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SHEET FEEDING METHOD AND GAUGING MECHANISM THEREFOR

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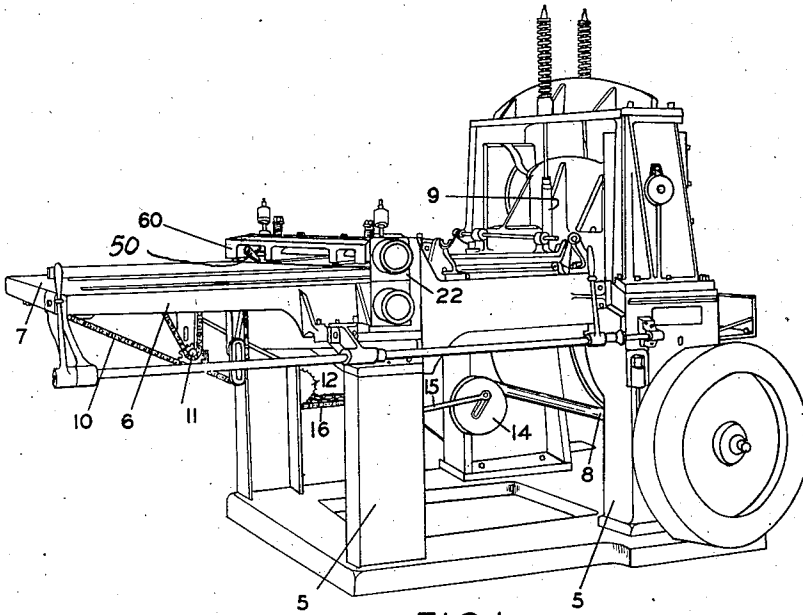


FIG. 1.

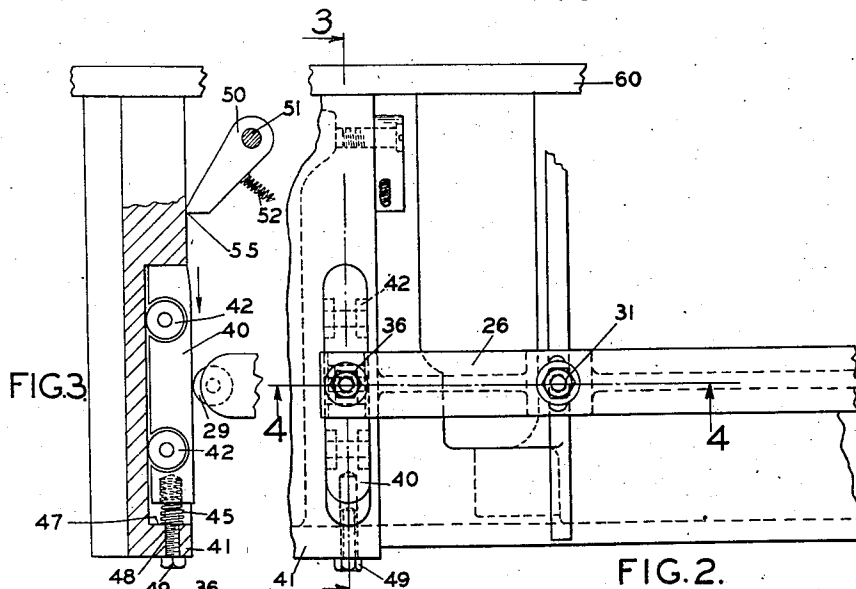


FIG. 2.

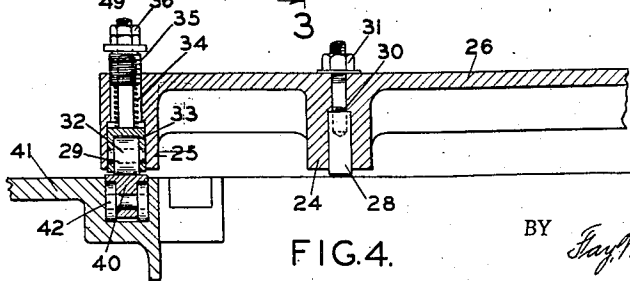


FIG. 3.

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SHEET FEEDING METHOD AND GAUGING MECHANISM THEREFOR

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9 Claims. (Cl. 271-60)

The present invention relates to a sheet gauging mechanism and is devised for use in machines serving for cutting or trimming sheet material. In particular, the mechanism is applicable in scroll shear presses used for cutting out accurately sized blanks from which a multiplicity of smaller blanks are subsequently punched out.

The object of the invention is to provide means for accurate registration of blanks which are fed into a blank cutting machine such as a scroll shearing press, or other machine for cutting sheet material. When blanks are fed into the machine at a considerable rate of speed, as is the case in modern machines of the aforementioned type, the momentum gathered in the blank imparts to the same an impulse of forward movement after the driving power has ceased to act, said impulse carrying the blank along beyond the point of registration, thus rendering accurate positioning of blanks for trimming and cutting purposes difficult, if not impossible. Such accurate positioning is, however, of very great importance to obtain the desired results with absolute reliability.

The present invention provides a gauging mechanism which allows of accurate registration in a simple way. Instead of arranging the line of registration, at which the incoming blank is stopped and positioned for being worked upon, in the direction of feed, I allow the blank to travel in that direction without stopping it abruptly at a given point. Moreover, means are provided to push the blank in the opposite direction where a positive stop is caused by appropriate arrangement. Since this back driving force is much less powerful than the driving force of the feeding mechanism, accurate registration at this stage of travel is easily accomplished.

For the above outlined purpose I provide means for frictionally engaging said blank when it arrives in the machine, which means are carried along by the blank until all the force moving it forward is spent. The means for frictional engagement with the blanks consists of a movable block or the like, which carries in its front end an elastic means secured to the frame of the machine. The elastic means is compressed when the block is carried forward by the blank. As soon as the forward movement comes to a stop, which need not be at any well defined point at all, the movable block or carrier is urged back by the action of the elastic means taking the blank along to the positive stop arranged in the

direction of back travel, thus providing the accurate registration as set forth.

As mentioned above, one of the intended uses for my improved sheet gauging mechanism is the combination with a scroll shear press adapted to receive metal sheets and to cut the same into a series of scroll edged blanks which are subsequently fed through automatic die presses which cut and form a multiplicity of can tops from each of said blanks. Since the primary object of providing scroll edged blanks is to achieve the greatest possible economy of metal in subsequently punching out the can tops, it will be apparent that the blanks should be cut accurately to the required size. Oversize blanks would result in waste of material, while undersize blanks would result in defective can tops.

The usual commercial sheets obtained from the mill do not have accurately cut edges and it is, therefore, impracticable to use such edges for effective registration in the successive shearing operations. Special means had to be applied to provide registering points which are employed as gauge points in positioning the sheet for making the scroll cuts.

My improved means for accurately positioning the sheets when arriving from the feed-in mechanism makes it possible to have initially trimmed blanks with perfectly straight parallel margin lines, the successive operations in the press being greatly simplified thereby.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims; the annexed drawing and the following description setting forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various means in which the principle of the invention may be used.

In said annexed drawing—

Fig. 1 is a perspective view of a scroll shear press with the sheet gauging mechanism forming the invention built into the press;

Fig. 2 is a top plan view of the said mechanism;

Fig. 3 shows the mechanism in section along lines 3-3 of Fig. 2; and

Fig. 4 is a sectional view taken along line 4-4 of Fig. 2.

Referring to Fig. 1, 5 is the rigid frame of a blank cutting machine, this frame providing a flat bed 6 along which the sheets are fed onto a platform 7, from the left-hand side in Fig. 1. At the rear of the frame 5 is disposed a reciprocating

cating scroll shear press of conventional design. 9 is one of the plungers carrying the upper die head (not shown), whereas the mating lower die head as well as most parts of the operating mechanism are located below the platform 7 and are, therefore, likewise not shown in the drawing. This arrangement of the operating mechanism below the platform has the advantage of eliminating any possibility of oil or grease dripping on the sheet under treatment. The main shaft from which the dies are driven is shown at 8, other parts of the driving mechanism comprising a wheel 14, a rod 15 slidably mounted therein, sprockets 11 and 12 as well as chains 10 and 16, all of which cooperate in a well-known manner to effect a reciprocating movement in the working parts of the machine, thus advancing the blank for a predetermined space to have successive trimmings and cuttings performed thereon.

The sheet gauging mechanism is built into the frame between upright members 22, one of which is shown in Fig. 1. The mechanism is duplicated on each side of the machine and hence a description of one side will suffice for both.

Referring to Figs. 2 to 4, 60 is a casting extending transversely over the bed of the machine and secured to the frame of the same between the uprights 22. A crossbar 26 extends parallel to casting 60, said crossbar 26 having portions 25 and 24 for housing sheet engaging member 29 and a longitudinal bar 28 respectively. Bar 28 is secured to crossbar 26 by means of a pin 30 and nut 31. Member 29 is a roller carried in a bearing 32 within a slide block 33 upon which a spring 34 acts. The other end of the spring bears against the head of an adjusting bolt 35 held down by a nut 36.

A carriage 40 is arranged underneath said roller 29 and cooperating therewith in a groove of a casting 41 secured to the frame of the machine. Said groove is longer than carriage 40 to an extent that will allow a certain movement of said carriage under the impact of the incoming sheet. Carriage 40 is slidably supported on rollers 42 and bears against a spring 45, the other end of said spring being secured to frame 41 by bolt 48 and nut 49.

The carriage 40 has its surface slightly raised above the level of the platform 7, but beveled at the end receiving the incoming sheets, thereby being adapted to readily receive said sheets and to carry them in said raised plane and thus take complete control of their movement.

A gauge finger 50, pivotally mounted at 51 on casting 60, bears on the frame 41 under the control of a spring 52, likewise mounted on said casting 60.

The operation of the sheet gauge mechanism is as follows: Sheet material is fed onto the platform 7 by means of any known feed-in mechanism, delivering sheets at a rate of 100 or more per minute. The incoming sheets are swept beneath fingers 50 owing to the force of the feeding thrust, lifting said fingers out of their way, but being frictionally engaged by carriages 40 which are arranged at both sides of the platform and being held in engagement with the carriages by spring-controlled rollers 29. The impact of the blank pushes the carriage along towards the wall 47, spring 45 absorbing the shock and preventing the carriage with the sheet thereon from being abruptly stopped in its movement. As the impact of the sheet is spent, spring 45 is free to return to its former position, imparting to the carriage and the blank held thereon a movement

that is now easily stopped by fingers 50 which have been returned to their original position by the action of spring 52, so that the blanks are accurately positioned at a fixed gauge point at 55. Bars 28 serve to keep the blanks flat and prevent them from flapping during their travel over the platform.

From the position at 55 the blanks are fed by reciprocating fingers, not shown in the drawing, to subsequent stations for further operations and are finally fed out of the machine through chutes, not shown, provided at the rear end of the machine in a well known manner.

While I have described the operation of my improved sheet gauging mechanism in combination with a scroll shearing press it will be readily understood that it may be used in combination with any blank trimming or cutting machine, where accurate registration of the incoming sheets is of a major importance.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the means and the steps herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In a method for feeding sheets to a cutting station of a blank cutting machine, the steps of providing a movable carrier as a shock absorbing means, receiving the incoming sheets travelling at a considerable speed on said movable carrier, allowing said carrier to advance with the sheets under the impact thereof, urging said carrier and sheets back under the control of a force weaker than the driving force of the feed-in mechanism and arranging a positive stop for said sheets at the rear of the line reached by their previous forward travel.

2. In a method for feeding sheets to a cutting station of a blank cutting machine, the steps of providing a movable carrier as a shock absorbing means for receiving the incoming sheets which are traveling at a considerable speed, allowing said carrier to advance with the sheets under the impact thereof, urging said carrier and sheets back under the control of a force weaker than the driving force of the feed-in mechanism and originating from a source disposed at a point on the incoming path of said sheets before they reach the cutting station, and arranging a positive stop for said sheets at the rear of the line reached by their previous forward travel.

3. In a method for feeding sheets to a cutting station of a blank cutting machine, the steps of providing a movable carrier as a shock absorbing means, receiving the incoming sheets travelling at a considerable speed between said movable carrier and a pressure exerting means, allowing the sheets to travel on said carrier against the resistance of elastic means disposed at a point on the incoming path of said sheets before they reach the cutting station, said travelling continuing until the driving force of the feed-in mechanism is spent, urging the sheets back under the control of said elastic means and arranging a positive stop for said sheets at the rear of the line reached by their previous forward travel.

4. In a blank cutting machine comprising means for feeding sheets to a platform on a cutting mechanism, means for advancing said sheets over said platform to the cutting working station and means for feeding the cut blanks out

of said machine in combination, a sheet gauging mechanism comprising a movable carrier-block for receiving the incoming sheets travelling at a considerable speed and for frictionally engaging therewith, yielding means disposed between the entrance for said sheets on said platform and the cutting station, said means being adapted to cooperate with said carrier-block in absorbing the shock of said incoming blanks and imparting thereto a movement in the opposite direction and means for positively stopping and registering said sheets at a position behind the line reached by their previous forward travel.

5. In a blank cutting machine, a sheet gauging mechanism as claimed in claim 4 characterized by duplicate carrier blocks, one on each side of the machine.

6. In a blank cutting machine comprising means for feeding sheets to a platform on a cutting mechanism, means for advancing said sheets over said platform to the working stations, and means for feeding the cut blanks out of said machine in combination a sheet gauging mechanism comprising on both sides of the machine a carriage located in a groove longer than said carriage, said carriages being adapted to receive the incoming sheets travelling at a speed of at least one hundred per minute and to frictionally engage therewith, a spring mounted between each of said carriages and one wall of said grooves for cooperating with said carriages in absorbing the shock of said incoming blanks and for imparting thereto a movement in the opposite direction, a spring controlled member for holding said sheets on said carriage while in engagement therewith, and means for positively stopping and registering said sheets at a position behind the line reached by their previous forward travel.

7. In a blank cutting machine comprising means for feeding sheets to a platform on a cutting mechanism, means for advancing said sheets over said platform to the working stations, means for feeding the cut blanks out of said machine in combination, a sheet gauging mechanism, comprising on both sides of the machine a carriage for receiving the incoming sheets travelling at considerable speed, said carriage being located in a groove of greater length than said carriage and having a surface raised above the level of the working platform of the machine,

said surface being adapted to hold the incoming sheets in frictional engagement, a spring mounted between the front wall of each of said carriages and one end wall of the groove for cooperating with said carriages in absorbing the shock of said incoming blanks and imparting to said carriages and the blank transported thereon a movement in the opposite direction, a spring loaded member located above said carriages for holding down said sheets, a pivotally mounted finger for positively stopping and registering said sheets at a position behind the line reached by previous forward travel, and a spring for returning said finger after it has been moved out of the path of travel of the incoming blanks.

8. A sheet gauging mechanism comprising on both sides of the machine a carriage located in a groove longer than said carriage, said carriage being adapted to receive the incoming sheets and frictionally engage therewith, a spring mounted between said carriage and one wall of said groove for absorbing the shock of said incoming blanks and imparting thereto a movement in the opposite direction, a spring controlled member for holding said sheets on said carriage while in engagement therewith, and means for positively stopping and registering said sheets at a position behind the line reached by their previous forward travel.

9. A sheet gauging mechanism, comprising on both sides of the machine a carriage located in a groove of greater length than said carriage, said carriage having a surface raised above the level of the working platform of the machine, said surface being adapted to receive the incoming sheets and frictionally engage therewith, a spring mounted between the front wall of said carriage and one end wall of the groove for absorbing the shock of said incoming blanks and imparting to said carriage and the blank transported thereon a movement in the opposite direction, a spring loaded member located above said carriage for holding down said sheets, a pivotally mounted finger for positively stopping and registering said sheets at a position behind the line reached by previous forward travel, and a spring for returning said finger after it has been moved out of the path of travel of the incoming blanks.

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