H. A. AND R. H. GRIFFITHS.

POWER PRESS FOR OPERATING ON METAL SHEETS OR STRIPS.

APPLICATION FILED FEB. 18, 1921.

1,401,108. Patented Dec. 20, 1921.

4 SHEETS—SHEET 1.

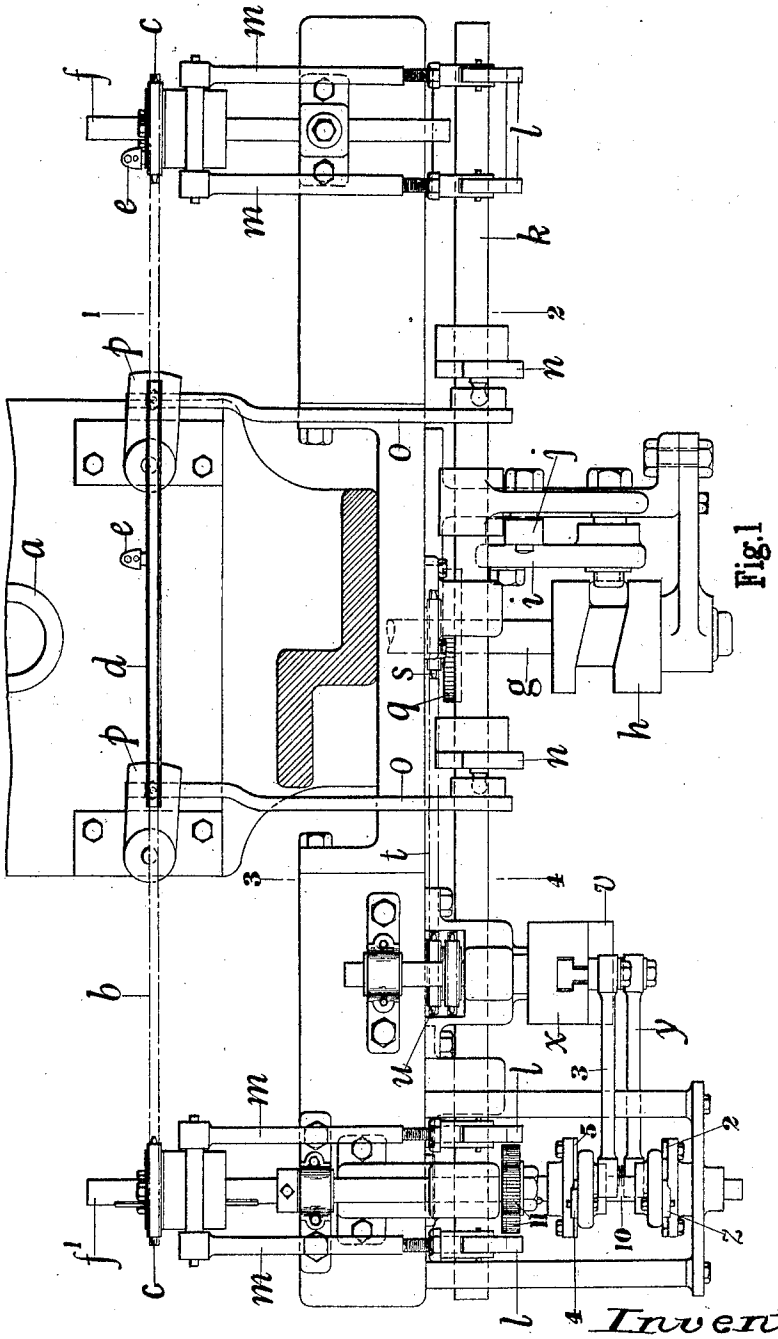


Fig. 1

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4 SHEETS—SHEET 2.

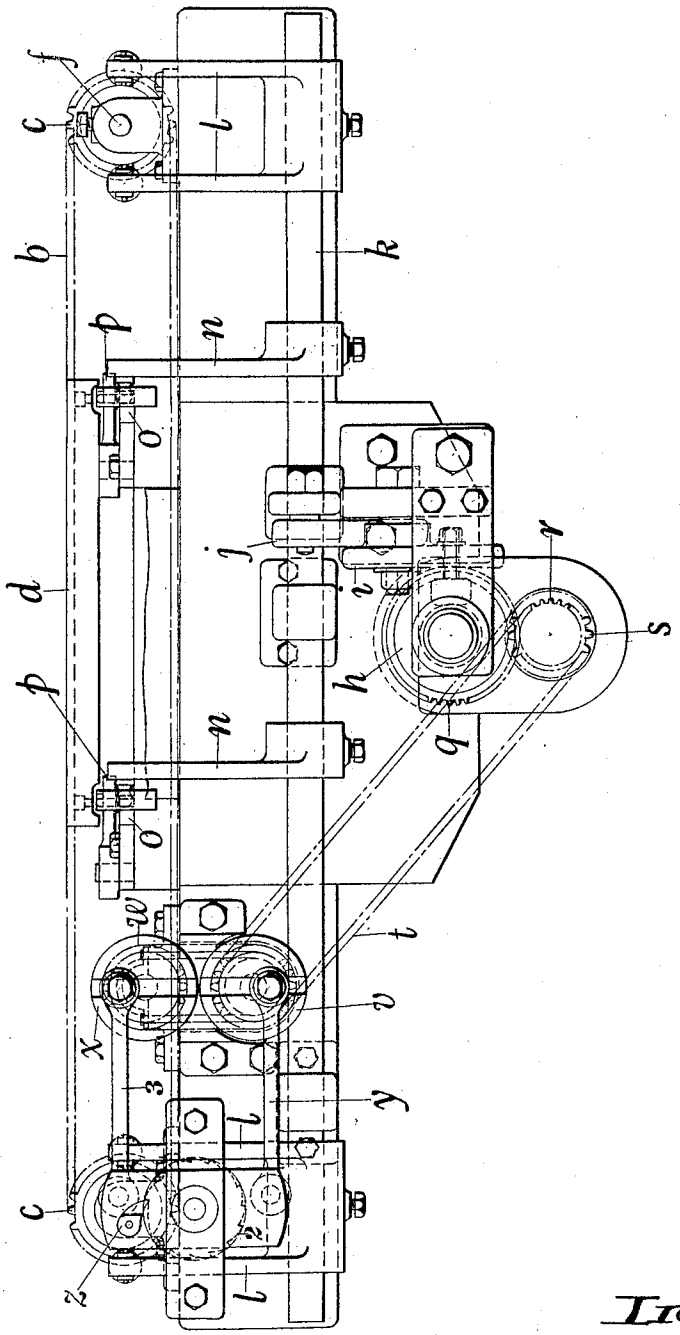


Fig.2

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4 SHEETS—SHEET 3.

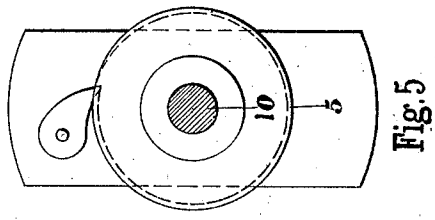


Fig.5

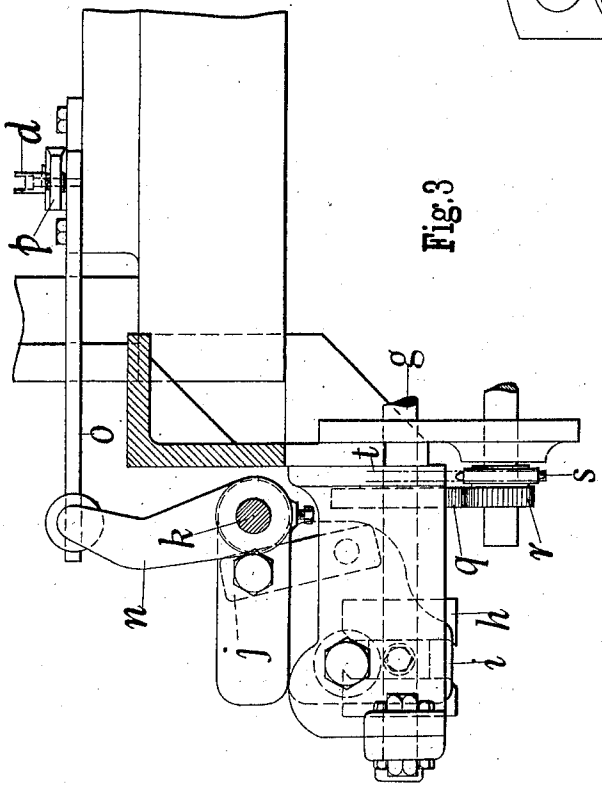


Fig.3

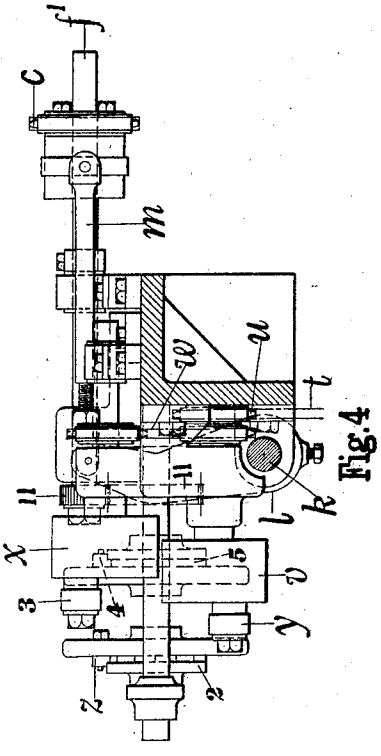


Fig.4

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4 SHEETS—SHEET 4.

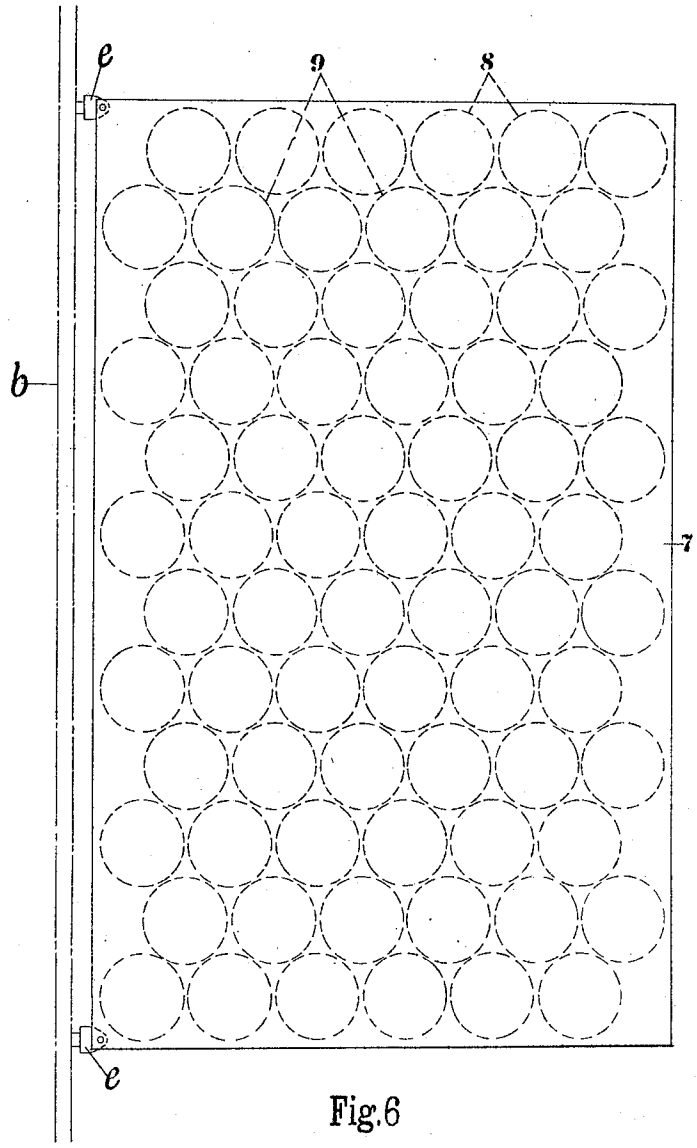


Fig.6

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UNITED STATES PATENT OFFICE.

HARRY ALBERT GRIFFITHS, OF BIRMINGHAM, AND RICHARD HANSON GRIFFITHS, OF SUTTON COLDFIELD, ENGLAND.

POWER-PRESS FOR OPERATING ON METAL SHEETS OR STRIPS.

1,401,108. Specification of Letters Patent. Patented Dec. 20, 1921.

Application filed February 18, 1921. Serial No. 446,116.

To all whom it may concern:

Be it known that we, HARRY ALBERT GRIFFITHS, residing at 8 Chad road, Edgbaston, in the city of Birmingham, England, and RICHARD HANSON GRIFFITHS, residing at Highfield, Sutton Coldfield, in the county of Warwick, England, subjects of the King of Great Britain and Ireland, have invented certain new and useful Improvements Relating to Power-Presses for Operating on Metal Sheets or Strips, of which the following is a specification.

This invention relates to power presses as employed more particularly for the cutting out of blanks from metal sheets or strips, and has for its object to provide improved means for feeding the sheets or strips past the tools.

The invention comprises the use in conjunction with a plurality of independent tools, of an endless chain to which the sheet can be detachably connected, and means for intermittently imparting longitudinal and lateral movements to the chain for subjecting different portions of the sheet in succession to the action of the tools.

Referring to the four accompanying sheets of explanatory drawings:—

Figure 1 is a plan, Fig. 2 a side elevation, Fig. 3 a cross section on 1.2. (Fig. 1), Fig. 4 a cross section on 3.4. (Fig. 1) and Fig. 5 a detail illustrating a feeding mechanism constructed in accordance with this invention.

Fig. 6 is a diagram illustrating one mode of operation on the metal sheets to be cut.

In carrying the invention into effect as shown, a plurality of cutting out dies of which only a portion of the first *a* is shown in the drawings (Fig. 1), are arranged side by side and have coöperating therewith a corresponding number of reciprocating punches for simultaneously cutting out blanks from different portions of the sheet. These tools may, for example, be disposed in a row with spaces between them approximately equal to the diameter of the blanks and the sheet is passed between them as described hereafter. Preferably a number of sheets are superimposed and secured together by eyelets or their equivalent so that each punch may cut out a number of blanks at each stroke.

Alongside the tools is arranged an endless feed chain *b* which passes over end sprockets *c* and also along an intermediate guide channel *d*. The sheet (or superimposed sheets) is connected at one edge to the chain by the engagement with holes in the same of projections *e* from the chain. The end sprockets are free to slide on their shafts *f f'* and provision is made by suitable lever or other mechanism for moving these sprockets axially on their shafts and thereby producing lateral movements of the chain and sheets.

In the mechanism illustrated the motion is derived from a rotating shaft *g* which is driven from any convenient part of the ordinary press mechanism. This shaft has secured to it a cam *h* which actuates a bell crank lever *i* and the latter in turn actuates through a link *j* another bell crank lever secured to an oscillatory shaft *k*. The oscillatory motions of the shaft *k* are communicated to the sprockets *c* by levers *l* and links *m*. The shaft *f* is fixed and the corresponding sprocket can both slide and revolve thereon, but the shaft *f'* is rotated for driving the chain, and its sprocket is feather keyed to the said shaft. In addition to the sliding or reciprocatory movements of the sprockets, a like movement is given to the chain guide channel *d*, this being communicated from the shaft *k* through levers *n*, link *o*, and oscillatory carriers *p* to which the ends of the channel are pivotally connected. Any convenient provision is made in conjunction with one or both of the bell crank levers for varying the lateral movement given to the chain. Thus the position of the link *j* relatively to either or both of the said levers can be varied.

Intermittent longitudinal movement of the chain is obtained by means of ratchet and pawl mechanism acting on one of the sprockets. Preferably an additional ratchet and pawl device is provided for producing periodically a greater feeding movement than the normal.

On the shaft *g* is secured a toothed wheel *q* gearing with a wheel *r* driving a sprocket *s* from which motion is transmitted by a chain *t* to a sprocket *u* driving a slotted crank disk *v*. Coaxially with the sprocket *u* is another like sprocket which by means of a chain *w* drives another sprocket and slotted crank disk *x*. Oscillatory motion is communicated from the disk *v* by a link *y* to a pawl *z* which by its action on a

ratchet 2 secured to a shaft 10 produces equal intermittent motions of that shaft, this motion being transmitted to the shaft f' through gear wheels 11. The disk a imparts motion by a link 3 to a pawl 4 engaging another ratchet 5 on the shaft 10. The amplitude of the movement of this pawl is greater than that of the other, and the ratchet is notched at only one position, the pawl being therefore inoperative during the greater part of each rotation of the ratchet. But when the pawl does come into action it gives a greater movement to the shaft f' than the other pawl, this movement being utilized to carry one set of sheets out of action and the next into action. The amplitude of movement of both ratchet mechanism and their period of operation relatively to the lateral movements of the chain can be varied by any convenient and ordinary provisions in the mechanism.

Preferably the punches and chain are in continuous operation; that is to say the machine is not stopped after each operative stroke of the punches. The attendant attaches a sheet (or a number of superimposed sheets) to the chain, and when the leading edge of this sheet approaches the tools (or the tools have cut out the last row of blanks in the preceding sheet) the abnormal feeding movement is produced in the chain, and this carries the preceding sheet clear of the tools and also brings the new sheet into position for the first cutting action. The next descent of the tools causes one row of blanks to be cut out, and from this instant onward the sheet is carried past the tools by intermittent lateral and longitudinal movements of the chain until all the required blanks have been cut from the sheet.

Meanwhile another sheet (or number of superimposed sheets) is placed on the chain and when the former sheet has been completely punched the previous sequence of operations is repeated.

The mode of passing the sheets between the punches may be varied by appropriately adjusting the mechanism for producing the lateral and longitudinal motions of the feed chain. An example is illustrated at Fig. 6. The sheet 7 attached to the chain b is carried beneath a row of six punches which simultaneously cut out a row of blanks as indicated by the dotted circles 8. During the return of the punches the chain is fed forward and is also moved laterally so that the positions of the blanks 9 to be cut in the next row lie in an intermediate or staggered relation to the preceding blanks. In this mode of procedure each forward motion of the chain is accompanied by a lateral motion in one direction or the other. When it is preferred to cut out say six blanks in each row by means of three punches, the latter are spaced apart to cut out alternate blanks in one stroke and the remainder in the next stroke. Between the strokes the sheet is moved laterally to bring it into the proper position, but no forward movement is given until the second stroke has been completed. Then the sheet is fed forward and after the first stroke of the punches in the next row is moved laterally in readiness for the second stroke. The lateral movements thus alternate with the longitudinal movements of the chain.

If desired means such as runners or guides may be provided for supporting the sheets while passing through the machine. The scrap sheet (or sheets) is automatically disengaged from the chain by a guide or other device which causes it to rise off the chain projections, and is allowed to fall away to a discharge chute or conveyer.

By this invention we are able to increase the rate of production of the blanks and reduce the liability to wastage by careless attendants.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:—

1. In mechanisms for automatically feeding metal sheets or the like between press tools, the combination with a plurality of tools, of an endless chain, means for detachably connecting the sheet or the like to the chain, and means for imparting intermittent longitudinal and lateral movements to the chain for subjecting different portions of the sheet or the like in succession to the action of the tools, substantially as described.

2. In mechanisms for automatically feeding metal sheets or the like between press tools, the combination with a plurality of tools, of an endless chain, rotatable and laterally movable sprockets carrying the chain, independently variable means for imparting intermittent movements to the sprockets, and means for detachably connecting the sheets or the like to the chain, substantially as described.

3. In mechanisms for automatically feeding metal sheets or the like between press tools, the combination with a plurality of tools, of an endless chain, rotatable and laterally movable sprockets carrying the chain, independently variable means for imparting intermittent movements to the sprockets, means for detachably connecting the sheets or the like to the chain, and a laterally movable guide channel for the chain, substantially as described.

4. In mechanisms for automatically feeding metal sheets or the like between press tools, the combination with a plurality of tools, of an endless chain, rotatable and laterally movable sprockets carrying the chain, two ratchet mechanisms for imparting in-

termittent rotational movements to one of the sprockets, one producing the normal longitudinal feeding movements of the chain, and the other an occasional extra feeding movement, means for producing intermittent lateral movements of the sprockets, and means for detachably connecting the sheets or the like to the chain, substantially as described.

5. In mechanisms for automatically feeding metal sheets or the like between press tools, the combination with a plurality of tools, of an endless chain, a pair of sprockets carrying the chain, shafts on which the sprockets are carried and are capable of lateral movement, means for imparting intermittent rotational movements to one of the sprockets for producing longitudinal movements of the chain, an oscillatory shaft, means for connecting the said shaft and the sprockets for producing lateral movements of the chain, means for actuating the said shaft, a guide channel for the chain, means for imparting from the shaft lateral movements to the guide simultaneously with the lateral movements of the sprockets, and means for detachably connecting the sheets or the like to the chain, substantially as described.

6. In mechanisms for automatically feeding metal sheets or the like between press tools, the combination with a plurality of tools, of an endless chain, sprockets carrying the chain, a fixed shaft on which one of the sprockets is rotatably and slidably mounted, a rotatory shaft to which the other sprocket is slidably secured, ratchet mechanism for imparting intermittent rotational movements to the second named sprocket, a guide channel for the chain, an oscillatory shaft, means connecting the sprockets and guide channel to the said shaft for producing intermittent lateral movements to the same, and means for detachably connecting the sheets or the like to the chain, substantially as described.

In testimony whereof we have signed our names to this specification.

HARRY ALBERT GRIFFITHS.
RICHARD HANSON GRIFFITHS.