

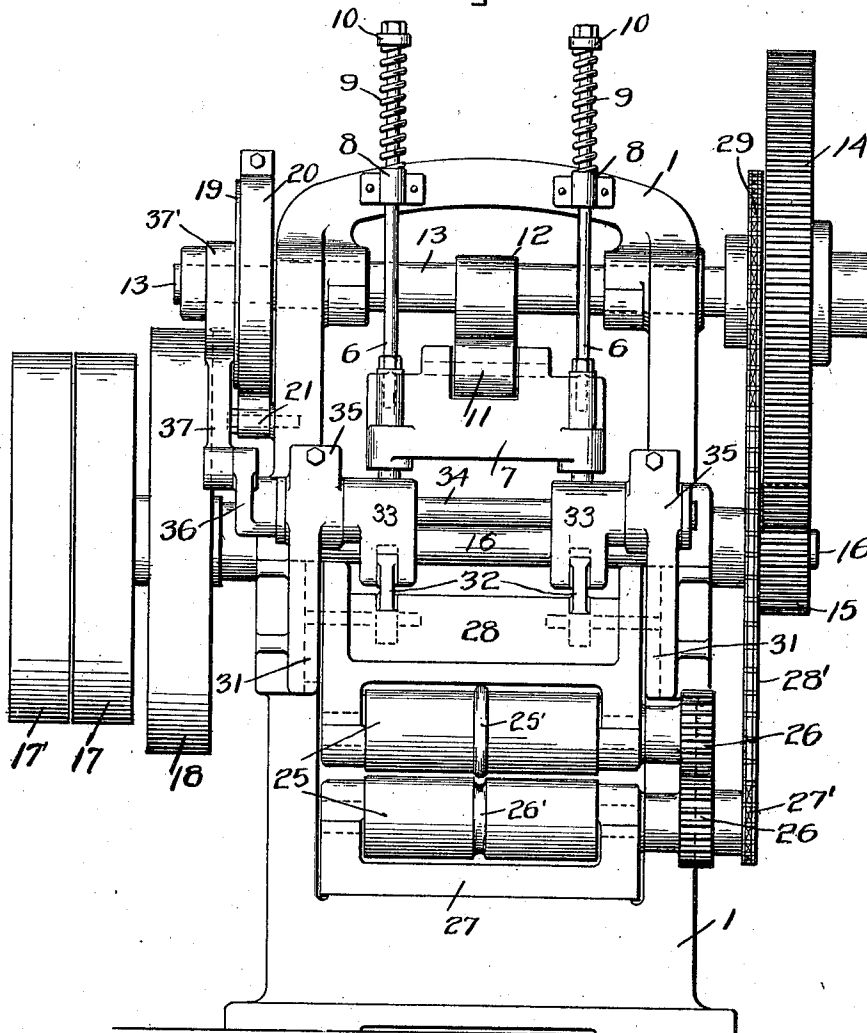
W. R. KINNEAR.  
MACHINE FOR PARTIALLY LOOSENING OR SEPARATING METAL SHEETS.  
APPLICATION FILED MAY 24, 1910.

1,001,651.

Patented Aug. 29, 1911.

3 SHEETS-SHEET 1.

Fig. 1.



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Witnesses

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By

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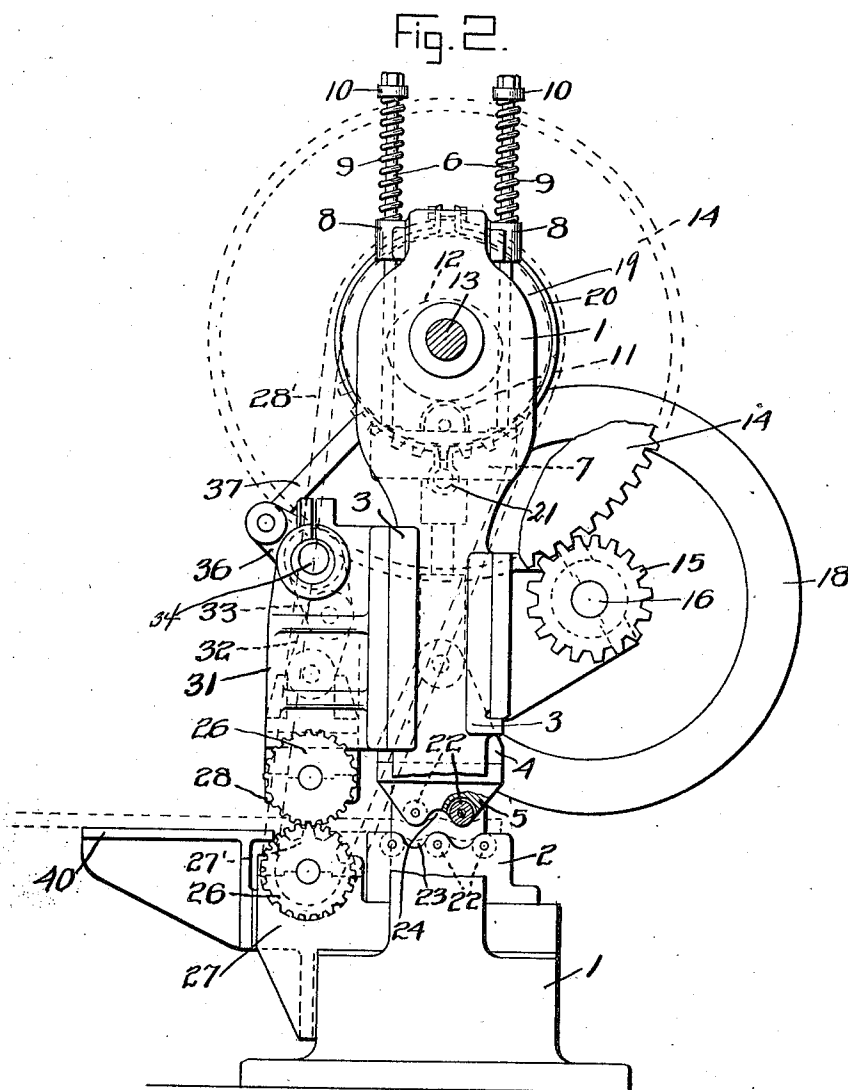
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3 SHEETS—SHEET 2.



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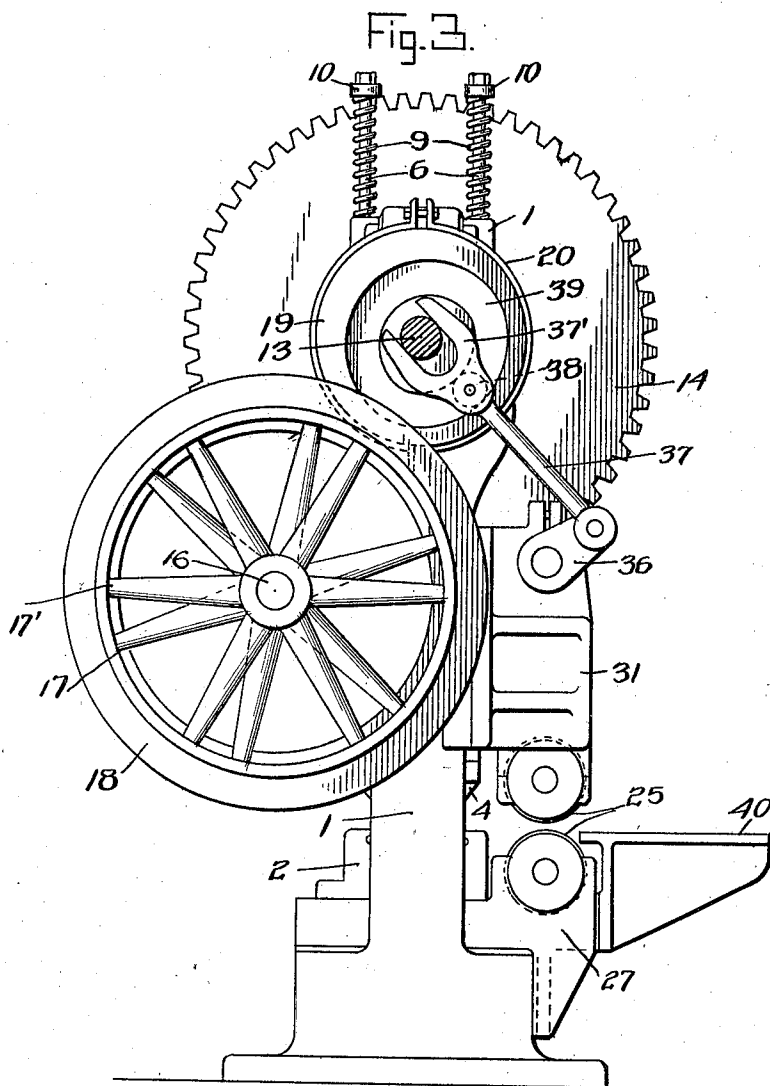
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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

WILLIAM R. KINNEAR, OF NEW CASTLE, PENNSYLVANIA.

MACHINE FOR PARTIALLY LOOSENING OR SEPARATING METAL SHEETS.

1,001,651.

Specification of Letters Patent. Patented Aug. 29, 1911.

Application filed May 24, 1910. Serial No. 563,210.

*To all whom it may concern:*

Be it known that I, WILLIAM R. KINNEAR, a citizen of the United States, and resident of New Castle, in the county of Lawrence and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Partially Loosening or Separating Metal Sheets, of which the following is a specification.

This invention relates to the separation of sheets of metal which are caused to adhere with more or less tenacity by some step or treatment in the process of their manufacture, such for instance, as the so called hot roll step in the process. in which a number of sheets are rolled simultaneously to reduce them in thickness, and by which step, the sheets are caused to adhere firmly together a greater or less distance inward from the edges and even in some instances to the center of the sheets. It has heretofore been the practice to disrupt or destroy the adhesion between such sheets at their edges, by hammering the edges of the pack or adhering group, through means of a body of soft metal such as lead until the separation was started, and then to grip the top sheet with tongs, and tear it asunder while the remaining sheets were held down. This process was repeated until all the sheets were separated. It has also been proposed to draw a group of adhering sheets between rolls corrugated peripherally so that the group was corrugated and fed through in corrugated form and afterward straightened out. But this method has proven unsuccessful owing to the insufficient relative movement enforced between the sheets, this being particularly true of the intermediate sheets of the pack.

The object of my invention is to effect separation of adhering sheets over any area or extent desired, by means which will affect all the sheets in an adhering pack or group.

In this broadest aspect, the invention consists in means causing the sheets or the portion thereof over which adhesion is to be destroyed, to draw, creep or move edgewise one over the other repeatedly, and alternately in opposite directions, and preferably while maintaining a tension on the sheets so that adhesion is destroyed.

In carrying out the invention, the effect is preferably produced by drawing the

sheets through a fixed serpentine path, which causes the group or pack as a whole to be repeatedly bent alternately, in opposite directions, thereby causing movement to take place between the sheets.

By the expression, fixed serpentine path, is intended to be conveyed the idea of substantial constancy in the relations of the two walls (preferably a pair of opposed corrugated members with the projections on one opposite the depressions on the other) which constitute the path through which the group of sheets is drawn, these walls being provided with anti-friction surfaces if desired, so long as there is relative surface travel between the sheets and said walls, which makes the sheet develop a tortuous motion as distinguished from merely the feeding of a corrugated body between two intermeshing corrugated surfaces as occurs with rolls having intermeshing corrugations. In some work of this kind, adhesion develops inward from the edges of the sheets to a greater extent than in other work, and the area of treatment will be correspondingly enlarged.

The invention may be put into practice by an apparatus substantially as shown in the accompanying drawings, wherein,

Figure 1 is a front elevation of the machine; Fig. 2 is a side elevation thereof, showing one of the dies partly in section, and Fig. 3 is an elevation of the reverse side of the machine.

In the said drawings, 1 designates the machine frame which carries a lower stationary die 2 and guideways 3 in which is mounted a cooperating vertically reciprocating die 4. The movable die 4 is yieldingly supported in its uppermost position by four depending rods 6, which connect with the cross head 7; said rods working through bearings 8 and being provided with retracting springs 9 confined between said bearings 8 and the heads 10 of the rods. The die 4 is depressed by a cam 12 carried upon the shaft 13 and acting against the roller 11 on the cross head, (see Figs. 1 and 2). The shaft 13 has fixed thereon a large gear wheel 14 meshing with a pinion 15 that is keyed upon the shaft 16, which on its opposite end, carries idle and loose pulleys 17 and 17', for the power driven belt; also the fly wheel 18. The shaft 13 is further provided with a friction disk 19 embraced by a brake band 20, fixed at 21, to the machine frame, and

holding the shaft 13 against over-speeding. A further purpose for the disk 19 will be explained hereinafter.

The dies 2 and 4 are corrugated, preferably by providing them with rollers 22 journaled therein in parallel arrangement, and by cutting away the beds of the dies intermediate of the rollers as shown at 23 and 24 in Fig. 2; the rollers being so located that the corrugated surfaces of the dies intermesh. There are preferably three rollers or corrugations on the lower die and two on the upper die.

Adjacent the corrugated dies is a pair of feed rollers 25 of which the lower is journaled in a fixed member 27, while the upper roller is journaled in the frame 28, that is moved vertically in the guideways 31 on the machine frame by a pair of toggles or links 32 pivotally supported from arms 33, said arms being in turn fixed upon shaft 34 that is oscillated in bearings 35, by an arm 36 fixed upon the shaft 34 and connected to a pitman 37, that is reciprocated through the rotation of the shaft 13. The means for imparting this action to the pitman 37 consists of a roller 38 carried by said pitman and traveling within a cam groove 39 which is formed within the outer face of the disk 19, and said pitman is also provided with a bifurcated extension 37' which spans the shaft 13.

The friction rollers 25 are adapted to be continuously driven, for which purpose they are each provided with intermeshing pinions 26, and the shaft of the lower roller has a sprocket 27' to which movement is imparted by the chain 28' that travels on the sprocket 29 of the shaft 13.

In the operation of the machine, one corner, for instance of a layer of sheets is pushed between the dies 2 and 4 from the table 40, and through a starting means (not shown) the upper die is caused to be brought with force against the sheets, which by reason of the design of the dies corrugates or slightly distorts the sheets. And immediately thereafter, the movable die is slightly lifted, when through the medium of the pitman 37 the upper friction roller 25 is lowered, which roller with the lower roller 25 frictionally drags the sheets through the serpentine path formed by the stationary projections of the dies 2 and thereby bends them repeatedly in opposite directions while keeping the sheets under considerable tension. That is to say, the means for effecting the lifting of the die 4 and bringing the stripping rollers into action is so timed that said rollers begin the withdrawal of the sheets before the upper die is moved to its uppermost position, with the result that the sheets are subjected to a slight straining between the dies and the stripping rollers and the effect of this is that the reflexed portions

of the sheets are further loosened or separated by reason of being slightly spread apart in the direction opposite to their movement of withdrawal. Following this operation, the movable die 4 is permitted to lift under the influence of the springs 9, and the machine is then ready to repeat the operation.

After being reflexly bent by the rollers 22 and thence further loosened by the retarding of their withdrawal, the sheets would have a tendency to flare outwardly or spread apart, and to overcome this likelihood the stripping rollers are provided with corrugating means 25' and 26', respectively, which slightly crimp the loosened portions of the sheets at right angles to their corrugations.

What is claimed is:—

1. In a machine for loosening sheets to be separated, a die adapted to distort the sheets, and developing a fixed tortuous path for the sheets, means holding the dies in such distorting position, and means for drawing the sheets from the die and thereby causing the distorted portion to drag through said tortuous path.

2. In a machine for loosening sheets to be separated, a die adapted to distort the sheets, and develop a tortuous path therefor, means holding the die against movement in the direction of movement of the sheet, means for intermittently lifting said die, and intermittently actuated means for forcibly drawing the sheet from the die.

3. In a machine for loosening sheets to be separated, a die adapted to distort the sheets, and develop a tortuous path therefor, means for forcibly drawing the sheets from the die, and means for actuating said die, and holding it in position to retard the withdrawal of the sheets whereby to effect a further loosening thereof.

4. In a machine for loosening sheets to be separated, a die adapted to distort the sheets, and develop a fixed tortuous path therefor, means for intermittently moving said die to, and returning it from distorting position, and frictional means for forcibly drawing the sheets through the path formed by the die.

5. In a machine for loosening sheets to be separated, a die having rollers developing a corrugated antifriction face, adapted to distort the sheets and develop a tortuous path therefor, means holding said die against movement with the sheets and a pair of frictional rollers adapted to draw the sheets from the roller die.

6. A machine for loosening sheets to be separated having in combination, roller dies adapted to corrugate one portion of the sheets, means for bringing said dies into action, frictional rollers for stripping the sheets from the dies, and means for intermittently bringing the stripping rollers into

action, said roller dies adapted to retard the withdrawal of the sheets by the frictional rollers, whereby to effect a further loosening of the sheets.

5 7. A machine for loosening sheets to be separated having in combination, roller dies coöperating to corrugate one portion of the sheets, means for bringing said dies into action, frictional rollers for stripping 10 the sheets from the dies, means for intermittently bringing the stripping rollers into action, and means on said stripping rollers for preventing excessive spreading of the loosened portions of the sheets.

15 8. A machine for loosening sheets to be separated having in combination, roller dies coöperating to corrugate one portion of the sheets, a pair of coöperating friction rollers adapted to withdraw the sheets from 20 said roller dies, and means for intermittently and alternately bringing said stripping means and dies into action.

25 9. A machine for loosening sheets to be separated having in combination, a fixed and a movable die provided with rollers, the rollers of the movable dies being adapted to engage between the rollers of the fixed die and corrugate one portion of the sheets, a pair of coöperating friction rollers adapted 30 to withdraw the sheets from the dies, and

means for intermittently and alternately bringing said stripping means and dies into action; said dies adapted to retard the withdrawal of the sheets therefrom and effect a further loosening of the sheets, and means 35 on the friction rollers adapted to prevent excessive spreading of the loosened portions of the sheets.

10. A machine for loosening metallic sheets to be separated having in combination, a fixed and a movable die provided 40 with rollers adapted to corrugate a portion of the sheets, means for reciprocating the movable die, a pair of coöperating friction rollers adapted to withdraw the sheets from 45 the dies, means for bringing the friction rollers into action immediately following the corrugating of the sheets, said die rollers adapted to retard the withdrawal of the sheets therefrom whereby to further loosen 50 said sheets and means on said friction rollers for preventing excessive spreading of the loosened portions of the sheets.

The foregoing specification signed at New York, N. Y. this 17th day of March, 1910. 55

WILLIAM R. KINNEAR.

In presence of two witnesses—

M. L. SULLIVAN,

I. M. BLANCHFIELD.