R. R. MILLER.

MACHINE FOR WIRE TYING BAGS.

APPLICATION FILED DEC. 26, 1914.

1,222,014.

Patented Apr. 10, 1917.

5 SHEETS—SHEET 1.

Fig. 1.

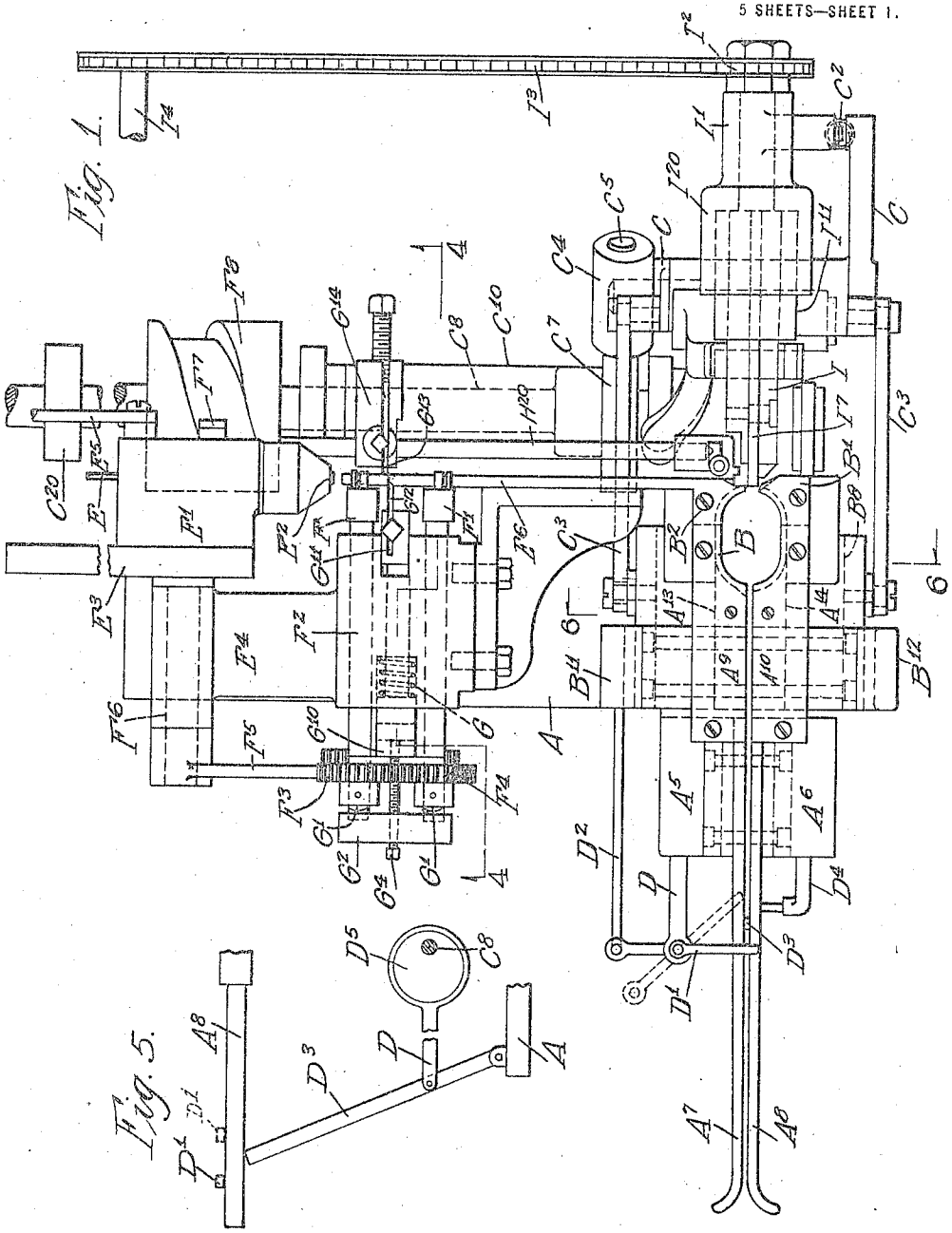


Fig. 5.

Witnesses:

Chas. Smith

Bessie S. Rice.

Inventor

Reginald R. Miller

by Parker & Burton

his Attys.

R. R. MILLER.

MACHINE FOR WIRE TYING BAGS.

APPLICATION FILED DEC. 26, 1914.

1,222,014.

Patented Apr. 10, 1917.

5 SHEETS—SHEET 2.

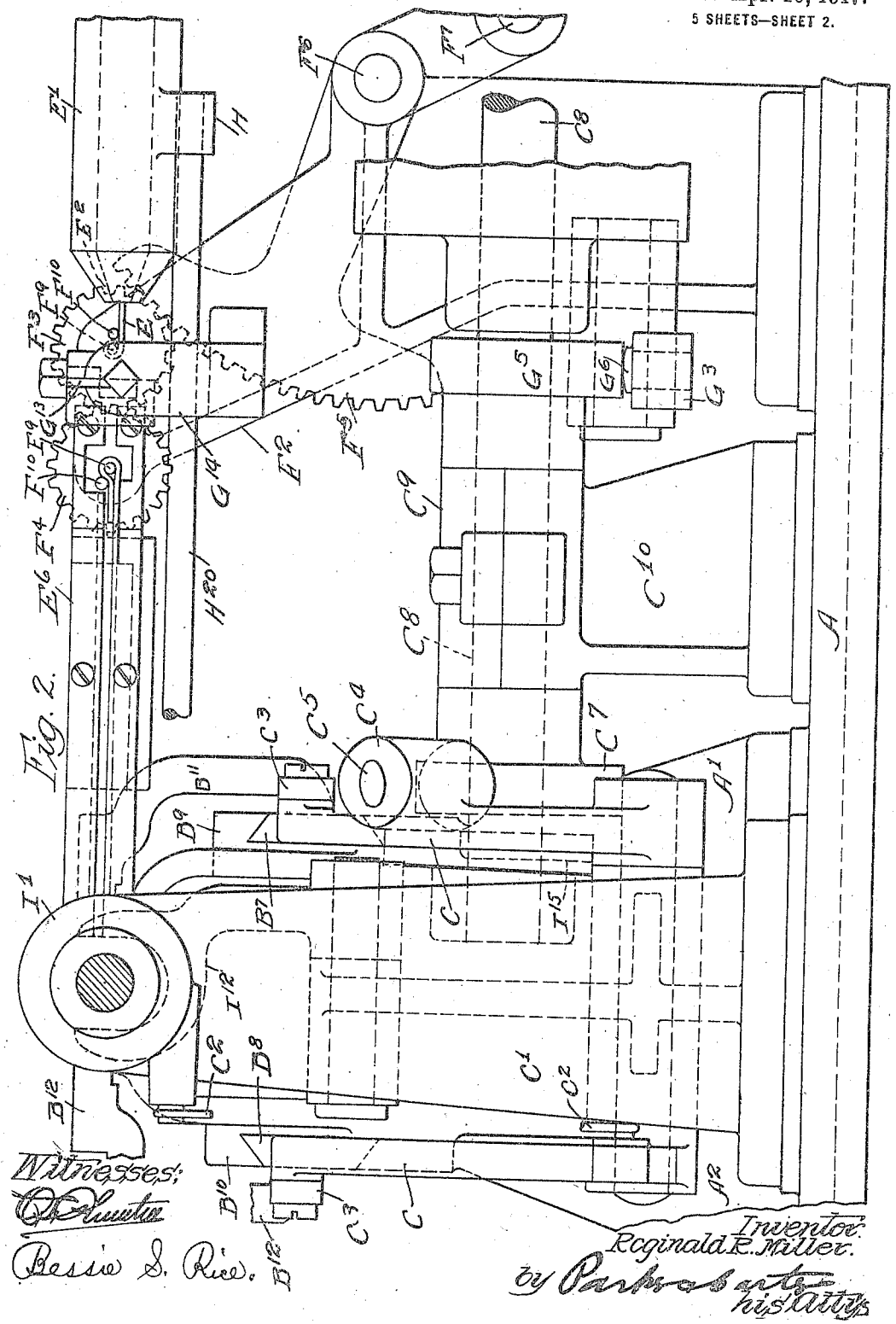


Fig. 2.

Witnesses:
C. E. Knowlton
Bessie L. Rice.

Inventor:
Reginald R. Miller.
by Parker & Burton
his Attys

R. R. MILLER.

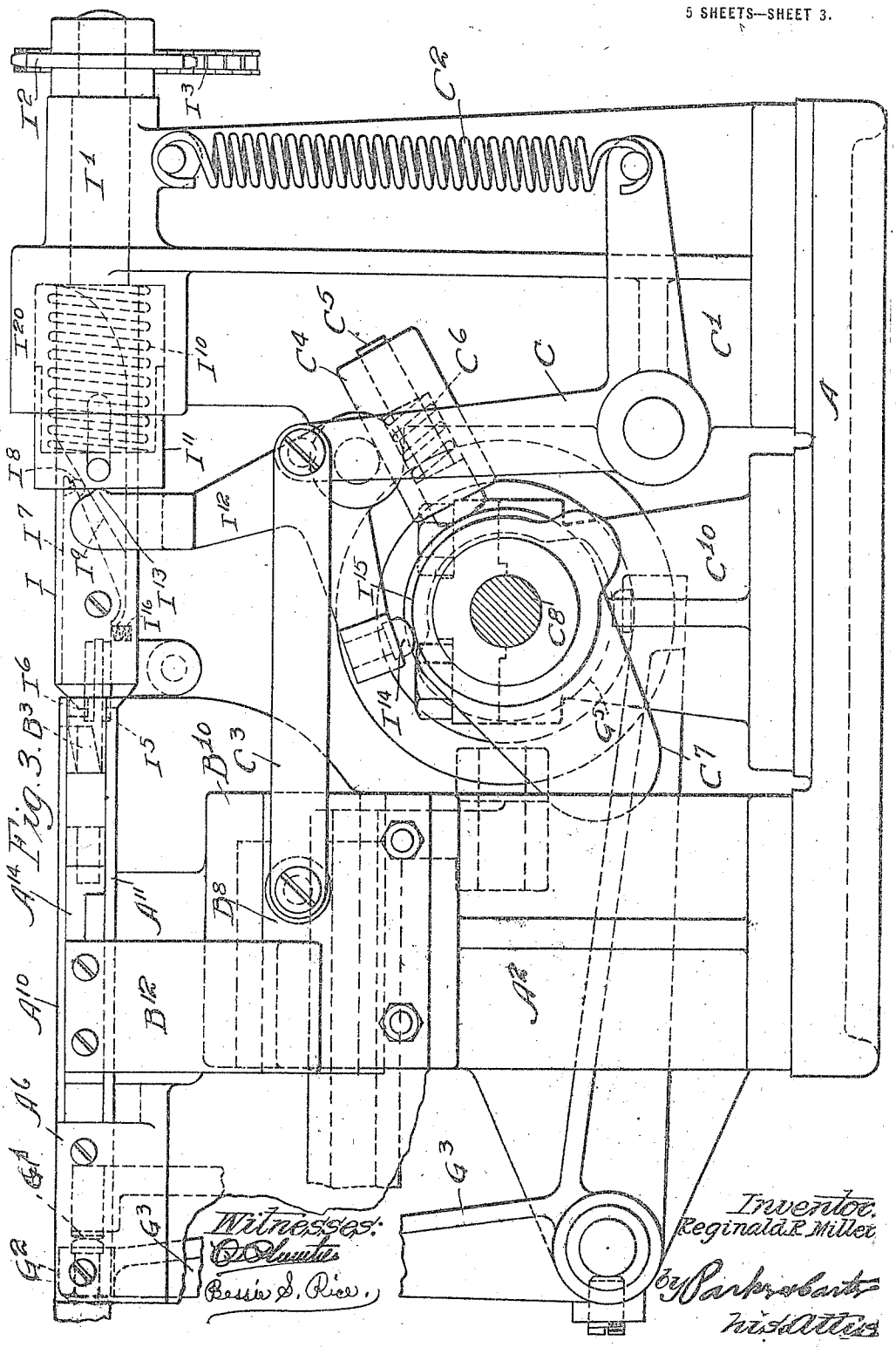
MACHINE FOR WIRE TYING BAGS.

APPLICATION FILED DEC. 26, 1914.

1,222,014.

Patented Apr. 10, 1917.

5 SHEETS—SHEET 3.



R. R. MILLER.

MACHINE FOR WIRE TYING BAGS.

APPLICATION FILED DEC. 26, 1914.

1,222,014.

Patented Apr. 10, 1917.

5 SHEETS—SHEET 4.

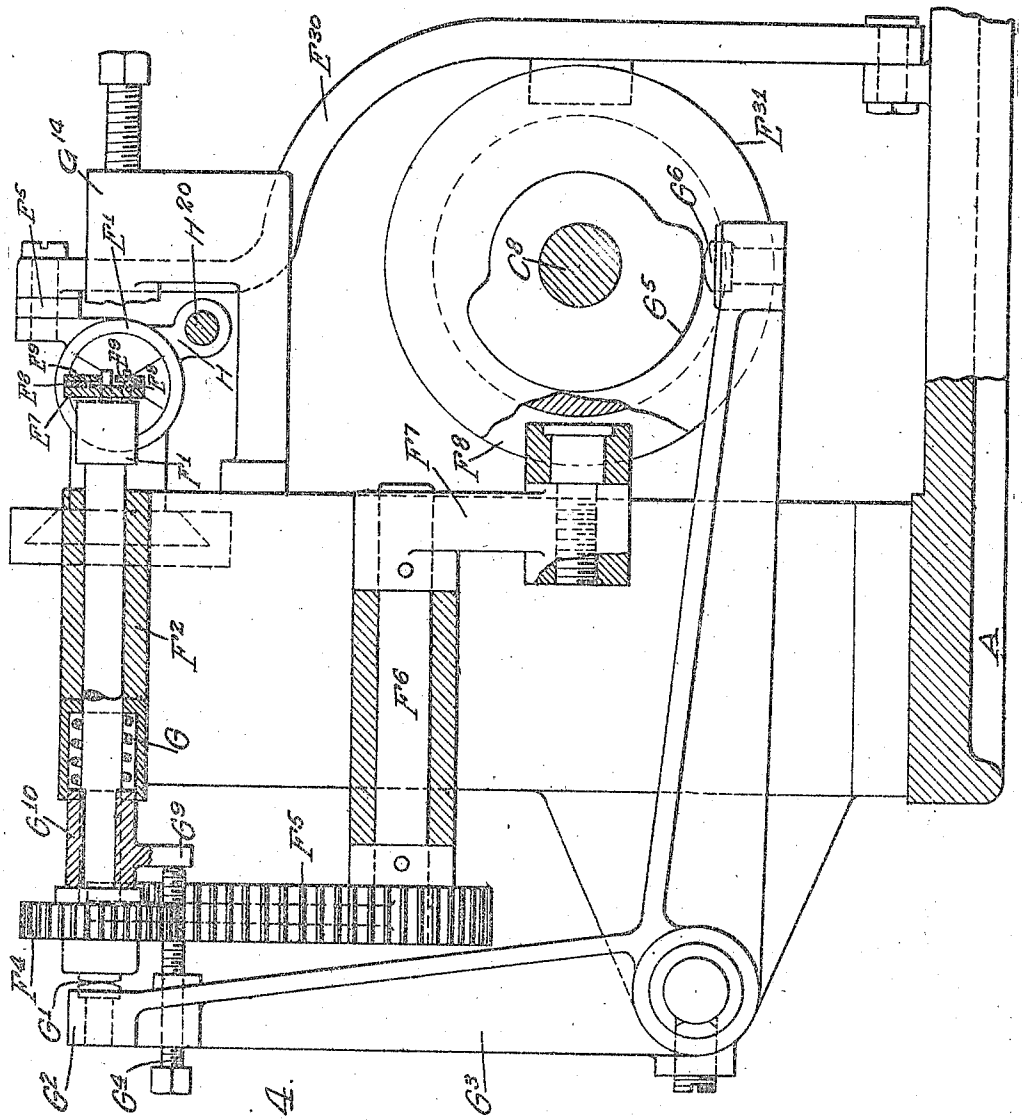


Fig. 4.

Witnesses:
C. F. Hunter
Bessie S. Rice.

Inventor:
Reginald R. Miller.
by Parker & Burton
his Attys.

R. R. MILLER.

MACHINE FOR WIRE TYING BAGS.

APPLICATION FILED DEC. 26, 1914.

1,222,014.

Patented Apr. 10, 1917.

5 SHEETS—SHEET 5.

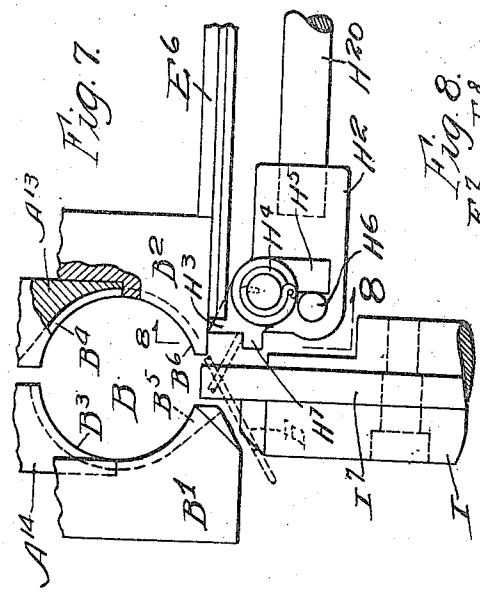


Fig. 7.

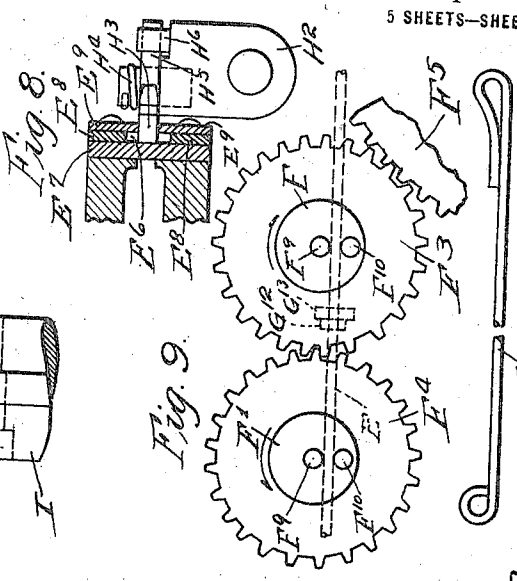


Fig. 8.

Fig. 9.

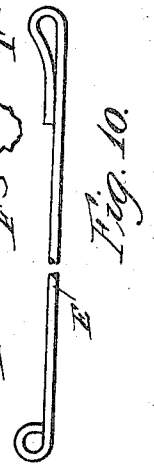


Fig. 10.

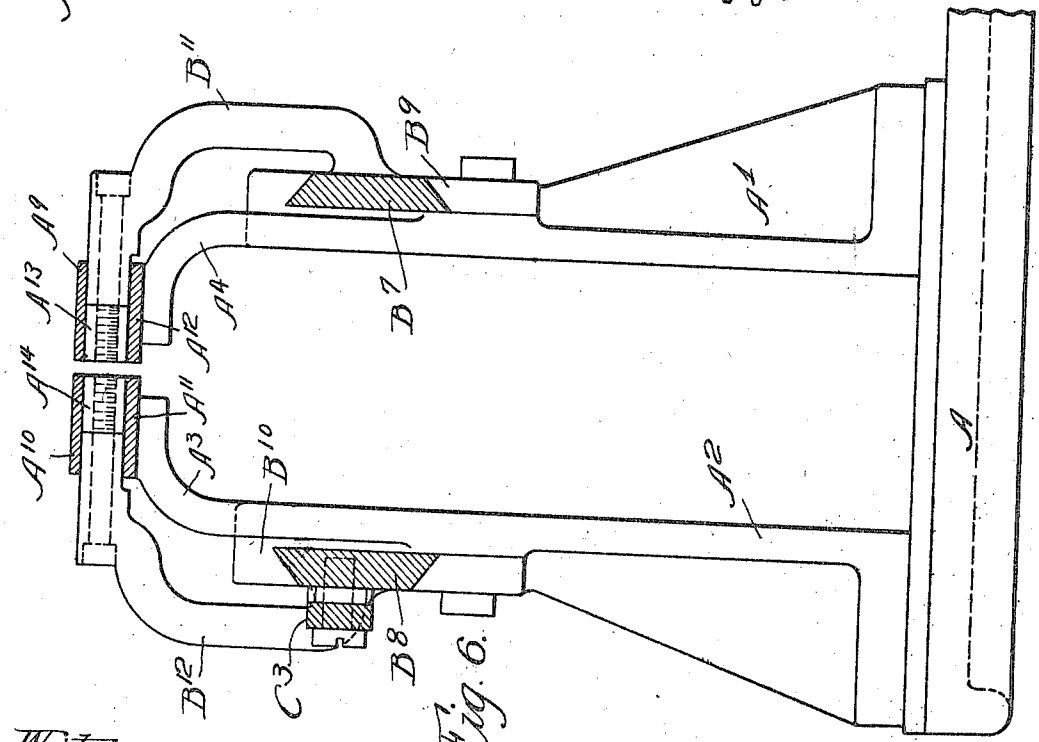


Fig. 6.

Witnesses:

Chas. A. Hunter

Bessie S. Rice.

Inventor.

Reginald R. Miller.

by Parker & Burton

Attorneys

UNITED STATES PATENT OFFICE.

REGINALD R. MILLER, OF CHICAGO, ILLINOIS, ASSIGNOR TO BATES VALVE BAG COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF WEST VIRGINIA.

MACHINE FOR WIRE-TYING BAGS.

1,222,014. Specification of Letters Patent. Patented Apr. 10, 1917.

Application filed December 26, 1914. Serial No. 878,392.

To all whom it may concern:

Be it known that I, REGINALD R. MILLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Machines for Wire-Tying Bags, of which the following is a specification.

My invention relates to improvements in means for tying bags. In it I provide means for puckering the bag, means for feeding out wire to form a tie, cutting it off, forming a tie blank, feeding the tie blank, bending it around the puckered neck of the bag and then twisting the tie to hold the bag tightly in the puckered closed condition. In a machine such as this, it will, of course, be obvious that if this operation is to be successful and economical it is necessary to produce the tied bag at a very rapid rate and, therefore, I have provided means for operating the machine to do all the different duties required as rapidly as the operator can feed the bag to the machine and in my arrangement the operator's act in feeding the bag starts the necessary machinery for forming the tie, feeding it, puckering the bag, bending the tie around the bag, twisting it and ejecting the tied bag. It is, of course, obvious that these different operations are all going on simultaneously and successively and when the bag is fed in to be tied its being fed starts the machinery and all the parts move so that the bag is puckered, a tie is fed in, a wire is fed in, a piece cut off, a tie blank formed, a tie blank fed or bent around the puckered neck of the bag and twisted tie and the bag ejected. A number of these movements are simultaneous and a number successive and these will be pointed out in the specification. One object, therefore, of my invention is to tie the bag with a wire tie, another object to provide means for forming a tie and drawing it tight around the neck of the bag to close the bag. Still other objects of my invention will develop in the specification.

The invention is illustrated very diagrammatically in the accompanying drawings wherein is illustrated both a machine and a process. The drawings show all the essential features of my invention but since the matter is very complicated, I have omitted such obvious constructions as clutches, springs and controls which are well-known types of stock or standard parts. My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a plan view;

Fig. 2 is a side elevation viewed from the right-hand side of Fig. 1;

Fig. 3 is a side elevation viewed from the bottom of Fig. 1;

Fig. 4 is a section along the line 4—4 of Fig. 1;

Fig. 5 is a detail of the driving mechanism;

Fig. 6 is a section on the line 6—6 of Fig. 1.

Fig. 7 is a detail plan view of part of the tie twisting mechanism;

Fig. 8 is a section along the line 8—8 of Fig. 7;

Fig. 9 is a detail plan view of the twisting mechanism; and

Fig. 10 is a plan view of the tie as it would appear if it were discharged from the machine when formed instead of being immediately fed to and around the bag.

Like parts are indicated by like letters throughout the several figures.

A is a rigid base for the entire machine which serves as a supporting means for holding all the fixed parts in their proper relation. A^1, A^2 are supporting brackets projecting upwardly from the base A. Projecting upwardly from these brackets are inwardly curved extensions A^3, A^4 which support guide blocks A^5, A^6. Forwardly projecting from these guide blocks are spring guide bars A^7, A^8 carried by these guide blocks. It will be noted that there is a narrow passage between these guide bars A^7, A^8 extending into the interior of the machine. A^9, A^{10} are cover plates overlying the guide members A^{11}, A^{12} and slidable on these guide members and held in position by the cover plates A^9, A^{10} are two puckering jaw carriages A^{13}, A^{14}. These puckering jaw carriages are separated one from the other as are the cover plates A^9, A^{10} to form a continuation of the passage between the guide fingers.

B is an oblong curved end pocket at the inner end of the passage bounded partially by the cover plates A^9, A^{10} and partially by the bag holding plates B^1, B^2. It will be noted that the cover plates B^1, B^2 and the forward curved or quadricircular ends of the puckering jaws A^{13}, A^{14} are grooved at B^5, B^6 and B^3, B^4, respectively, so that when

the parts are brought together in the position shown in Fig. 7 the aperture B is reduced to a circular aperture having slots or grooves peripherally arranged about the outer wall thereof. B^7, B^8 are cross heads in the cross head guides B^9, B^{10} on the brackets A^1, A^2. Projecting upwardly from these cross heads are curved arms B^{11}, B^{12} which bend over and are attached to the puckering jaw plates A^{13}, A^{14}. These parts are rigid so that these plates must reciprocate with the cross heads.

C is a bell-crank lever mounted on the bracket C^1 which projects from the base A. C^2 is a spring tending to throw the bell-crank lever in a counter-clockwise direction. C^3 is a link leading from the other end of the bell-crank lever to the cross head B^8. C^4 is a sleeve integral with the latter arm of the bell-crank lever. In it is a cam contacting plunger C^5 outwardly thrust by the spring C^6. C^7 is a cam in engagement with said plunger C^5 mounted on the main drive shaft C^8. This shaft C^8 is rotatable in a bearing C^9 on the bracket C^{10} on the base A. C^{20} is a clutch housing interposed between the shaft and the power source. This housing contains any suitable clutch and throw-off mechanism which when actuated will cause the shaft to rotate once and then stop. This device is not specifically illustrated because it, of course, forms no part of my invention and may be of any suitable well-known type. The shaft C^8 is driven from any suitable source of power not here shown and may be discontinuously connected by any controlling means not here shown.

D is a bracket projecting from the guide blocks A^5. Pivoted in it is a latch lever D^1 which projects across the path of the bag between the guide blocks A^7 A^8 and controls at its other end the link D^2 which leads through any suitable transmission mechanism not here shown to control the clutch in the housing C^{20}, for connecting and disconnecting the shaft C^8 with a suitable source of power. D^3 is a lever pivoted on the base A controlled by an eccentric link D^4 from the eccentric D^5. This lever as shown in Fig. 5 has its effective end in line with but below the level of the guide bars A^7, A^8. It is adapted when rotated by the eccentric to swing up into a slot and feed the bag through the slot and force it into the puckering opening B. This eccentric is driven from the main drive shaft from any suitable means not here specifically shown or illustrated.

E is a wire which is supplied from any suitable source not here indicated which projects into the sliding head E^1 which has a gripper jaw E^2 for gripping and feeding the wire. The head E^1 is slidably mounted on the guide E^3 on the bracket E^4 and is adapted to be reciprocated from any suitable source of power by an arm E^{30} pivoted to a bevel cam E^{31} on C^8, in unison with the operation of the machine and is connected thereto by a link E^5. The jaw E^2 is the ordinary type of one-way clutch jaw which feeds the wire when the jaw is moved forward and releases it when the jaw returns. E^6 is a continuous wire and tie guide made up as shown in Figs. 4 and 8 of a plate E^7, filler plates E^8 and a pair of cover plates E^9 to form a channel oblong in cross section with an opening in one side. This guide extends but not continuously from the effective forward limit of the wire feeding jaw to the puckering jaw B^2.

F, F^1 are wire bending heads each of them rotatably mounted in the bracket F^2 and carrying the meshed pinions F^3, F^4 one of which is in mesh with a segmental gear F^5 rotatable on the shaft F^6 adapted to be driven by the arm F^7 which arm is in engagement with the cam F^8 on the drive shaft C^8. Each of these rotating wire bending heads has a central pin F^9 and a bending pin F^{10} to one side thereof there being sufficient space between the two pins to permit passage of the wire. These twisting heads are, of course, right in line with the effective wire carrying portion of the guide E^6 and mounted for reciprocation so that when they have bent the wire tie they may be withdrawn therefrom to permit its passage down toward the puckering jaws.

G is a spring mounted in the bracket F^2 which tends normally to thrust each of the twisting heads toward the left. G^1, G^1 are pressure buttons on the ends of the shaft carrying said twisting head and G^2 is a yoke engaging the said buttons. This arm is carried by the bell-crank lever G^3. The set-screw G^4 is mounted in the bell-crank lever G^3 and projects toward the lug G^9 on the sleeve G^{10}. The sleeve G^{10} is connected to the knife block G^{11} in which is adjustably mounted the knife G^{12} in opposition to a knife G^{13}. The knife G^{13} is adjustably mounted in the bracket G^{14} so that when the sleeve G^{10} is reciprocated against the pressure of the spring G by means of the cam G^5 on the shaft C^8 engaging the button G^6 on the opposed end of the bell-crank lever the two knives operate to exert the cutting movement.

H is a bracket projecting from the clutch head H^1 securing one end of a rod H^{20}. H^2 is a wire tie head carried on the end of said rod H^{20}. This head carries the latch H^3 which projects into the wire guide E^6 and is held thereagainst by the spring H^4. It is limited in its rotary movement with respect to the head in engagement with the head H^6. On the front end of the latch H^3 and slightly removed from its outer edge is a catch H^7. The bounded portion of the latch is adapted to engage and push the

wire tie through the guide slot but after the latch gets beyond the end of the slot the wire which by that time has been pushed around the bag as it lies in the puckering jaw will spring out being no longer held by the guide and will then be further pushed by the front end of the latch where it engages it and the part H⁷ which part prevents the wire tie coming too far along the wire latch.

I is a tie twisting or bag-tying head. It consists of a shaft as indicated, rotatably mounted on the bearing I¹ having at its rear end a wheel I² driven by the sprocket chain I³ which is driven by the main driving shaft in any suitable means not here shown. The head I has two tie engaging jaws. The lower one I⁵ is fixed on the shaft, the upper one I⁶ is carried on the pivoted arm I⁷. This arm I⁷ has a contact pin I⁸ at its rear end and in engagement with this pin I⁸ is a wedge I⁹ adapted to be thrust forward against the spring I¹⁰ contained within the bearing I²⁰ in the sliding sleeve I¹¹. I¹² is a bell-crank lever having an engagement ball I¹³ in engagement with the sleeve I¹¹ at one end and a pin I¹⁴ in engagement with the cam I¹⁵ at the other end on the shaft C⁸ so that a rotation of that shaft will result in drawing the edge I⁹ away from the pin or ball I⁸ permitting the spring I¹⁰ to spread the two jaws open in the position which they normally occupy except when engaging the twisting tie.

It will be evident that while I have shown in my drawings an operative device, still many changes might be made both in size, shape and arrangement of parts without departing from the spirit of my invention and I wish, therefore, that my drawings be regarded as in a sense diagrammatic.

The use and operation of my invention are as follows:—

The operator stands adjacent the bag guide forks and feeds each individual bag separately and successively toward the machine between these two forks. As he feeds the bag in, the latch arm is moved by the bag to the dotted position shown and as soon as a bag has passed on beyond the end of the latch arm it snaps back to the position shown in full lines. This operates the clutch and throws on the power. The feed finger or arm then carries the bag forward into and between the puckering jaws feeding it from the guide member into these jaws. It will be noted that in the position shown the jaws are open and there is a substantially parabolic hole in which the bag is found. The sliding jaw then approaches the first jaw until the bag is compressed or puckered, the parts assuming substantially the position shown in Fig. 7 the bag being held then in a round hole or opening. Meanwhile the wire feeding mechanism will have fed out a length of wire to the cutting knife and this length of wire stopping as it does just short of the cutting knife and passing through the first twisting head, will be twisted into the shape shown at the right-hand end of Fig. 10. The partially formed tie thus resulting will then be fed on the proper distance. It will then be cut off from the wire and on the first movement of the two twisting heads, for they operate simultaneously, the rear end of the cut-off piece of wire will be bent into the shape shown in Fig. 10, the front end of the next piece of wire bent to the shape shown in the left-hand end of Fig. 10. This tie blank is then fed on through the passage shown in Fig. 8 along the path as indicated in Fig. 7 around the puckered bag through the slots in the puckered jaws until the front or stub end of the tie comes in contact with the anvil or stop as shown in Fig. 7, thus the tie blank infolds the puckered neck of the bag and has its two ends crossed adjacent the bag. The twisting fingers or jaws illustrated in Fig. 3, being operated by the cam arrangement there shown, then grip the two crossed ends of the tie and upon their rotation twist these two ends together to tighten the tie on the puckered bag.

It will be noted that the bag as it passes through the machine is first fed by the operator to the feeding point. It is then fed into the puckering jaw by one movement, the puckering jaw is then contracted to pucker the bag by another movement and the bag is later released by the withdrawal movement of the puckering jaw, thus there are three movements effecting the position of the bag. During this time, however, a large number of movements take place effecting the wire tie. Starting with the wire end which terminates at the cutting knife the first movement is the bending of the front end of the blank, the second movement the feeding forward of the wire, the third movement its cutting off, the fourth movement the bending of the rear end of the wire which is simultaneous with the bending of the front end of the following wire, the fifth movement the feeding forward of the wire blank and its threading or encircling about the puckered neck of the bag, and the sixth movement the gripping and twisting of the crossed ends of the blank to tighten it upon the neck of the bag. It will be noted that there are thus three bag movements and six wire movements, but those six wire movements are arranged in a series so that two movements are always simultaneous, in other words, the first and fourth bending movements occur at one time then they are followed by the second and fifth feeding movements and then the third and sixth cutting off and twisting movements. Thus for each bag movement there are two

simultaneous wire movements, and thus there is always one bag in the machine being acted upon by two bag ties in the machine, and thus the timing of the different movements is comparatively simple. This timing is perfected by the cam arrangement driven from the single drive shaft, as indicated in the specification, and it is thought that no further discussion of these mechanical movements is here needed.

For the sake of convenience it will be noted that the wire is cut off and a blank bag tie formed all before the wire is fed and bent about the puckered part of the bag, though it is quite obvious that these steps might be omitted in my process and that the wire might be fed direct around the bag either by pushing from behind as indicated or by any other suitable means so long as the ultimate result is a loop which encircles the neck of the bag and which may then be tightened by twisting or otherwise compressing it about the bag to tie it.

I claim:

1. In a bag tying machine, means for puckering the open mouth of a bag, means for feeding out a wire and forming a head thereon, means for feeding out and cutting off the wire and forming a head on the other end thereof, means for feeding the blank thus formed to and around the puckered mouth of the bag crossing said ends and twisting them one on the other to tighten them on the bag.

2. In a bag tying machine, means for puckering the open mouth of a bag, means for feeding out a wire and forming a head thereon, means for feeding out and cutting off the wire and forming a head on the other end thereof, means for feeding the blank thus formed to and around the puckered mouth of the bag, and twisting the two ends of the blank one on the other to tighten the tie on the bag.

3. In a bag tying machine, means for puckering the neck of the bag, operating means for feeding wire, cutting it off, forming it, feeding it around the puckered neck of the bag and twisting it to tighten it, all by successive steps.

4. In a bag tying machine, a guide, means for puckering the neck of the bag, operating means for feeding wire, cutting it off, forming it, feeding it around the puckered neck of the bag and twisting it to tighten it, all by successive steps, and guiding means.

5. In a bag tying machine, a guide, means for puckering the neck of the bag, operating means for feeding wire, cutting it off, forming it, feeding it around the puckered neck of the bag and twisting it to tighten it, all by successive steps, and driving means, and means responsive to the passage of the bag along the guide for connecting said driving means with the operating means.

6. In a bag tying machine, a guide, means for puckering the neck of the bag, operating means for feeding wire, cutting it off, forming it, feeding it around the puckered neck of the bag and twisting it to tighten it, all by successive steps, and driving means, and means responsive to the passage of the bag along the guide for connecting said driving means with the operating means, and automatic means for disconnecting them after each successive step.

7. In a bag tying machine, means for puckering the neck of the bag, operating means for feeding wire, cutting it off, forming it, feeding it around the puckered neck of the bag and twisting it to tighten it all by successive steps, the bag puckering means comprising a guide means for positively feeding the bag on the guide and a pocket in which the bag is fed from the guide, and means for compressing the bag into said pocket to complete the puckering act.

8. In a bag tying machine, means for puckering the neck of the bag, said means comprising two parallel guides and an open pocket, means for positively feeding the bag along between the guides into the pocket and there compressing the neck of the bag to pucker it.

9. In a bag tying machine, means for puckering the neck of the bag, operating means for feeding wire, cutting it off, forming it, feeding it around the puckered neck of the bag and twisting it to tighten it all by successive steps, the bag puckering means comprising a guide means for positively feeding the bag on the guide, and a pocket in which the bag is fed from the guide and means for compressing into said pocket to complete the puckering act, a power source driving means interposed between the power source and all the operating mechanisms, and means responsive to the passing of the bag for said driving means and the operating mechanisms.

In testimony whereof, I affix my signature in the presence of two witnesses this 23rd day of December, 1914.

REGINALD R. MILLER.

Witnesses:
BESSIE S. RICE,
MINNIE M. LINDENAU.