July 15, 1930. F. JOHNSON 1,770,487

PRINTING MACHINE

Filed Aug. 10, 1927 5 Sheets-Sheet 1

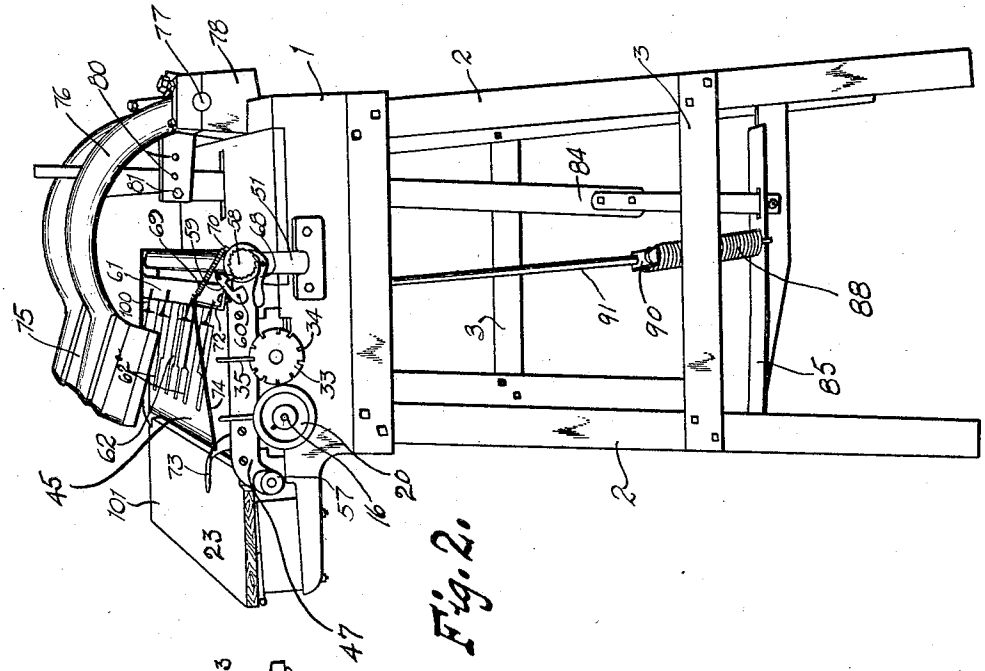


Fig. 2.

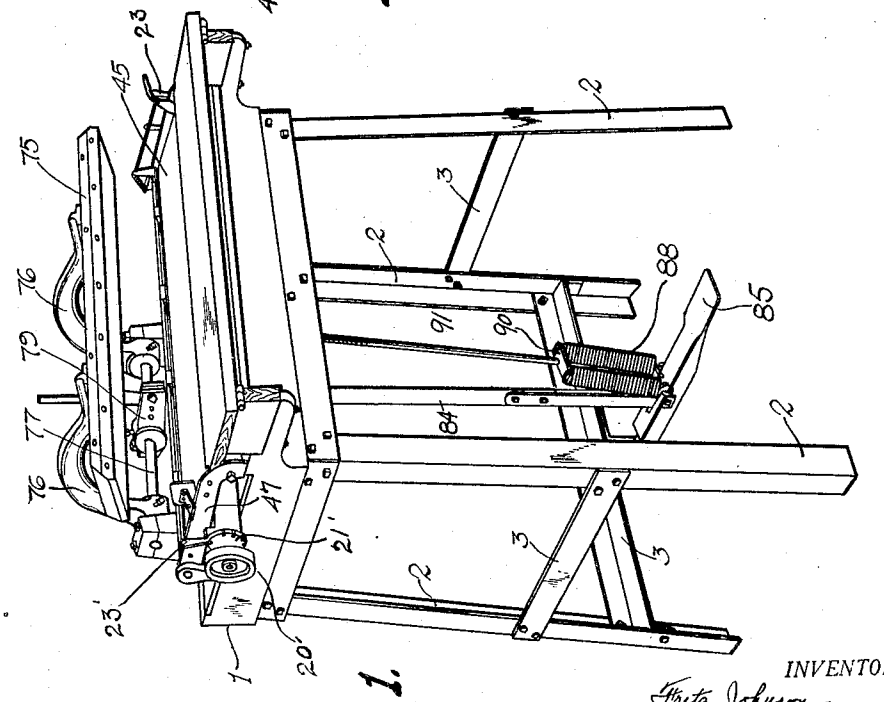


Fig. 1.

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July 15, 1930. F. JOHNSON 1,770,487

PRINTING MACHINE

Filed Aug. 10, 1927 5 Sheets-Sheet 2

Fig. 3.

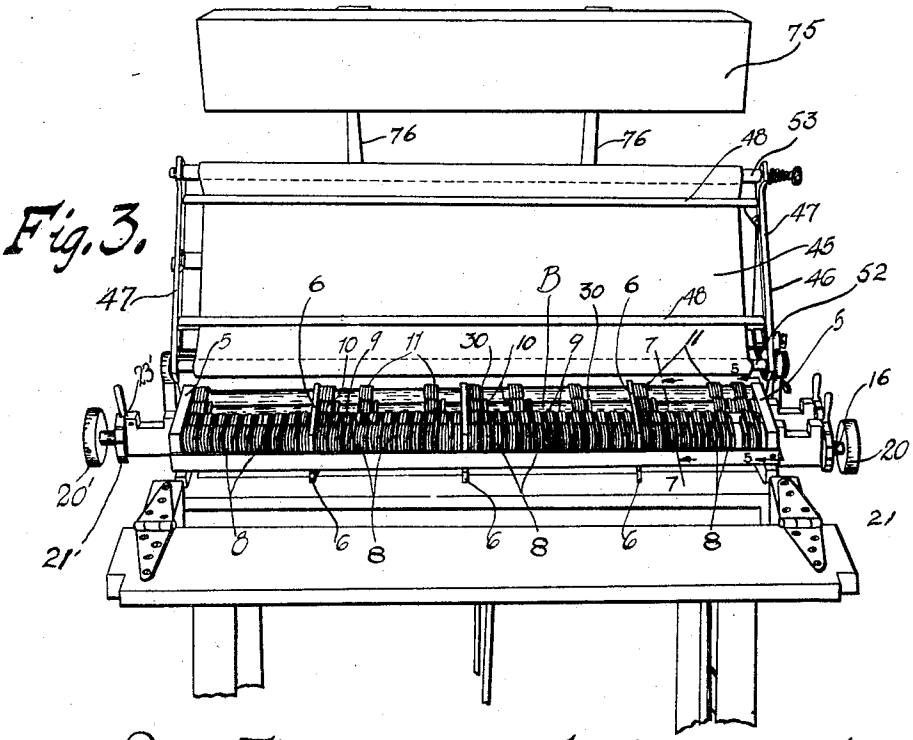


Fig. 9.

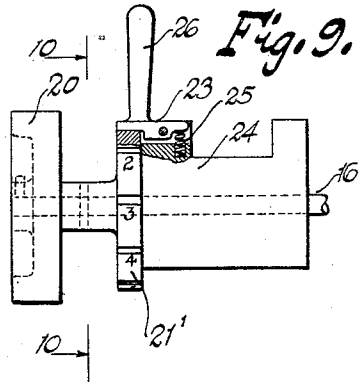


Fig. 10.

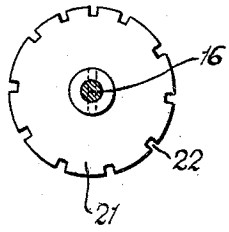


Fig. 11

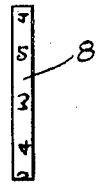
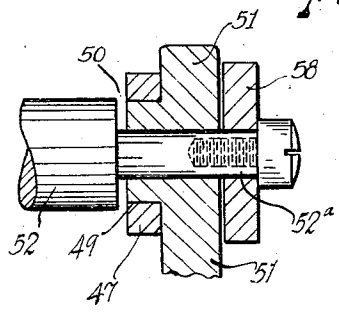


Fig. 15.



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July 15, 1930. F. JOHNSON 1,770,487

PRINTING MACHINE

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Fig. 4.

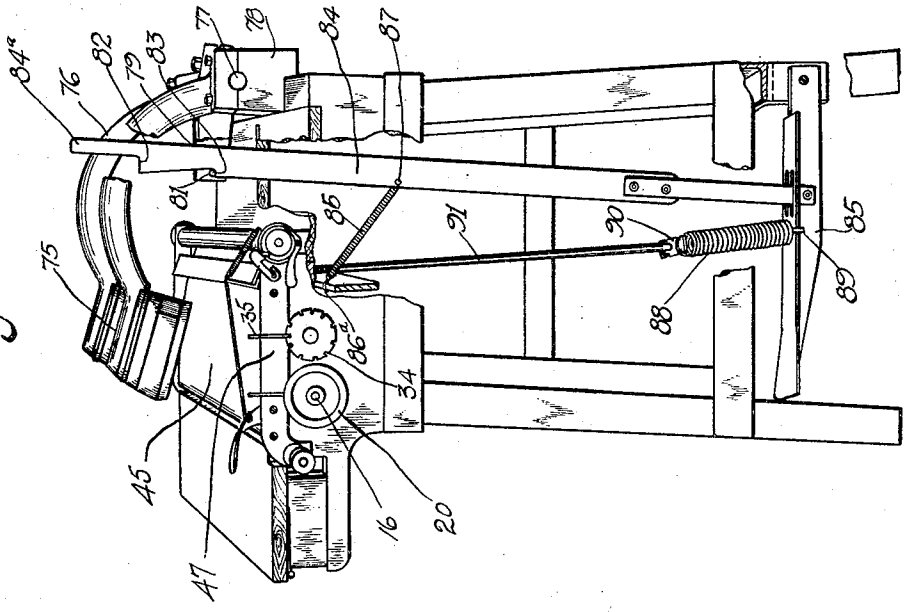


Fig. 12.

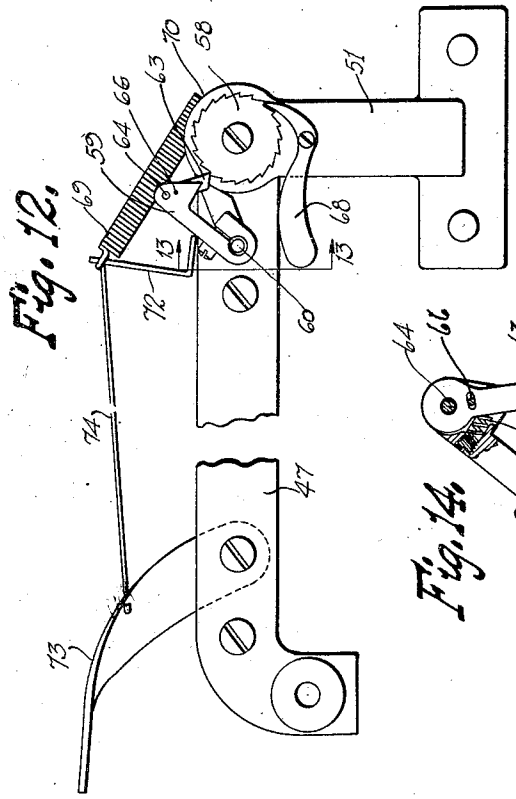


Fig. 14.

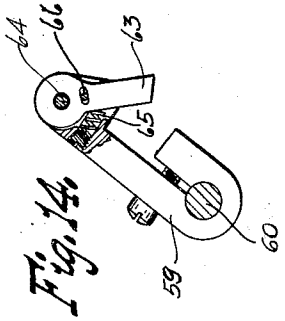
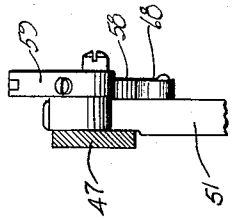


Fig. 13.



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July 15, 1930. F. JOHNSON 1,770,487

PRINTING MACHINE

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Fig. 5.

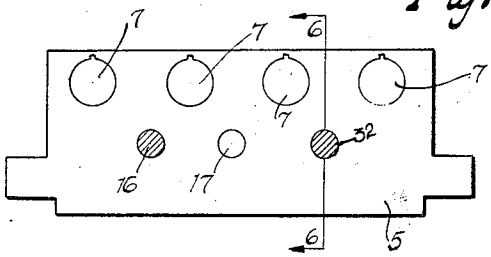


Fig. 6.

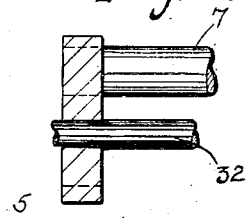


Fig. 8.

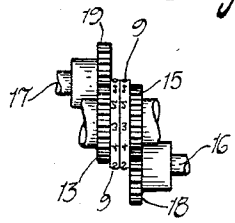
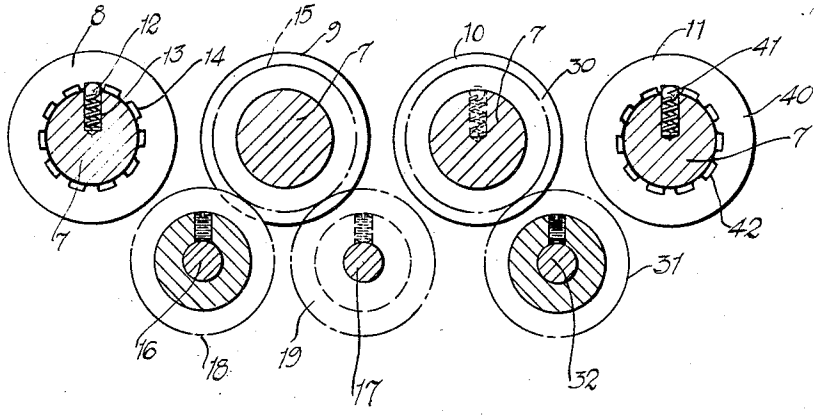


Fig. 7.



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July 15, 1930. F. JOHNSON 1,770,487

PRINTING MACHINE

Filed Aug. 10, 1927 5 Sheets-Sheet 5

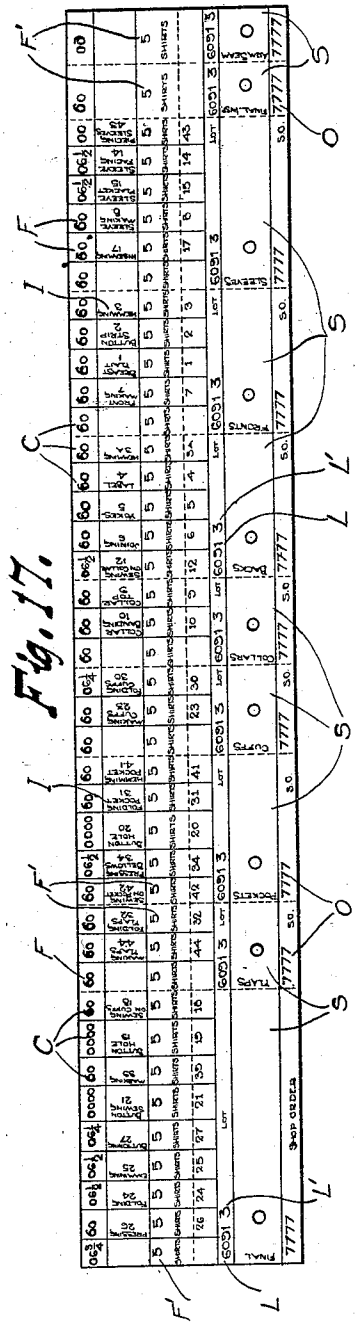


Fig. 17.

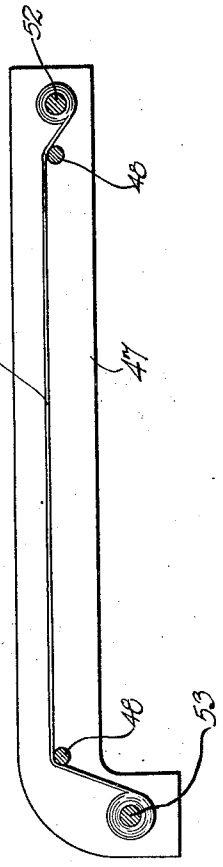


Fig. 18.

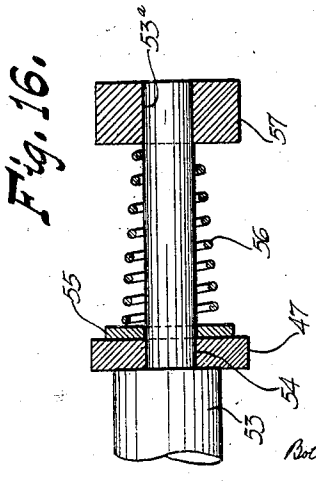


Fig. 16.

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ATTORNEY

Patented July 15, 1930 1,770,487

UNITED STATES PATENT OFFICE

FRITZ JOHNSON, OF RACINE, WISCONSIN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO STEPHENSON UNDERWEAR MILLS, OF SOUTH BEND, INDIANA, A CORPORATION

PRINTING MACHINE

Application filed August 10, 1927. Serial No. 212,026.

This invention relates in general to printing machines and more particularly to a printing machine especially designed and adapted for use in printing the numbers or characters in the spaces of the so-called "coupon tickets" employed for keeping a record of piece work in various industries.

The present invention has a wide range of use in that it may be employed to facilitate the keeping of a record of piece work in various arts, trades, and industries, and in connection with various manufactures, products, articles, or commodities. It is merely for the sake of illustration and simplicity in disclosure that the present application sets forth the machine as applicable to the coupon tickets employed in keeping a record of the piece work involved in the manufacture of shirts.

In the manufacture of shirts on a commercial scale, there are a great many operations, involved in the production of each shirt, each individual operation being performed over and over by an operator who specializes on such operation. Thus, one operator does nothing but "front making"; another is restricted to "breast plait" work; a third to the "button strip" operation; a fourth to "sleeve making"; and so on through the manifold operations. Different operations call for different degrees of skill and are more or less difficult and so the price paid for the piece work varies with the particular operation performed. And the amount of piece work performed by each operator varies. For these and other reasons the problem of keeping an exact record of the piece work performed by each of the many operators has been a serious and troublesome one and a practice widely followed is to use coupon tickets. Such coupon tickets having a number of stubs for the related groups of operations, such as the operations involved in making fronts, backs, sleeves, etc., these stubs bearing the shop order number, a lot and split number and having spaces for the application of suitable identifying and recording indicia. The stubs are detachable from each other and also carry detachable coupons. There is one coupon for each of the individual operations and each coupon has a space bearing indicia identifying it with its operation and also has spaces adapted to receive figures representing the price paid for the operation, the number of shirts in the particular split for which the coupon is used and spaces for receiving the indicia which identifies the coupon with an individual operator. The price paid for different operations varies as before mentioned, also the number of shirts in each split varies. The shop number and order number also vary but with less frequency. The application of these variable numerals to the multiplicity of coupons and stubs of the many coupon tickets that must be employed involves a great deal of clerical labor when done manually and yet heretofore this work has, for the most part, been so performed, as machines proposed for the work have been found unsuitable or unsatisfactory for one reason or another.

The principal difficulty inherent in the machines hertofore proposed is the lack of range and also the lack of capacity for convenient variation in the numerals or other matter that must be applied to the coupons and stubs. This difficulty will be appreciated when it is borne in mind that as many as forty-one operations are involved in the manufacture of each shirt and that there is a coupon for each operation. Moreover, the coupons bear varying figures to represent the different prices paid for the several operations and must also bear varying figures to represent the varying number of shirts in each split. The same difficulty to a lesser degree is met in connection with the stubs which must bear varying numbers representing the lot and split number and representing the shop order number.

One object of the present invention is to provide a printing machine which is so constructed and organized as to have such an ample range of selection that it is capable of printing any and all of the various numbers that must be printed and which simultaneously prints the selected numbers on all of the coupons and on all the stubs of the ticket.

Another object of the invention is to pro-

vide a printing machine of this character in which the convenient and accurate selection of desired numbers is greatly facilitated.

A further object is to provide a printing machine having these advantages and capacities and which provides for a clean cut and uniform impression of the numbers on all of the coupons and stubs at each printing operation.

A still further object is to provide a printing machine which conveniently and quickly and easily applies the varying numbers or characters to all of the spaces of the coupons and stubs so as to minimize the manual clerical work that must be done in connection with the keeping of the record of the piece work.

Another object resides in the provision of a printing machine having these advantages and capacities and which is of simple and durable construction, reliable, speedy and effective in operation, easily and quickly controlled, manipulated and adjusted, and adapted to be manufactured at a comparatively slight expense from materials and by means of facilities ordinarily available.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawings forming a part of this specification, and in which:

Figure 1 is a perspective view of a printing machine embodying the present invention;

Figure 2 is a similar view looking towards the opposite side of the machine from that shown in Figure 1;

Figure 3 is a fragmentary perspective view looking toward the front of the machine and showing the inking ribbon and its frame elevated to expose the printing bed;

Figure 4 is a fragmentary perspective view similar to Figure 2, but with parts broken away to show the means for operating the platen;

Figure 5 is a sectional view taken on line 5—5 of Figure 3, and showing one of the end plates of the frame and the shafts mounted thereon;

Figure 6 is a view in section taken on line 6—6 of Figure 5;

Figure 7 is a fragmentary sectional view through the printing bed and taken in the plane of line 7—7 of Figure 3;

Figure 8 is a fragmentary detail view showing how the printing wheels of one shaft are adjusted;

Figure 9 is a fragmentary detail view partly in section and partly in elevation showing the actuating and latching means for one of the adjusting shafts shown in Figures 7 and 8;

Figure 10 is a sectional view on line 10—10 of Figure 9;

Figure 11 is a detail view in elevation of one of the printing wheels;

Figure 12 is a fragmentary detail view in side elevation illustrating the feed mechanism for the inking ribbon;

Figure 13 is a view in section taken on line 13—13 of Figure 12;

Figure 14 is a detail sectional view of the pawl of the ribbon feed;

Figure 15 is a fragmentary detail sectional view showing the swingable mounting of the ribbon frame;

Figure 16 is a fragmentary detail sectional view showing the tensioning means for the inking ribbon;

Figure 17 is a plan view of one of the coupon tickets, and

Figure 18 is a view of the ribbon frame in central longitudinal section, the ribbon being shown in elevation for the sake of simplicity in illustration.

The coupon ticket utilized in keeping a record of the piece work involved in the manufacture of shirts is shown in Figure 17. In this coupon the stubs are designated at S, the detachable coupons at C. It is to be noted that the stubs have spaces for receiving the lot numbers L and split numbers L′ and also has spaces for receiving the shop order numbers O. The coupons are impressed with wording and indicia I to identify them with the operation in connection with which they are used and are lined to provide spaces for receiving the figures F representing the price and the figures F′ representing the number of shirts in the split.

As shown, the printing machine comprises a suitable base 1 supported on legs 2 which may be appropriately braced by means of cross members 3. On the base 1 the printing bed designated generally at B is provided and is preferably constructed as shown in Figures 3, 5, 6, 7 and 8. As illustrated, the printing bed includes end frame members 5 suitably secured to the base 1 and intermediate frame members 6 also supported and secured to the base 1. Fixed supporting shafts 7 are carried by these frame members 5 and 6, the shafts 7 being fitted in openings provided therefor in the frame members and being suitably secured. These shafts 7 are horizontally disposed and extend in spaced parallel relation to each other and provide the support for the printing members which, in the present instance, consists of printing wheels or rings.

In the present instance, to adapt the printing machine to the coupon ticket with which it is to be used a gang or row 8 of printing wheels is arranged longitudinally along the forward supporting shaft 7, these printing wheels 8 being segregated into forty-one groups and bearing characters on their peripheries to adapt them to print the prices to be paid for the various piece work opera-

tions. On the second shaft 7, that is, the one next adjacent the front of the machine, a second gang or row 9 of printing wheels is provided and also consists of forty-one groups or sets, each group consisting of two printing wheels designed to print on each of the coupons of the ticket the number of shirts in the particular split. The third shaft 7, that is, the shaft third from the front of the machine, carries a row or gang of ten sets of printing wheels 10 which are designed to print the lot and split numbers. The rearward shaft 7 also carries a gang or row of ten sets of wheels designated at 11 and which are adapted to print the shop order numbers.

As will be understood from Figure 7, each printing wheel is angularly adjustable on its fixed supporting shaft to permit any printing character on the periphery of the wheel to be selected and brought into printing position.

The printing wheels 8 of the first group which print the price are independently and manually adjustable, each printing wheel 8 being rotatably mounted on its shaft 7 for angular adjustment but being releasably locked in any adjustment by a spring projected pawl 12 mounted in a blind recess 13 of the shaft 7 and cooperable with internal recesses 14 formed in the printing wheel 8. There is one such recess 14 for each printing character. With this arrangement any printing wheel 8 or any set or group thereof may be adjusted independently of any other and this is important and necessary as the price paid for the various operations differ and consequently even on a single ticket, prices printed on the different coupons vary greatly.

The printing wheels 9 of the second group print the number of shirts in the split and these numbers are the same on each coupon of any one ticket and vary with each split. Thus, the numbers, after being selected, are printed on as many coupons as may be necessary to provide a record of the operations involved in making the shirts in any split and remain unchanged until the record for one split is completed whereupon they are adjusted to present the numbers corresponding to the number of shirts in the next split. To facilitate the rather frequent adjustment of the printing wheels 9 of this second group, these printing wheels are rotatably mounted on their shaft 7 and each printing wheel has a gear wheel 15 fixed to one side face thereof. As indicated, the printing wheels 9 are arranged in pairs, with the adjacent faces of the members of each pair abutting in face to face relation and the remote faces of the members of each pair carrying the gear wheels 15. Two rotatable adjusting shafts designated at 16 and 17 are rotatably mounted on the frame members 5 and 6 of the frame of the printing bed and these adjusting shafts have fixed thereto gear wheels 18 and 19. The gear wheels 18 mesh with the gear wheels 15 of the printing wheels 9 which print unit numbers, whereas the gear wheels 19 mesh with the gear wheels 15 of the printing wheels 9 which print tens. At one end of the machine, the shaft 16 projects beyond the frame member 5 and carries a hand wheel 20 whereby the shaft 16 may be turned to bring the desired printing character of any one of the unit printing wheels 9 into printing position. For the purpose of holding the selected printing characters in printing position a collar 21 is fixed to the shaft 16 and has a peripheral notch 22 for each printing character, the notches 22 being longitudinally alined with the printing characters. A pivoted latch 23 is mounted on a bracket 24 fixed to the end frame member and is urged by a spring 25 to snap into any one of the notches 22 brought to a position beneath the latch 23. A handle 26 is integral with the latch and facilitates release thereof. The opposite end of the shaft 17 carries a similar handle 20′, a similar notched wheel 21′ and a similar latch 23′. Numerals are applied to the collars 21 and 21′ adjacent their notches and indicate the characters that may be or have been selected.

The printing wheels 10 in the third group are designed to print the lot and split numbers and for this purpose each of the ten sets consists of four independently adjustable wheels for printing the lot numbers and one wheel for printing the split numbers. All of the wheels which print the split numbers are simultaneously adjusted, and for this purpose each printing wheel which prints a split number has a gear wheel 30 fixed thereto. Gear wheels 31 are fixed on an adjusting shaft 32 rotatably mounted on the frame of the printing bed and having an operating knob 33 whereby it may be turned. The knob 33 is notched as at 34 to cooperate with a spring pressed latch 35 whereby the knob, shaft and gear wheels 30 and 31 and the printing wheels 10 fixed to the gear wheel 30 may be releasably held in any adjustment and the selected printing character maintained in printing position. The gear wheels 10 which print the lot numbers are loosely mounted on their shaft 7 and releasably held in adjusted position by means of a spring projector ball 39 which coacts with internal recesses in the printing wheel to maintain the selected printing character in printing position just as in the case of the printing wheels 8.

The fourth group or gang of printing wheels consists of ten sets of printing wheels, each set consisting of four printing wheels 11. All of the printing wheels 11 are rotatably mounted on their supporting shaft 7 and are independently adjustable, each printing wheel being releasably held in adjusted position by means of a spring pressed pawl 41,

coacting with internal recesses 42 in the printing wheel.

An inking ribbon or inking sheet 45 overlies the printing bed and is carried by a swingable ribbon frame 46 which may consist of side bars 47 maintained in spaced relation by cross rods 48. The side bars 47 are pivotally supported on the base of the machine and for this purpose one end of each side bar 47 is provided with an opening 49 which is rotatably fitted on an inwardly and laterally projecting bearing boss 50 formed on a bearing bracket 51 carried by the base of the machine as clearly shown in Figure 15. Reels or rolls 52 and 53 are provided for the inking ribbon or sheet 45, the inking roll 52 having a reduced extension 52^a at each end rotatably mounted in the associated bearing bracket 51, as illustrated in Figure 15. The roll or reel 53 has a reduced extension 53^a at each end rotatably fitted in the bearing opening 54 provided therefor in the associated side bar 47 of the ribbon frame. The cross rods 48 also serve as fixed guides for the inking sheet or ribbon.

Tensioning means for the ribbon is organized with the roll 53 and may consist of a friction faced shoe or washer 55 suitably fitted on one of the reduced extensions 53^a of the roll 53 and frictionally engaging the adjacent side bar 47 of the frame 46 under the influence of a compression coil spring 56 interposed between the washer 55 and a knob 57 fixed on the reduced extension 53^a and having its ends operatively associated with the washer and with the knob.

The other roll 52 is intermittently driven by suitable feed mechanism which is preferably automatic. This feed mechanism comprises a ratchet wheel 58 fixed to one of the reduced extensions 52^a and a pawl 59 cooperable with the ratchet wheel 58 and carried by one of the mounting trunnions 60 of the bar 61 of a guard designated generally at 62. This bar 61 has a trunnion 60 at each end and these trunnions 60 are pivotally supported in the side bars 47 of the ribbon frame. The trunnion 60 which has the pawl 59 fixed thereto projects laterally beyond its side bar of the ribbon. The pawl 59 has a tooth 63 received in the slotted head of the pawl and pivoted thereto as at 64. The tooth 63 is projected by a spring 65 but is limited in its pivotal movement by means of a stop pin 66 which is carried by the pawl and which extends through a slightly elongated slot formed in the tooth. With this arrangement when the pawl 59 swings downwardly, that is, in a clockwise direction as viewed in Figure 12, its tooth 63 coacts with the ratchet wheel 58 to advance the inking ribbon or sheet, that is, to wind the inking ribbon or sheet on the roll 52 whereas when the pawl 59 moves upwardly, that is, in a counter-clockwise direction as viewed in Figure 12, the spring 65 is compressed to permit the tooth 63 to play idly over the teeth of the ratchet wheel 58.

A weighted dog or detent 68 is pivotally mounted on one of the brackets 51 and normally engages the ratchet wheel 58 to prevent retrograde movement of the roll 52. When the ribbon or inking sheet is to be rewound on the roll 53 this dog or detent 68 must be manually disengaged from the ratchet wheel 58 while the knob 57 is turned.

The guard 62 has the usual guard fingers 62^a suitably shaped to expose only the proper portions of the printing bed. A retractile coil spring 69 has one end connected as at 70 to one of the bearing brackets 51 and has its opposite end connected to a bracket 72 fixed to the bar 61 of the guard whereby the spring 69 tends to normally elevate the guard 62 slightly above the printing bed. To provide for manual depression of the guard and manual actuation of the feed mechanism a pivoted finger piece 73 is mounted on one of the side bars 47 of the frame and is connected to the bracket 72 by a link or connection rod 74.

A platen designated generally at 75 is cooperatively disposed with respect to the printing bed and overlies the same as shown in the drawings, the platen being carried by curved arms 76 which are fixed to a rock shaft 77 supported for oscillating or rocking movement in bearings 78 formed on the base. A crank arm 79 is fixed to the rock shaft 77 and has its projecting portion slotted or bifurcated and formed with registering holes 80, any alined pair of which may receive a crank pin 81 designed to coact with shoulders 82 or 83 formed on a pitman 84 which fits in the slot provided by the bifurcated arm of the crank and which is pivotally connected at its lower end to a treadle 85. The pitman 84 is biased to cause its shoulders to swing toward and engage the crank pin 81, this biasing being effected by a retractile coil spring 86 (see Fig. 4) which has one end anchored on the base of the machine as at 86^a and which has its other end connected to the pitman 84 as indicated at 87. The treadle 85 and consequently the pitman 84, the crank arm 79, the rock shaft 77, the arms 76, and the platen 75, are urged to a position wherein the platen is elevated and this action is brought about by a pair of retractile coil springs 88 connected as at 89 to the treadle and carried by a cross head 90 formed in the lower end of an adjustable mounting rod 91, the mounting rod 91, being suitably supported on the base of the machine. The platen 75 and the parts which carry the same have considerable weight and it is this weight that is utilized to make the impression, the depression of the treadle merely relieving the platen of the supporting action of the springs 88 exerted through the pitman 84,

crank pin 81, rock shaft 77, and arms 76. By providing the two shoulders 82 and 83 to coact with the crank pin 81, the platen may be cooperatively disposed with respect to the printing bed (when its shoulder 83 is engaged with the pin 81) or may be swung upwardly therefrom to permit the ribbon frame to be raised to expose the printing bed (when its shoulder 82 is engaged with the pin 81). When the platen 75 is elevated in this manner the handle portion 84a of the pitman is grasped and the pitman is pushed rearwardly. The treadle 85 is held against upward movement and the platen is grasped and pushed up until its shoulder 82 is positioned beneath the pin 81 whereupon the pitman, platen and treadle are released and the platen is held elevated in the position shown in Figure 3.

Upon elevation of the ribbon carrying frame the entire printing bed is exposed and any adjustment that may be necessary are effected in an easy and convenient manner and under the full view of the operator.

Wherever a simultaneous adjustment of the printing wheels of any group is possible it is had, for, under such circumstances, the wheels simultaneously adjusted are geared to a hand wheel operating knob or other operating element. On the other hand, wherever independent adjustment of the printing wheels of any group is necessary then the printing wheels are mounted for independent adjustment. Under all circumstances the printing wheels are releasably locked in position with the selected printing character located in the printing plane, that is, in printing position.

After the selection has been made in the printing bed and the ribbon frame and platen operatively positioned as shown in Figures 1 and 2, the coupons are placed one at a time on the guard. Gauges 100 on the guard facilitate the proper positioning of the coupons. The treadle is then depressed and the platen descends and forces the portions of the coupon exposed through the guard against the printing bed whereby to make the impression. It is impossible for a careless operator to utilize too much force in making the impression because no matter how hard the treadle is depressed only the weight exerted by the platen operates to make the impression. With each impression the guard swings up and down and advances the inking sheet or ribbon. With this operation forty-one spaces of the coupons have the selected prices impressed thereon, forty-one spaces of the coupons have the numbers impressed thereon which represent the number of shirts in the split; ten stubs have the lot and split numbers impressed thereon; and ten stubs have the shop order number impressed thereon. All of these impressions are made in a single printing operation. There is ample range of selection to provide the printing characters that may be necessary to print the prices, numbers of shirts in the split, the lot and split number and the shop order number, and the selection may be carried out with facility and with minimum opportunity for error. In making the selection a master coupon is laid on a table 101 provided at the forward end of the printing frame and in such position the master coupon lines up with the printing bed and comparison of the master coupon and printing bed is facilitated whereby to insure accurate selection. After selection this table 101 may be used for receiving the unprinted coupons.

Of course, it is to be understood that after selection is made it is necessary to print up coupon tickets in such number as may be necessary to keep a record of the piece work involved in the particular split. After the coupons are printed up the operators receive and retain their respective coupons while the stubs, after being properly marked, are attached to a bundle of the articles in connection with which the piece work record is being kept.

The invention claimed is:

1. A printing machine for use with coupon tickets and having a printing bed made up of groups of printing members located in the same printing plane and adapted to simultaneously print all of the spaces of the coupon ticket, said printing members being adjustable to permit of selection of the desired printing characters, certain of said printing members being independently and individually adjustable and having means for releasably securing the same in adjusted position, other of the printing members having means for simultaneously adjusting the same and means for holding the printing members simultaneously adjusted in adjusted position.

2. A printing machine of the character described having a printing bed made up of a plurality of groups of printing members located in the same printing plane, the printing members of each group being arranged longitudinally in a row, the members of one group being parallel with respect to the members of every other group, means for mounting the printing members of certain groups for independent adjustment and means for simultaneously adjusting the other printing members of the groups.

3. A printing machine of the character described having a printing bed, including a plurality of parallel rows of printing wheels, fixed supporting shafts on which the printing wheels are rotatably mounted, certain of the shafts having means coacting with certain of the printing wheels for releasably maintaining such wheels in adjusted position, manually operable gearing connected with the other printing wheels for adjusting

the same and latching means for releasably maintaining the last mentioned wheels in adjusted position.

4. A printing machine of the character described having a printing bed including a fixed supporting shaft, printing wheels rotatably mounted thereon, spring projected detents carried by the shaft and cooperable with certain of the printing wheels, and manually operable gearing controlling the adjustment of the other printing wheels.

5. A printing machine of the character described having a printing bed including a fixed supporting shaft, printing wheels rotatably mounted on said supporting shafts and arranged in pairs, a gear wheel fixed to rotate with each printing wheel, two rotatably mounted adjusting shafts, gear wheels on one shaft meshing with the gear wheels of one member of each pair of printing wheels, and gear wheels on the other adjusting shaft meshing with the gear wheels of the other printing members.

6. A printing machine of the character described having a printing bed including a frame, a row of printing wheels mounted thereon for angular adjustment, a single adjusting shaft geared to a plurality of the printing wheels for simultaneously adjusting the same, an operating element on the shaft whereby it may be turned, and a single latching means cooperable with the shaft to maintain all of the printing wheels geared thereto in adjusted position.

7. A printing machine of the character described having a printing bed including a row of printing wheels arranged in pairs with the adjacent faces of the members of each pair in face to face relation, gear wheels secured to the remote faces of the members of each pair, two rotatable adjusting shafts, one on one side and one on the other of the row of printing wheels, gear wheels fixed to each adjusting shaft, the gear wheels of one adjusting shaft meshing with the gear wheels secured to corresponding members of the pairs of printing wheels, the gear wheels of the other shaft meshing with the gear wheels secured to the other members of the pairs of printing wheels, an individual operating element for turning each shaft and an individual latching means for each shaft.

In witness whereof, I hereto affix my signature.

FRITZ JOHNSON.