 66. The body portion 92 includes the abutment 95 adapted for engagement by plunger 59. The forward portion of this knife structure includes a body portion 96 having a cylindrical bore 97 therein and a clamping screw 98 is adapted to clampingly retain in the rotatively adjusted position the cylindrical member 99. This member is provided with an inclined recess 100 adapted to receive a knife blade member 101. The complementary clamping member 102 is associated therewith for the clamping retention of the knife blade 101 by means of the clamping screw 103. The knife blade 101 has the beveled cutting edges 101a and 101b meeting in a point 101c. These beveled faces are of singular character so that the proper clean bevel cut can be obtained. Usually, for mat purposes this bevel cut is about 60° although if desired, any other bevel or inclination may be obtained when desired. This swivel type holder structure may, if desired, be used for all purposes that the knife structure shown in Fig. 12 is utilized. In that event, if desired, the knife blade 91 may be substituted for the knife 101.

In Figs. 14 to 16, inclusive, there is illustrated a modified form of bar, the latter figure illustrating the operation of said modification when applied to the base. In these figures, numerals of the 300 series indicate like or similar parts shown in Figs. 6 and 7, and indicated by the primary series of numerals.

In the bar 369 and in portions 369a and 369b in opposed and paired relation, are a pair of parallel longitudinally aligned series of threaded apertures 371a. In each is a set screw 370a of Allen type. These are staggered in relationship as illustrated in Figs. 14, 15 and 16 so that the ends 370b when projected from the bar may space the bar 369 from the base so that as the rule 375 or 376 wears, the same effective upper rule surface may be maintained, thus delaying rule replacement.

This adjustment also permits the bar to be elevated relative to the base in such instances as a higher rule surface, relative to the base, is desired without the necessity of breaking down the bar and replacing the standard rule with a higher rule. These are but two purposes to which this adjustment is directed.

In Fig. 14—A there is illustrated a modified form of bar suspension. Herein 469 indicates the body portion provided with the head portion 472 apertured at 472c to receive the inward directed ends 472b of a snap loop 472a.

In Fig. 17 is illustrated a modified form of carriage structure and the same is shown associated with an adjacent rail or track. Numerals of the 400 series indicate parts herein which are like or equivalent to parts illustrated in previous views and indicated by similar numerals of the primary series.

In Fig. 17 the transverse portion of the carriage is indicated by the numeral 425. The portion parallel to the track 423 having the web portion 424 and providing the inwardly directed face 424a and the top and bottom surfaces 424b, is indicated by the numeral 426.

Depending therefrom in spaced relation and

"within" the rail structure, are ears **430***b*, each of which mounts the trunnion or shaft **431** in turn mounting the rollers **432***b* which engage upon the under surface **424***b* of the track structure. Each projecting end of the portion **426** is slotted as at **426***a* and mounted on the shaft **428** therebetween is roller **429** that bears against the inner track surface **424***a*.

A pair of rollers **432***b* engage the upper surface **424***b* of the track structure. These rollers are carried by the ear portions **430***a* which support the shafts **431***a*. Portions **430***a* are integral with and form extensions on the ends of the portion **426'**.

Reference will be had to Fig. 1 and from the same it will be understood that the main frame structure shown in Fig. 17 is substantially I-shaped, including portions **426** at each end of the transverse portion **425**, and that in superposed relation to each portion **426** there is provided a portion **426'**. The portion **425** supports the handle **427**, indicated by dotted lines in Fig. 17, because the section is taken between the handle and the remote rail **423**.

The upper portion **426'** is adjustably secured to the lower portion **426** and master carriage portion by means of a pair of threaded bolts **400**. These have threaded engagement with the member **426** through the threaded openings **401**. The bolts therefor extend upwardly above the portion **426**. The bolt immediately above portion **426** mounts the adjusting nut **402** and the bolt extends through the opening **403** in portion **426'**. A nut **404** bears on the portion **426'** and rigidly clamps portion **426'** upon the bolt structure carried in turn by the portion **426**. Each side of the carriage structure is similarly formed.

The aforesaid adjustable connection facilitates the proper positioning and adjustment of the various rollers with respect to the track structure and thus eliminates the necessity for accurate machining or fitting which is necessary in connection with the integral form of the invention shown more particularly in the left hand portion of Fig. 1 and in Figs. 4 and 5.

Reference will now be had to Fig. 18 wherein there is illustrated a perforating score knife for forming a cut-score line. In Fig. 18 numerals of the 400 series indicate like or equivalent parts designated by the primary numerals used in Figs. 11, 12 and 14. In brief this form of the invention includes the pivot forming opening **478**, the body portion **477**, the cam engageable portion **484**, the handle pin engageable portion **486** and the socket structure represented by the body portion **480** bifurcated to form a groove or recess **488**. A suitable pivot structure **490** extends from one wing or arm to the other and forms a pivot or axle upon which is mounted the wheel **483**, the latter being included between said parallel wings.

The peripheral surface of the wheel indicated by the numeral **481***a* is provided with a coplaner series of arcuately spaced cutting projections **481**. The teeth **481** are not only spaced apart in peripheral relation but are spaced from the side faces of the wheel **483**.

In Fig. 19 there is illustrated a modified form of the foregoing which is a rotary type of creasing structure which functions in a manner somewhat similar to the knife illustrated in Fig. 20 but forms the type of conformation in the board operated upon as does the creasing knife shown in Figs. 9 to 11, inclusive. Numerals of the 500 series herein indicate parts similar to those illustrated in Fig. 18 and indicated by numerals of 400 series. Thus, the body portion **577** is provided with an opening **578** constituting the pivot bearing for the knife and the body portion is provided with the cam engageable abutment **584**. It is also provided with the abutting portion **579** engaged by the projected member associated with the handle of the carriage. The opposite end **580** of the body portion **577** is bifurcated as indicated at **588** and a screw **590** extends from one bifurcation to the other and forms an axle upon which is mounted a creasing wheel **583** having the median groove **581** therein and the two groove separated peripheral portions **581***a*.

Herein there is provided a metal addition member indicated by the numeral **582**. It is angular in shape and the main portion thereof has an end **582***c* which abuts the end of the socket **588**. The screw **590** extends through an opening in said member. The opposite end of the member **582** includes two projecting portions **582***a* and **582***b*. **582***a* is the starting designator and **582***b* is the stopping designator, and these correspond to the linear starting and stopping indications **82***a* and **82***b* shown in Fig. 9.

It will be obvious that in order to secure the proper accommodation with the form of the invention shown in Fig. 18 that the width of the cutting teeth and/or the length thereof and/or the spacing therebetween, may be that desired. In other words, a series of wheels may be provided with different widths et cetera, and each be interchangeable receivable by the holder structure. In a like manner, with respect to the form of the invention shown in Fig. 19, the creasing wheel may be similarly modified as to the depth of the slot and width of slot, and an entire series of said wheels may be provided and interchangeably received by the socketed body portion of the knife structure.

It is also within the scope of this invention that the single handle structure of socketed type interchangeably receives the cut-scoring wheel or the creasing wheel, although in the present instance an example of each is illustrated herein in Figs. 18 and 19, respectively.

In Figs. 20 and 21, there is illustrated a modified form of the carriage structure. In this respect these figures illustrate a form of the invention more clearly like that shown in Fig. 19 than that shown in Fig. 5, although for a complete understanding of the invention, reference must be had to Fig. 5 as well.

In Figs. 20 and 21 numerals of the 600 series indicate parts similar to those illustrated in Fig. 19 and indicated by numerals of the 400 series. This form of the invention essentially differs from that illustrated in Fig. 19 in that in place of the stop nut **402** being employed—see Fig. 19—the same is omitted and instead of portion **426** and **426'** being rigidly connected together in spaced relation as are the parts **262** and **262'** in Figs. 20 and 21, the same are yieldingly connected together in spaced relation. This is attained by omitting the locking nut **402** and interposing between the ornamental nut **604** and the body portion **626'**, the yielding compression spring **602**.

The modified form of carriage shown in Figs. 20 and 21 further differs from that shown in Fig. 17 in that the horizontally mounted wheels **629** instead of being directly carried by the member **626** are indirectly carried thereby in the following manner.

The body portion **626** at each end is recessed or slotted as at **626***b* and in the face adjacent the

handle portion 627. Seated in this slot is a tongue portion 626c and the latter includes a bifurcated extension 626a in alignment with the body portion 626 and extending across the arms of the bifurcated portion is a suitable pivot 628 mounting the wheel 629.

The body portion 626 is apertured as at 620 and a bolt 621 having the head portion 622 is threaded into said aperture and extends through an aperture 624 in the tongue portion 626c. Interposed between the head 622 and the tongue portion 626c and concentric with the portion 621 is the compression spring 623. By means of this connection the carriage structure is arranged so that all wheels 629 engage the inside and confronting faces of the tracks so that lateral play between the tracks and the carriage is substantially eliminated. The adjustment previously described as of yielding character between the portions 626' and the two portions 626 of a modified form of carriage as illustrated in Figs. 20 and 21 also prevents vertical chattering in the movement of the carriage structure upon the rails.

While the invention has been illustrated and described in great detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character.

The several modifications described herein as well as others which will readily suggest themselves to persons skilled in this art, all are considered to be within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. In a machine of the character described, a carriage including an I-shaped portion, a pair of spaced tracks for supporting same, each having a T-shape cross section and in confronting relation, and means at each corner of the I-shaped portion and engaging the confronting face of the track portion and positioned above and below said portion.

2. In a machine of the character described, a support member, a base member spaced therefrom, a clamping plate means therebetween and carried by one member, means guiding and constraining the plate means toward the plate means supporting member, a cam pivotally supported by the plate means supporting member and operatively engaging the plate means for movement thereof toward the other member in cam movement, and stop means between the plate means supporting member and the cam for preventing excessive movement of the plate means toward the other member.

3. In a machine of the character described, the combination of a base structure, an angular aligner supported thereby, a pair of spaced track means above the structure, and aligner clamping means operatively associated with the track means for securing the aligner in adjusted position upon the base structure, the aligner including parallel rib means parallel to the track means, said structure and aligner having a parallel complementary connection, said clamping means bearing upon the rib means.

4. In a machine of the character described, the combination of a base structure, an angular aligner supported thereby, a pair of spaced track means above the structure, and aligner clamping means operatively associated with the track means for securing the aligner in adjusted position upon the base structure, the aligner including parallel rib means parallel to the track means, said structure and aligner having a parallel complementary connection, said clamping means bearing upon the rib means, said aligner having a parallel groove therein below the top of the rib means, and a rule slidably supported by the groove.

5. A machine of the character described, including in combination, a base structure, a pair of spaced track means spaced from said structure, a carriage movable on both portions of said track means, knife means depending from said carriage between the spaced portions of the track means for base supported stock engagement, knife cooperating bar means carried by said base structure and juxtapositioned relative to said track means and including normally nestable adjustable means adapted for base structure contact for adjusting the bar means relative to the base structure and normally exposed for adjustment operation.

6. A machine of the character described, including in combination, a base structure, a pair of spaced track means spaced from said structure, a carriage movable on both portions of said track means, knife means depending from said carriage between the spaced portions of the track means for base supported stock engagement, knife cooperating reversible bar means carried by said base structure and juxtapositioned relative to said track means and including a plurality of oppositely directed, normally nestable adjustable means adapted for base structure contact for adjusting the position of the bar means relative to the base structure, the similarly directed base contacting adjustable means being normally exposed relative to the base for adjustment operation.

7. In a machine of the character described, a track confined carriage including an I shaped portion, each parallel portion including at each end a roller for lateral face track engagement, a roller adjacent thereto at each end and adapted for transverse face track engagement, a pair of cooperating rollers in spaced relation to the second mentioned rollers and adapted for opposed and transverse face track engagement, means supporting said third mentioned pair of rollers including a body portion in substantial parallelism with the head portion of the I shaped portion, and a plurality of spaced connections between the head portion of the I shaped portion and the second mentioned body portion substantially parallel thereto.

8. In combination, a travelling carriage, a knife structure movably supported thereby, means carried by the carriage normally constraining the knife structure toward working position, and a wear member interposed between the constraining means and knife structure.

9. In combination, a travelling carriage, a knife structure movably supported thereby, means carried by the carriage normally constraining the knife structure toward a working position, and a wear member interposed between the constraining means and knife structure, and a flexible flat spring character and inherently opposing the constraint of the last mentioned means.

10. A machine of the character described, including in combination, a base structure, a pair of spaced track means spaced from said structure, a carriage movable on both portions of said track means, knife means depending from said carriage between the spaced portions of the track means for base supported stock engagement, and

cushion type stop means at opposite ends of the track means for carriage movement limitation.

11. A carriage as defined by claim 7, characterized by the spaced connections being of adjustable character.

12. A carriage as defined by claim 7, characterized by the spaced connection being of yielding character and normally constraining the opposed rollers toward each other.

13. A carriage as defined by claim 7, characterized by the spaced connection being of adjustable and yielding character and normally constraining the opposed rollers toward each other.

14. A carriage as defined by claim 7, characterized by the ends of a parallel portion being of articulated character and the lateral face engaging roller having articulated relative movement, and by the addition of means adjusting the articulated position of the last mentioned roller.

15. A carriage as defined by claim 7, characterized by the ends of a parallel portion being of articulated character and the lateral face engaging roller having articulated relative movement, and by the addition of yielding means normally constraining the articularly mounted roller into lateral face engagement.

16. A carriage as defined by claim 7, characterized by the ends of a parallel portion being of articulated character and the lateral face engaging roller having articulated relative movement, and by the addition of adjustable yielding means normally constraining the articularly mounted roller into lateral face engagement.

17. In combination, a travelling carriage, a knife structure movably supported thereby, means carried by the carriage normally constraining the knife structure relative to the carriage and toward working position, a removable pivot for detachably and pivotally supporting the knife structure upon the carriage, and means associated with the constraining means for removing the constraint upon the knife structure to facilitate pivot removal.

18. In a knife structure having a knife carrier, the combination of an elongated knife body portion apertured intermediate its ends for mounting upon the carrier, one end being arranged for operative association with the carrier for control engagement, the other being arranged for operating engagement, and a portion intermediate the aperture and operating end for operative association with the carrier for operating engagement, the operating end of the body portion including a crease score forming outwardly directed groove therein.

19. In a knife structure having a knife carrier, the combination of an elongated knife body portion apertured intermediate its ends for mounting upon the carrier, one end being arranged for operative association with the carrier for control engagement, the other being arranged for operating engagement, a portion intermediate the aperture and operating end for operative association with the carrier for operating engagement, the operating end of the body portion being of socketed character, and wheel means in the socket and rotatably supported thereby.

20. In a knife structure having a knife carrier, the combination of an elongated knife body portion apertured intermediate its ends for mounting upon the carrier, one end being arranged for operative association with the carrier for control engagement, the other being arranged for operating engagement, a portion intermediate the aperture and operating end for operative association with the carrier for operating engagement, the operating end of the body portion being of socketed character, and wheel means in the socket and rotatably supported thereby, said wheel means including a relatively smooth periphery with an intermediate peripheral groove therein.

21. In a knife structure having a knife carrier, the combination of an elongated knife body portion apertured intermediate its ends for mounting upon the carrier, one end being arranged for operative association with the carrier for control engagement, the other being arranged for operating engagement, a portion intermediate the aperture and operating end for operative association with the carrier for operating engagement, the operating end of the body portion being of socketed character, and wheel means in the socket and rotatably supported thereby, said wheel means including a peripheral series of spaced teeth for cut-score formation.

CLYDE L. GILBERT.