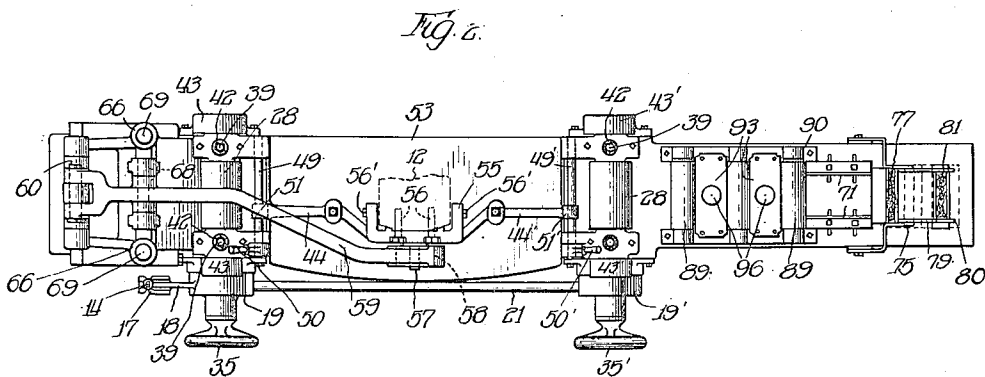
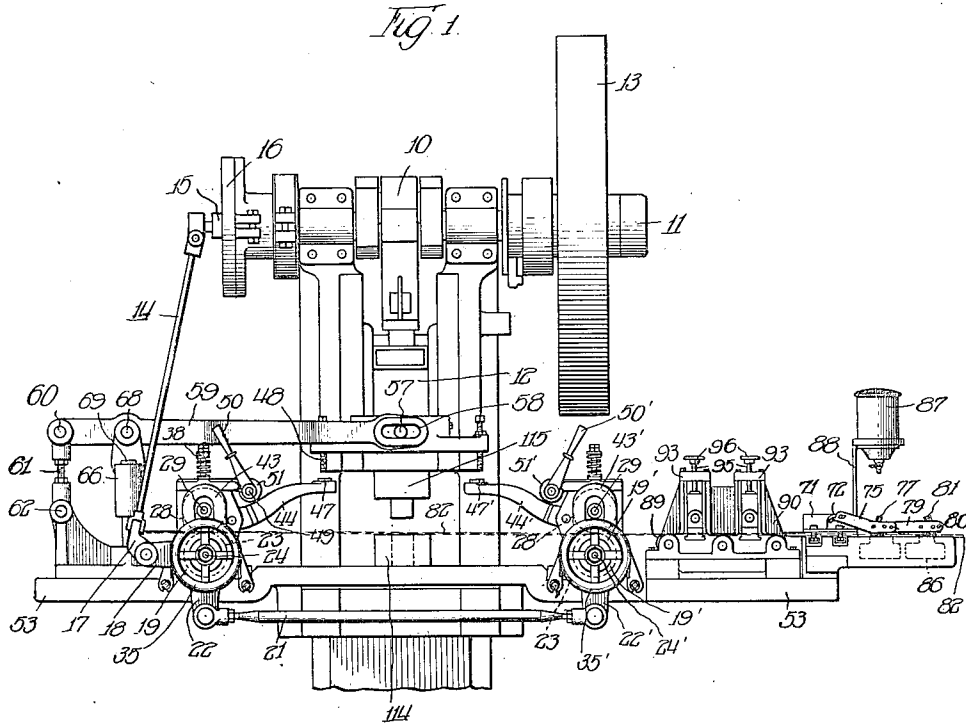


F. J. LITTELL.
STOCK HANDLING MECHANISM.
APPLICATION FILED APR. 8, 1921.

1,421,354.

Patented June 27, 1922.

3 SHEETS—SHEET 1.



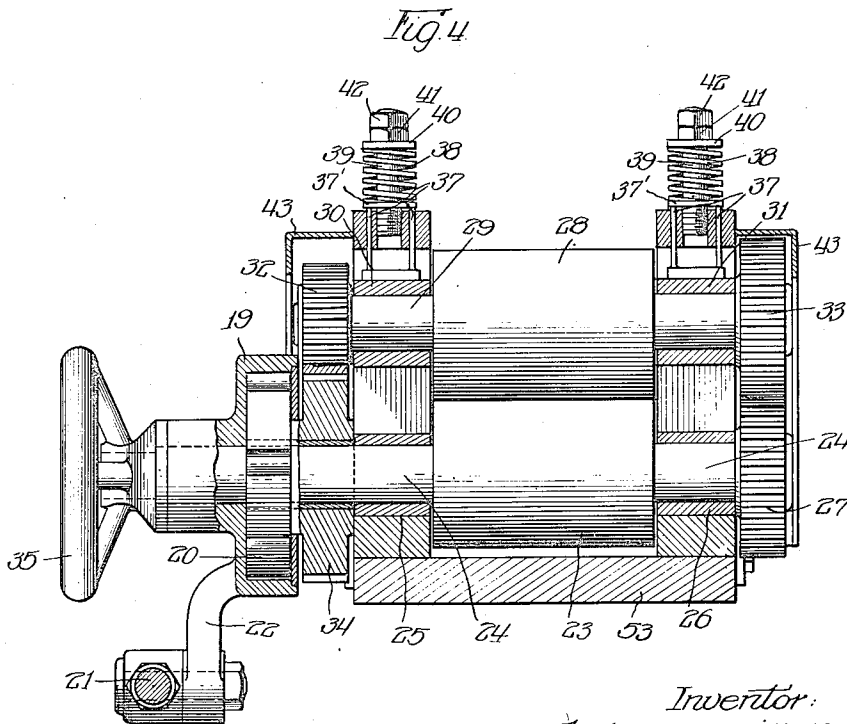
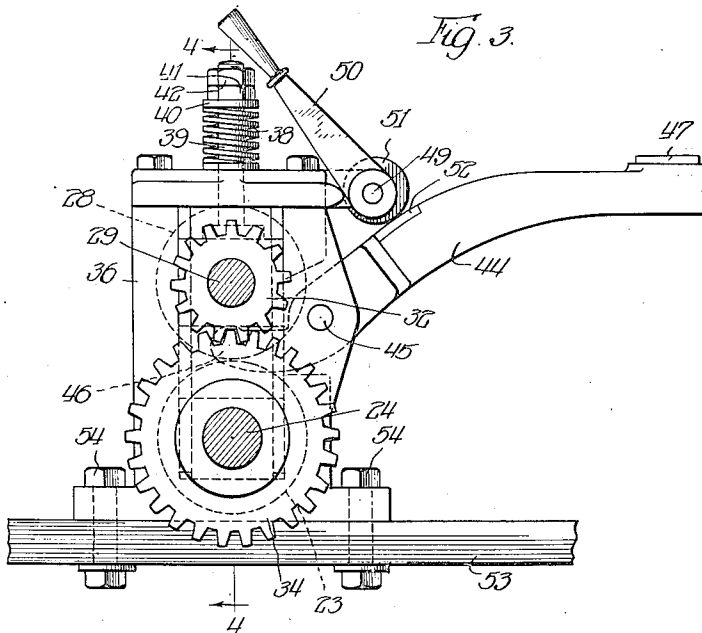
Witness:
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Inventor:
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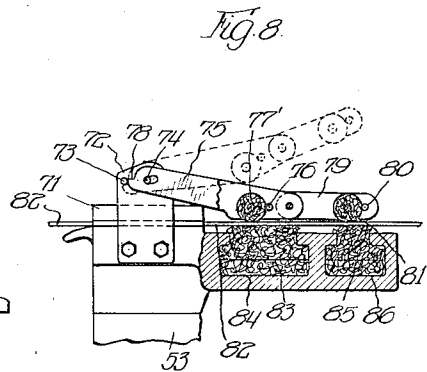
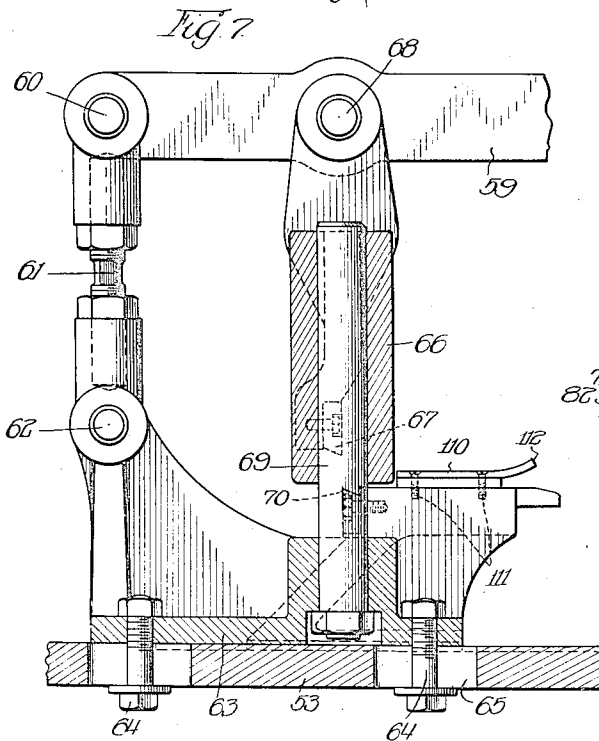
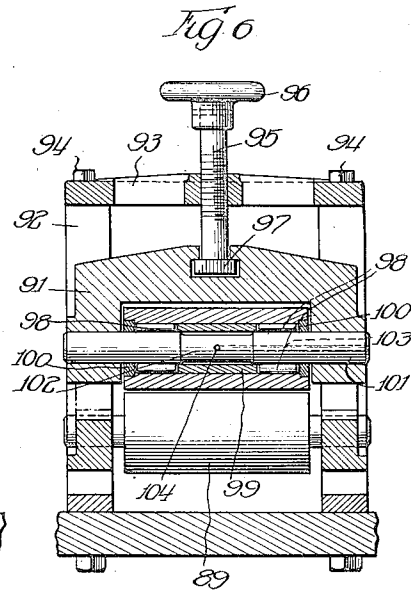
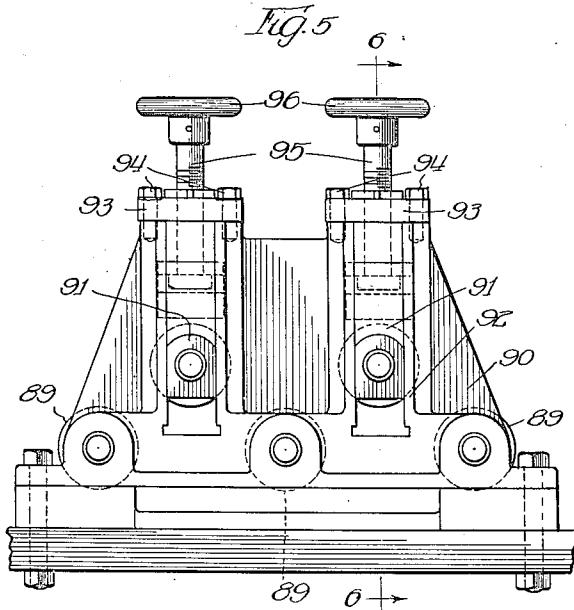
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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STOCK-HANDLING MECHANISM.

1,421,354.

Specification of Letters Patent. Patented June 27, 1922.

Application filed April 8, 1921. Serial No. 459,740.

To all whom it may concern:

Be it known that I, FREDERICK J. LITTELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Stock-Handling Mechanism, of which the following is a specification.

This invention relates to a new and improved stock feeding mechanism, and more particularly to a mechanism adapted to be associated with a strip stock working apparatus in a manner to substantially convert the apparatus to an automatic machine.

In connection with strip stock working apparatus such as punch presses or the like which operate to form blanks or small punched shapes from strip stock, or to draw shells with combination dies from such stock, a constant feed is necessary to assure rapid and economical production. In order to supply stock to such a feed, it is commonly made up either in the form of short strips or in the form of coiled rolls and fed from the rolls across the machine. In order to secure the maximum efficiency in the operation where coiled stock is used, it is necessary that the stock be straightened to take out the curves caused by the coiling and to feed the stock constantly and uniformly to the machine. In all cases means should be provided for wiping from the stock any foreign matter which might tend to injure the straightening rolls, feeding rolls, dies or other portions of the apparatus, and in many cases it is desirable that the stock be oiled. Generally after the stock is operated upon by the dies, a mutilated strip or skeleton of scrap remains. In working with coil stock this scrap strip is very difficult to handle, as it tends to coil about the machine and requires continual cutting by hand.

A further difficulty is found in such machines in securing an even and uniform feed and withdrawal of the stock strip, it being highly desirable to have the strip operated on by feeding rolls both before and after the working in the machine.

In order to obtain an intermittent drive of the feed rolls, timed accurately in relation to the strokes of the press, a reciprocating part of the press should be employed; but I have found it desirable to greatly am-

plify the angle through which the feed rolls move over that developed by the reciprocating member that actuates them.

It is an object of the present invention to provide an assembly mechanism adapted to be associated with strip working mechanism to clean, oil and straighten the stock, to feed the stock properly to the machine and to take care of the ribbon scrap which leaves the machine.

It is a further object to provide mechanism of this character which is adapted for intermittent actuation by the apparatus with which it is to be associated, which is automatic in its action, and which will amplify in the angle of rotation of the feed rolls, a relatively short stroke of the driving connections, and, preferably, induce this amplification of drive positively and uniformly in both rolls of a pair, and in both roll pairs.

It is a further object to provide a device which is compact and relatively simple in design, composed of comparatively few parts, and which may be manufactured at relatively low cost and applied to existing machines without material alteration therein. Other and further objects will appear as the description proceeds.

Broadly, my mechanism comprises paired feeding rolls located upon either side of the working point of the press and operated by the crank shaft of the press to give the stock an intermittent movement, accurately timed with the working strokes of the press, the rotary motion of the crank shaft being converted into one-way rotary motion in the feed rolls, but amplified, to increase the length of feed. It includes straightening rolls adapted to receive the stock before its entry into the first feed rolls, and means adapted to wipe and to oil the stock before it reaches the straightening rolls. It also includes a scrap cutter adapted to cut the scrap strip into relatively small and easily handled sections and the scrap cutter exists as a separate entity in form for attachment to an existing press, and is adjustable relatively to the press plunger, in the direction of issue of the scrap, so that its plane of severance can be made to coincide with the narrowest part of the scrap and the energy consumed in operating it accordingly minimized. The limit of depression of the cut-

ting plunger may be determined at will, to accord with changes in feed level of the stock strip which varies with different dies; and also to compensate if desirable, for changes in leverage through which its working stroke is transmitted, incident to changing the distance of the cutter from the press plunger that imparts the working stroke.

I have illustrated a preferred embodiment of my invention in the accompanying drawings, in which—

Figure 1 is a face view of my mechanism shown assembled with a punch press of simple type;

Figure 2 is a view of the mechanism as seen in Figure 1, but is shown in plan view;

Figure 3 is an enlarged elevation showing a pair of feed rolls;

Figure 4 is a section on line 4—4 of Figure 3;

Figure 5 is an elevation of the straightening mechanism;

Figure 6 is a section on line 6—6 of Figure 5;

Figure 7 is an elevation showing the scrap cutter; and

Figure 8 is an elevation showing the cleaning and oiling mechanism.

In Figure 1 of the drawings I have shown a simple punch press 10 in order to illustrate the relation of my stock handling mechanism thereto. This press includes the rotating shaft 11, the vertically reciprocated plunger 12 and flywheel 13. The feed actuating rod 14 of my mechanism has its upper end pivotally connected to a crank pin 15 on a disk 16 rotated by the press shaft 11. The rod 14 has its lower end connected by knuckle 17 to the operating arm 18 of the clutch drive member 19. This clutch drive member drives the inner driven member 20 upon movement in one direction, but does not turn it in the reverse direction. The two pairs of feeding rolls are identical in construction and are connected by the rod 21 which is pivotally associated at either end with the downwardly extending lugs 22 and 22', the latter forming integral parts of the clutch drive members 19 and 19'.

In each roll pair, the lower roll 23 (see Fig. 4), is fast upon its shaft 24, which is journaled in bearings 25, 26, and said shaft has keyed thereon a gear wheel 27 through which it is driven. Each upper roll 28 is fast upon its shaft 29, which is journaled in bearings 30, 31, and said shaft has keyed thereon a small gear wheel 32 through which it is driven, and a gear wheel 33 corresponding in size with and imparting drive to the gear wheel 27 on shaft 24, so that both rolls are positively driven, and driven at identical surface speed.

To transmit amplified rotary motion to the rolls 23, 28 from the inner driven member 20 of the clutch, said member is united

with the large gear 34 which is loose on shaft 24, and meshes with smaller gear 32 on shaft 29, which latter thus receives a greater angle of rotation than the clutch member 20. The motion of shaft 29, as already stated, is imparted directly to roll 28, and indirectly, though positively and equally, to roll 23. Hence while the arms 22, 22' may be oscillating through the relatively small angle measured by the range of efficient drive obtainable from the rod 14 acting through crank arms 18, the feed rolls can impart an ample feed to the strip. A hand wheel 35 fast on the outer end of each shaft 24 serves to impart initial rotation to the rolls in starting the feed and properly gaging the strip in relation to the stroke of the machine. Wheel 35 also confines the outer driving member of the clutch on the shaft. Bearings 30, 31 are slidable in the roll frame 36 and are urged downwardly by the pins 37, the upper ends of which are in contact with the washer 37' which is engaged by the springs 38. The springs 38 are retained in place by the studs 39, washers 40, nuts 41 and lock nuts 42. The gear wheel assemblies 27, 33 and 32, 34 are protected by suitable gear guards 43 and 43'.

As best shown in Figure 3, a lift lever 44 is pivoted to the roll frame 36 at 45. This lever is provided with inner arms 46 adapted to engage the under surface of the slidable bearing members 30 and 31. The outer end of the arm 44 is provided with a contact 47 which is adapted to be engaged by operating studs 48, as shown in Figure 1. The horizontal shaft 49 is carried by the feed roll frame 36 above the member 44. This shaft 49 is provided with a handle 50 adapted for manual operation to rotate the shaft. The shaft is further provided with the eccentric cam 51. This cam is adapted to engage a cam surface 52 upon the member 44 to depress that member upon rotating the handle 50. This feed roll assembly is secured to the bed plate 53 by means of bolts 54. The screws 48 are carried by bracket 55 which is adapted to be secured to the reciprocating plunger of the press by means of screws 56 and 56'. The bracket 55 is provided with a stud 57 which coacts with a slot 58 formed in the scrap cutter actuating arm 59. The upper end of this arm 59 is pivotally connected at 60 to the adjustable link 61, the lower end of which is pivoted at 62 to the cutter base 63. This cutter base 63 is secured to the bed plate 53 by bolts 64 passing through slots 65 in the bed plate. The cutter is thus adapted for longitudinal adjustment relative to the bed plate. The cutter plunger 66 carrying the cutter blade 67 is pivotally associated with the operating lever 59 at 68. This member 67 is guided in its movement by the vertical guide rods 69. The stationary cutting knife 70 is secured to

the cutter base 63. A guide plate 110 is secured adjacent the fixed cutter blade 70, the plate being fastened by screws 111 and having an upturned entrance edge 112 adapted to receive and guide the scrap strip.

The cleaning and oiling mechanism is attached to the right end of the bed plate 53 and comprises the stock guide members 71 which are adapted for lateral adjustment for differing widths of stock. The upwardly extending ears 72 are attached to the base plate adjacent the guide members 71 and these ears are each provided with stop pins 73 and with pivot pins 74. The oil pad carrying arms 75 are connected by pins 76 between which oil carrying means 77 are placed. These arms are pivoted upon the pins 74 and provided with lugs 78 adapted to engage the stop pins 73. Extending beyond the arms 75 are the arms 79 connected to each other by pins 80 and carrying the cleaning pad 81. Instead of the pads shown in Figure 1, rolls 77' and 81' may be used as shown in Figure 8. In Figure 8 the ribbon of stock is designated 82. Below the pad 77 is located the fixed oil pad 83 carried in a recess 84. Below the pad 81 is a similar pad 85 carried in the recess 86. As shown in Figure 1, a source of oil 87 is held above the pads 77 and 81 by the supporting arm 88.

The straightening rolls best shown in Figures 5 and 6 comprise five staggered rolls 89, three being carried on a lower level fixedly in the frame 90 and two being carried at a higher level upon the adjustable journal castings 91 which are slidable vertically in guideways 92 in the casting 90. These guideways 92 are closed by cap plates 93 held in place by bolts 94. The adjusting screw 95 is provided at its upper end with the operating wheel 96. It makes a screw threaded connection through the plate 93 and is provided at its lower end with a head 97 rotatably engaging the journal member 91.

As shown in detail in Figure 6, each roller 89 comprises a hollow member carried by a series of roller bearings 98, these series being spaced by the sleeve 99. The rollers are engaged upon their outer ends by the washers 100. The shafts 101 are reduced at 102 adjacent the spacing sleeve 99 and are provided with the axial oil duct 103 provided with an opening 104 at its reduced portion.

In the operation of my apparatus, the coiled stock which is carried upon any suitable reel (not shown) has its end introduced through the adjustable guides 71 and between the straightening rolls 89. During this introduction the arms carrying the oiling and cleaning pads are lifted and are retained in lifted position by the engagement of the lugs 78 with the stop pins 73. The

two upper adjustable straightening rolls 89 are adjusted according to the thickness of the stock and the stock is fed through these rolls until it is engaged by the pair of feeding rolls 23, 28. The hand wheel 35' is rotated to rotate these rolls to draw the stock inwardly. This rotation of the handle 35' rotates the shaft 24' to which it is connected and by means of the intermeshing gears 27' and 33' also rotates the upper roll 28'. The outer clutch member 19', however, is not moved, since the inner member 20 is driven forward or in the driving direction by this movement. If desired, however, in feeding the material through, the handle 50' may be moved to the left, as seen in Figure 1, thus depressing the lever 44' and lifting the roller 28' to permit the end of the stock to be passed freely between the rolls. The stock is then drawn across the machine either manually or by turning the hand-wheel 35' until it reaches the dies. The machine is then operated and when the end of the ribbon of scrap reaches the rolls 23 and 28 it is passed through them in a similar manner. The tension upon the feed rolls may be varied by adjustment of the spring 38 by loosening or tightening the nuts 41 and 42. After the stock is fed through both pairs of rolls the press 10 may be operated in the usual manner. As the plunger 12 descends the contact screws 48 engage the members 44 and 44' to release the gripping action by the rolls upon the stock if desired.

It is to be understood, of course, that dies suitable for the work being done are placed in the bed of the machine below the stock and carried by the plunger 12, respectively. These dies cooperate to perform the desired operation. Dies have been indicated somewhat diagrammatically at 114 and 115 in Figure 1. As the plunger moves upwardly, the studs 48 release the levers 44 and 44', the stock is again gripped by the feed rollers, and these rollers are rotated by means of the movement imparted to the rod 14 by the stud 15 upon the rotation of the disk 16 carried by the press.

The clutch by which the feed rolls are driven is of the ratchet type or of a type operating similarly to a ratchet in so far as it results in movement of the outer members in one direction and in free movement of the outer member relative to the inner member when the outer member is moved in the opposite direction. In movement of the member 19 in the counter-clockwise direction upon downward movement of the arm 18, as shown in Figure 1, the inner member 20 is rotated. On the other hand, when the outer member is rotated in the clockwise direction, no movement is imparted to the inner member. Thus during each rotation of the shaft 11 the feeding rolls are moved a predetermined distance by

means of this clutch moving during part of the rotation and remaining stationary the remainder of the rotation of the shaft 11.

As has been stated, the two sets of feeding rolls are connected by the rod 21 and their movement is identical.

Difficulty has heretofore been found in securing an adequate linear movement by such a drive without the use of excessively large feed rolls. That difficulty has been solved by my particular gear construction shown in detail in Figure 4. As has been described in connection with this figure, the gear wheel 34 moves freely upon the shaft 24 and does not directly turn that shaft. Thus movement imparted to the gear wheel 34 through movement of the inner clutch member 20 is directly transmitted to the smaller gear wheel 32. These may be of any desired gear reduction so that, for example, a movement of the inner clutch member through 90 degrees would serve to rotate the gear wheel 32 and consequently the shaft 29 through 180 degrees. As has been noted, the gear 33 carried by the other end of the shaft 29 is identical in size with the gear 27 with which it meshes and which is carried by the shaft 24. Thus the two rolls are rotated at the same speed. This particular form of gear reduction and drive affords a very compact and simple structure and yet one which affords the desired gear reduction, and consequently permits considerable linear movement of the stock with a relatively small movement of the clutch, and yet without the necessity for feed rolls of excessively large diameter.

The stock, after passing through the dies, consists of a mutilated strip, ordinarily called scrap, from which the elements to be used have been punched. This scrap strip, accordingly, has points of greater and of less cross section. It is desirable for economy in power required to operate the scrap cutter and also to avoid wear upon the cutting blades, to cut the scrap at the points of minimum cross section. In order that this may be done, the entire scrap cutting assembly may be moved longitudinally upon the base plate by loosening and again tightening the holding bolts 64. This movement is permitted by the slot 58 upon the operating arm without variation in the operation of the device.

It will be noted that by adjustment of the link 61 the movement of the knife may be varied to accommodate the operation of the cutter to the press when using dies of different heights, also, if desired to compensate for changes in working stroke transmitted through lever 59 incident to changes in distance between the cutter and plunger, in finding the thinner part of the scrap.

The particular construction of the straightening rolls which I have shown in detail in

Figures 5 and 6 has been found to be particularly efficacious in straightening the stock with very small expenditure of power for drawing the stock through them. These rolls are preferably formed of hardened steel and are provided with roller bearings upon a large internal circumference so that they roll very easily. It has been found that with stock of ordinary working thickness, gripping of the steel feed rolls is quite sufficient to draw the stock through and properly straighten it.

The addition of my feeding and handling mechanism to punching machines of ordinary types transforms those machines into automatic machines and affords a great increase in rapidity of working, and further affords economy in that two or even three presses may be operated by one workman.

While I have shown my construction in considerable detail, I contemplate variation, within the scope of the appended claims, in the several elements to accord with different working devices and different classes of stock.

I claim:

1. In combination with strip stock working apparatus, intermittent stock feeding means controlled by the apparatus, means adapted to straighten the stock, the feeding means serving to pass the stock through the straightening means, means adapted to release the grip of the feeding means upon the stock between feeding movements, and means adapted to cut the stock scrap after the work of the apparatus upon the stock.

2. In combination with a punch for strip stock, having a bed, a scrap cutter having cutting mechanism adapted to receive scrap issuing from the punch, mounted on said base and having adjustment to change the position of its cutting mechanism in the direction of such issue, and actuating means for said cutting mechanism connected with and actuated by said punch, at different adjustments of the cutting mechanism.

3. A scrap cutting attachment for strip stock punching machines, comprising a cutter base adapted to be attached to a punching machine in position to receive scrap issuing from the punch, and with adjustment to change its distance from the punch, cutting mechanism carried by and applied to the machine through the medium of said base, and means for actuating said cutting mechanism and adapted for connection with an operating part of the punching machine, at different adjustments of said base.

4. A scrap cutting attachment for strip stock punching machines, comprising a cutter base adapted to be attached to a punching machine in position to receive scrap issuing from the punch thereof, with adjustment to change its distance from the punch in the direction of such issue, cutting mechanism car-

ried by said base, and a lever fulcrumed on and partaking of the adjustments of said base, actuating said cutting mechanism, and adapted to extend to and engage with a reciprocating part of the punch, from different adjustments of said base.

5. In a scrap cutter for strip stock punching machines, a base constructed for mounting upon said machine on the side of the punch from which punched scrap issues, constructed with cutting mechanism, and having an adjustment to change the distance of its cutting mechanism from the plunger, in the direction of such issue, a lever fulcrumed upon and adjustable with said base, transmitting movement to said cutting mechanism, and extending to and having actuating connection with said plunger, that is also adjustable in said direction, and means for adjusting the cutting stroke received by the cutting mechanism from said lever.

6. In a scrap cutter for strip stock punching machines, a base constructed for mounting upon said machine on the side of the punch from which punched scrap issues, constructed with cutting mechanism, and having an adjustment to change the distance of its cutting mechanism from the plunger, in the direction of such issue, a lever fulcrumed upon and adjustable with said base, transmitting movement to said cutting mechanism, and extending to and having actuating connection with said plunger, that is also adjustable in said direction, and means for adjusting the cutting stroke received by the cutting mechanism from said lever comprising an adjustable post upon which said lever is fulcrumed.

7. In combination with strip stock working apparatus, scrap cutting mechanism adjustable longitudinally of the stock strip, said mechanism being provided with a reciprocating knife, and means being provided for adjusting the cutting stroke of said knife.

8. In combination with strip stock working apparatus, scrap cutting mechanism adjustable longitudinally of the stock strip, said mechanism being provided with a reciprocating knife, and means being provided for adjusting the cutting stroke of said knife independently of the operating movement of the apparatus.

9. In combination with strip stock working apparatus, feeding rolls adapted to frictionally engage the stock therebetween, said rolls being driven by the operation of the apparatus, a lever extending into coaction with said apparatus, adapted to relieve the engaging pressure of said rolls during a period while the stock remains stationary, and manual means acting upon said lever for relieving the engaging pressure.

10. In combination with strip stock working apparatus, mechanism adapted to oil the stock as it moves into the apparatus, said

mechanism comprising lubricating means engaging the lower surface of the stock and lubricating means engaging the upper surface of the stock, a hinged carrier carrying the upper lubricating means, said carrier being provided with means to selectively maintain said lubricating means out of engagement with the stock.

11. In combination with strip stock working apparatus, mechanism adapted to oil the stock as it moves into the apparatus, said mechanism comprising a pad engaging the lower surface of the stock and a pad engaging the upper surface of the stock, and a second pair of pads adapted to first engage the stock to brush foreign matter therefrom, the lower pads of both pairs being fixed and a hinged carrier supporting the upper pads of both pairs, said carrier being provided with means to selectively maintain the pads out of engagement with the stock.

12. In combination with strip stock feeding mechanism, a pair of stock feeding rolls, a rotatable shaft for one of said rolls, a driven member and a driving gear rigidly connected to each other and rotatably carried by said shaft, a clutch associated with the driven member and adapted to drive said member when the clutch is moved in one direction and to move freely over said member in the opposite direction, the clutch and member being normally disconnected, a second shaft for the other roll, said second shaft having fixedly associated therewith a driven gear in mesh with the first-mentioned driving gear, a driving gear fixedly associated with the second shaft, and a driven gear carried fixedly upon the first shaft and in mesh with the driving gear upon the second shaft.

13. In combination with strip stock feeding mechanism, a pair of stock feeding rolls, a rotatable shaft for one of said rolls, a hand wheel carried by said shaft whereby it may be manually rotated, a driven member and a driving gear rigidly connected to each other and rotatably carried by said shaft, a second shaft for the other roll, said second shaft having fixedly associated therewith a driven gear in mesh with the first-mentioned driving gear, a driving gear fixedly associated with the second shaft, and a driven gear carried fixedly upon the first shaft and in mesh with the driving gear upon the second shaft.

14. In combination with strip stock feeding mechanism, a pair of stock feeding rolls, a rotatable shaft for one of said rolls, a hand wheel carried by said shaft whereby it may be manually rotated, a driven member and a driving gear rigidly connected to each other and rotatably carried by one end of said shaft, a clutch associated with the driven member and adapted to drive said member when the clutch is moved in one direction and to move freely over said member in the

opposite direction, the clutch and member being normally disconnected, a second shaft for the other roll, said second shaft having fixedly associated therewith a driven gear 5 in mesh with the first-mentioned driving gear and of less size than said driving gear, a driving gear fixedly associated with the opposite end of the second shaft, and a driven gear carried fixedly upon the opposite end of the first shaft and in mesh with the driving gear upon the second shaft, both said last-named gears being of the same size. 10

Signed at Chicago, Illinois, this 4th day of April, 1921.

FREDERICK J. LITTELL.